

# SEALS

Category  
SUBORDER

**Classification:** A suborder of the order Carnivora; the "aquatic predators", as compared to "terrestrial predators". The suborder comprises two superfamilies, with a total of three families, 19 genera, and 34 species.

## Superfamily Otarioidea

Family Otariidae (sea lions and fur seals)

Family Odobenidae (walrus)

## Superfamily Phocidea

Family Phocidae (earless seals)

## EARED SEALS (6 genera with 14 species)

**Body length:** 4.5-9.6 ft; 1.4-3 m

**Weight:** 110-2200 lb; 50-1000 kg

**Distinguishing features:** Considerable differences in size and weight between males and females; not completely developed external ears; well-developed front and strongly-developed back flippers, thus they are quite mobile on land (the body is lifted from the ground); propulsion in water is achieved by means of a rowing motion of the front flippers; testes in a scrotum.

**Reproduction:** Gestation (with a long fetal dormancy) of up to one year; one young per birth; birthweight, to the extent that it is known, 11-44 lb (5-20 kg).

**Life cycle:** Weaning at 4-12 months; sexual maturity at 3-7 years, social maturity not until later; lifespan 17-25 years, to the extent known.

**Food:** Chiefly fish and squid.

**Habit and habitat:** Males are polygamous; dominant bulls are owners of harems on land during the breeding season, and they defend their territories on sandy or rocky coasts.

## WALRUSES (1 genus with 1 species)

**Body length:** Males up to 13 ft (4 m); females up to 8.3 ft (2.6 m).

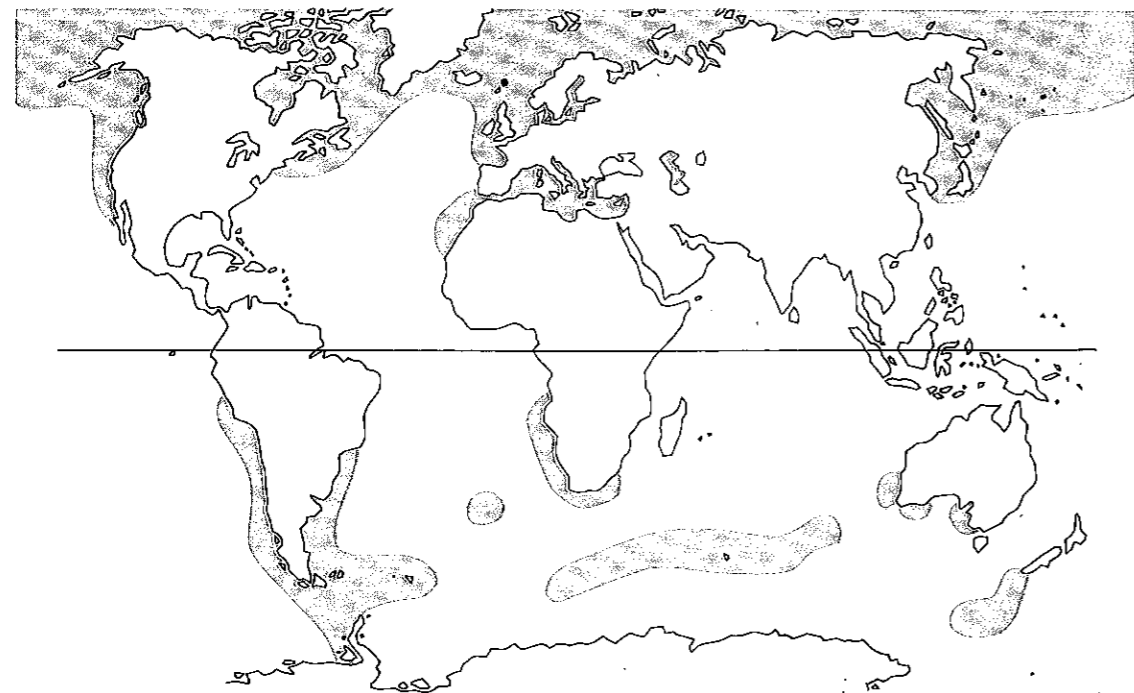
**Distinguishing features:** Small head with small eyes; lacks of external ears; elongated, fanglike upper canines, larger among the males than among the females; "beard" made of stiff bristles; folded, wrinkled skin; pharyngeal pockets that can be closed serve as buoyancy chambers and resonating chambers.

**Reproduction:** Twelve month gestation (with 3 month fetal dormancy); one young per birth; birthweight 110-132 lb (50-60 kg).

**Life cycle:** Weaning probably at two years; sexual maturity at 6-8 years; lifespan, 40 years.

**Food:** Chiefly invertebrates and echinoderms.

**Habit and habitat:** Social, and gregarious; the sexes live apart some of the time; during the breeding season, a group of females lives with one adult bull; great migrations in shallow Arctic waters.



## Pinnipedia

Pinnipèdes FRENCH

Robben GERMAN

## EARLESS SEALS

(12 genera with 19 species)

**Body length:** 3.7-16 ft; 1.2-5 m

**Weight:** About 110-8800 lb; 50-4000 kg

**Distinguishing features:** External ears are absent, rear limbs cannot be tucked under the body, so their locomotion on land is clumsy; locomotion in water chiefly due to rowing motion of the rear limbs; no scrotum; females of

most species have only two teats.

**Reproduction:** Gestation (with long fetal dormancy) averages 11 months; generally one young per birth; birthweight about 6.6-88 lb (3-40 kg).

**Life cycle:** Weaning at 12 days to 7 weeks; sexual maturity 2-7 years; social maturity, in many cases, several years later; lifespan about 14-46 years.

**Food:** Chiefly fish and squid, but also crabs and other invertebrates; leopard seals even eat other seals and penguins.

**Habit and habitat:** Widely varied social behavior; solitary, monogamous, or polygamous; some species form harems and are territorial; habitats vary widely (sandbanks, tital flats, rocky coasts, pack ice, and solid ice).

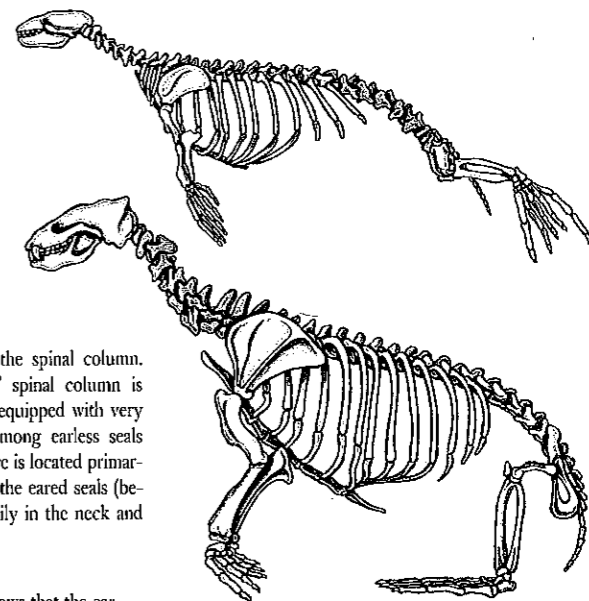
## Fur

Among the seals, adaptation to aquatic life is not as far advanced as it is among the whales or the sea-cows. This statement is supported by the fact that among all seals, the fur is still present, and it is in various stages of reversion. Among most seals, (haired seals) the woolly hair is in reversion; among others (fur seals), it forms a dense, protective undercoat (see illustration).



## Skeleton

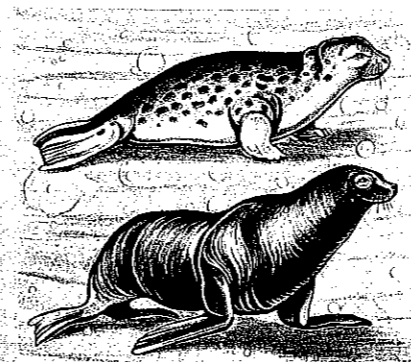
From the skeletons of seals, it is possible to see the clearly defined front limbs as well as the hind limbs. The coccyx is markedly shortened, because in contrast to the whales or the sea-cows, no tail fin is formed. Swimming motions originate in the arms, the extended "legs", and the snake-like motions of the spinal column. Accordingly, the seals' spinal column is quite mobile, and it is equipped with very strong musculature. Among earless seals (above), this musculature is located primarily in the loins; among the eared seals (below), it is found primarily in the neck and the front of the chest.



## External Features

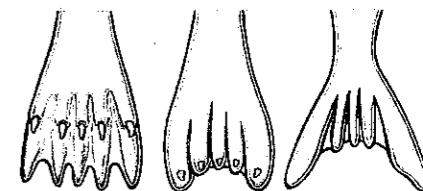
The shape of the earless seals (above) and the eared seals (below) clearly shows that the earless seals have undergone great evolutionary changes, diverging away from the land mammals, and being more closely allied in form to lower forms of aquatic life. Their external have not developed; their front limbs have evolved into short flippers; and their hind limbs have

extended rearward, and are unsuited for locomotion on land. Among the eared seals, on the other hand, small, external ears are still present, the relatively long limbs, including the hind limbs, can be tucked under the rump in such a way that they are turned toward the front, and they are well-suited for locomotion on land.



## Rear Limbs

The hind feet of the seals have been transformed into rudders. On the (from left to right) sea lion, seal, elephant seal, the toes on either side are elongated and strengthened.





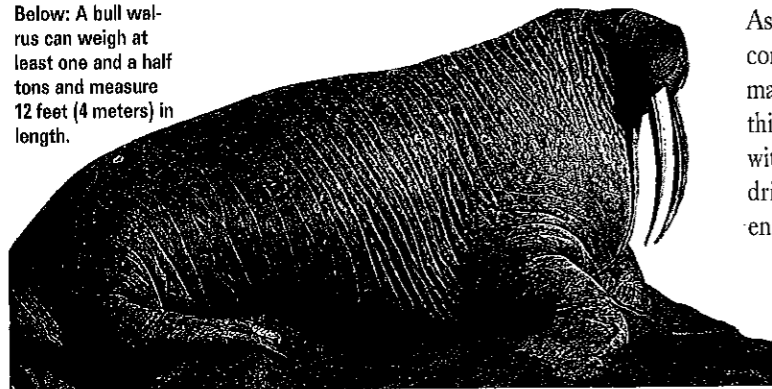
there appears to be some justification for classifying both as separate varieties, (*A. a. australis* on the mainland, *A. a. gracilis* on the Falkland Islands). Bulls attain an average length of 6 ft (1.9 m), and a weight of 348 lb (158 kg); cows measure 4.5 ft (1.4 m), and weigh scarcely 110 lb (50 kg). The coats of the males are gray-black in color, and they have longer hair on the neck and shoulders. Females are usually gray on the upper portion of their bodies.

Although one must assume that these seals do not participate in any regular migrations, it is known with regard to those animals from Uruguay that they go ashore all year round. It is probable that they take advantage of the continental shelf in their quest for food. Studies of stomach contents show that the South American fur seal lives on fish, squid, mussels, and snails.

Adult bulls occupy their territories from November onwards, and they defend them until the end of the breeding season in January. The females are not kept within these territories in the sense of a harem with clearly defined boundaries, even though they outnumber the males. Bulls without territories usually gather at the seaward side of the breeding colonies. Newborn pups weigh between 6.5 and 11 lb (3 and 5 kg). The females mate, just as the other fur seals probably do, shortly after delivery. Duration of suckling and delayed implantation of the fertilized ovum probably take as much time in this case as they do in the case of the other fur seals. Fights for coastal territory between this fur seal and the decidedly more powerful South American sea lion hardly ever occur, because the fur seal prefers rocky bottoms, and the sea lion prefers sandy shores.

Walrus possess a massive skull, the facial portions of which are dominated by the sockets for the fanglike canines.

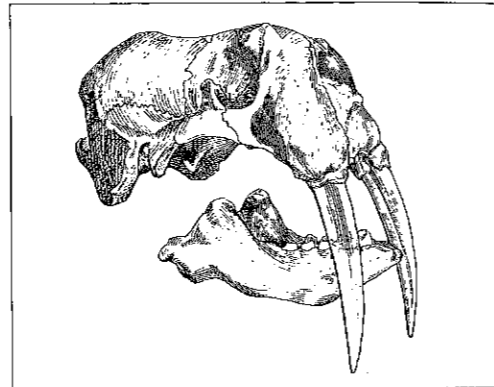
Below: A bull walrus can weigh at least one and a half tons and measure 12 feet (4 meters) in length.



### Walrus (Family Odobenidae)

The family of the walrus (Odobenidae) is more closely related to the eared seals than to the earless seals. For this reason, eared seals and walrus are included in the superfamily group Otarioidae.

WALRUSES (*Odobenus rosmarus*) – the family consists of just this one species – are the seals with the second greatest physical measurements after the elephant seals. It is said that old bull walrus measure over 13 ft (4 m) in length, weigh over 3520 lb (1600 kg), and measure 9 ft (3 m) across. Female walrus attain lengths of 8 ft (2.6 m), and weigh 2750 lb (1250 kg). These measurements apply only to the Pacific walrus; the Atlantic ani-



mals are somewhat smaller and lighter. The well-known external appearance of the walrus is the result of a head that is small in relation to its body, small eyes, and the lack of external ears, as well as the many folds and wrinkles in the skin. These folds and wrinkles can achieve a thickness of 2 in. (5 cm) or more on the neck or shoulders of a male. A layer of blubber measuring approximately 3 in. (7 cm) lies beneath the skin.

As a walrus increases in age, its fur covering becomes increasingly sparse. Whereas young animals and half-grown ones still exhibit a complete, thick coat, the adult walrus is more often covered with a thin coat that is bare in places. Erna Mohr drives the point home, however, that one can also encounter young animals with sparse coats, and



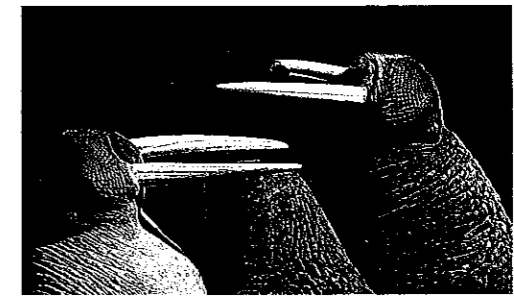
old bulls with thick ones. In each case, the shedding condition must be taken into account. An exception to the sparse coat of adult walrus is found in the stiff beard bristles that are so characteristic of the facial expression of the walrus. These bristles may be as long as 12 in. (30 cm). The long "beard" with which we are familiar in the case of zoo animals, is found less frequently among animals living in the wild, although even among wild walrus, some individual animals may have short bristles, while others will have long ones.

Due to the fact that the bristles serve to help with food location at the bottom, they are always worn away under natural living conditions. These bristles are replaced with each shedding season, however. Among adult males, shedding occurs in June and July, among the females, somewhat later, evidently. During this period, the animals do not like to go into the water, and it is claimed that they experience a great need to sleep in connection with the shedding period. Young animals are darker than old animals, not only as a result of their full coat, but also because their skin is darker. In other respects, the impression of color these animals make varies considerably in conjunction with the degree of circulation their skins are subject to; as temperatures increase, so does the amount of blood flowing through the skin. Thus, in the Summer, the animals present the well-known aspect of pink bodies lying one right next to the other – a shade that is often, and mistakenly, construed to be the result of sunburn.

The seals' hands and feet, and thus those of the walrus as well, have been transformed into flippers, and they are larger than the corresponding appendages in terrestrial animals. The individual fingers and toes are not free, but rather are connected to one another by webbing for swimming. The walrus' flippers resemble those of the eared seals; they are relatively short. The arms are free below the elbows. The index finger is somewhat longer than the rest, which gradually decrease in length down to the fifth finger. The rear limbs are

clad in the body's skin down to the heel. The first and fifth toes are somewhat longer than the rest, but they nevertheless bear well-developed claws. For propulsion in the water, the greatest importance is placed upon the alternative motion of the rear flippers; the primary function of the front flippers is guiding the motion. As a result of the great weight of the body, motion on land is naturally quite difficult; in principle, and with regard to their placement, the limbs, are like those of the eared seals. In this case, it is particularly important that the foot can be placed laterally next to the body, as it can among the eared seals at the upper elastic joint. The body drags along the ground between the supporting limbs. Despite their great weight, the animals are capable of amazing feats of locomotion, which becomes apparent when a particularly desirable, but not readily available spot within a colony must be reached. It should also be pointed out that walrus lack an external tail; it is enclosed in a small fold of skin.

An unmistakable feature of the walrus are the fanglike, extended upper canines, whose mighty sockets influence the form of the entire skull.



These are open-rooted teeth that grow as long as the animal lives. They reach greater length and attain greater weight among the bulls than they do among the cows. It is said that in exceptional cases, the fangs can grow to be 3 ft (1 m) in length, but as a general rule, they remain under 20 in. (50 cm) in length. Among yearlings, the fangs measure approximately 1 in. (2.5 cm), and among two-year-olds, they are 4 in. (10 cm). The thin enamel sheath is soon lost as a result of abra-

The walrus are without a doubt among the strangest animals in the world. Atop the amorphous, heavy body, there sits a head that appears to be tiny, with small eyes and extended, fang-like canines.

▷ The canines are used in disagreements, and they are a mark of rank. Animals with long fangs are superior to fellow walrus with shorter ones.

▷▷ A young walrus that has no fangs as yet.

▷▷▷ Walrus are quite social, not only on land, but also in the water.



sion. Given such a conspicuous feature as these teeth, there is an immediate question as to their function. Quite obviously, there is no connection between these fangs and the acquisition of food. The immediate assumption that they were used to dig up food could not only not be proven; it was wrong. One gains a better understanding of the function of these teeth by looking to the behavior of these animals instead. The fangs are used in inter-necine struggles, and, as one can easily see, they are very well suited to inflicting deep, bloody wounds on an opponent. It has even been demonstrated that those bulls within a herd that have the longest fangs are the most aggressive, and the most successful in conflicts. The length of the fangs evidently has some bearing on the bulls' position within the hierarchy of the herd.



Even long, pointy fangs do not deter walrus from seeking extremely intimate physical contact.

The walrus owes it to these fangs, whose ivory is much sought after for carving, that they have been ruthlessly hunted since time immemorial. More will be said on this point later. A particular feature of the secondary dentine (dental material that is deposited along the walls of the pulp cavity in the tooth) makes it easy for an expert to identify walrus ivory as such.

The other teeth are not particularly remarkable. The milk teeth fall out shortly after birth, but it is also reported that the milk teeth revert even prior to birth. At any rate, not all the milk teeth are replaced in the permanent set of teeth. In each half of the upper jaw, we usually find an incisor and three molars, and three molars in each half of the

lower jaw. These teeth are also equipped with nothing more than a thin enamel surface, and for a certain period of time, they have open roots. In other respects, where dentition is concerned, walrus exhibit a certain amount of individuality — a sure sign that no particular emphasis is placed on dentition in the matter of food acquisition.

An unusual feature of their physical structure must still be mentioned. These are the pharyngeal pockets that open on either side of the esophagus. The openings can be closed by muscles, and the walls of these pockets are rich in elastic, fibrous material. These pharyngeal pockets can hold up to 13 gal (50 l) of air, and they stretch to the rear between the throat muscles to the height of the shoulder blade, or even beyond. When filled with air, they can provide buoyancy to the animals, which sleep in an upright position. Another, possibly even more important, role is that of a resonance chamber and amplifier for the call they produce during the mating season, a call that resembles the ringing of a bell.

Their preferred diet consists of lower animal forms that live on the surface of the bottom or in the soil that comprises the bottom, creatures such as mussels, snails, echinoderms, and crabs. Besides these creatures, walrus stomachs have been known to contain fish, whale flesh, and the flesh of other seals. It is said that they pursue the young of the white whale, and there appears to be good reason for other seals to leave the vicinity of walrus as rapidly as possible. The latter are capable of pressing down on the former with their front flippers and tearing their bodies to pieces with their tusks. Such a diet remains the exception when compared with their principal food, the invertebrates. It has remained a mystery to this day how the walrus manage to remove the soft bodies of mussels and snails from the shells, but the fact remains that such shells are only rarely found in walrus stomachs in relation to the vast quantities of invertebrates consumed. It has been observed that walrus have cracked mollusk shells between their flippers, then eaten the soft parts. Their enormous



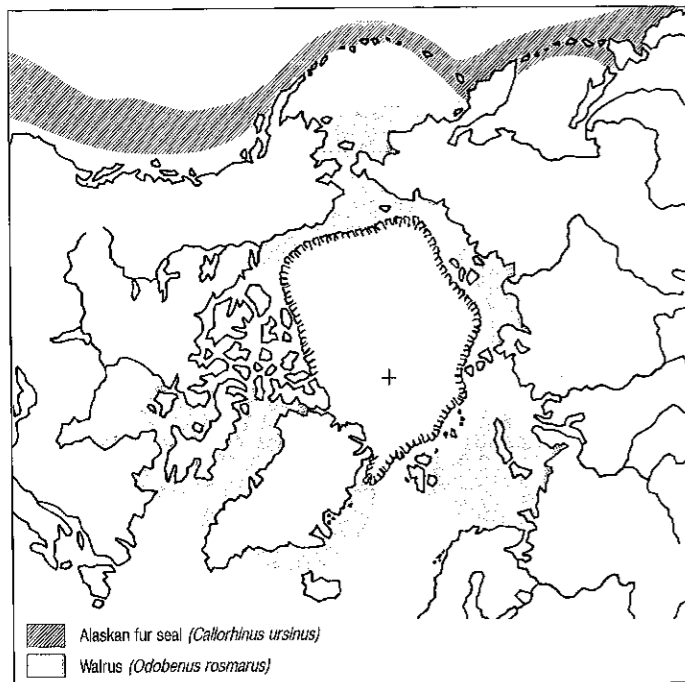
On the beach of Round Island, Bristol Bay, a large walrus colony huddles close together. This picture, which was taken in Summer, shows the walrus with good circulation to their skins.



Nomenclature English common name Scientific name French German	Approximate size Body length Weight	Distinguishing Features	Reproduction Gestation Young per birth Weight at birth
South American fur seal <i>Arctophalus australis</i> , 2 varieties Otarie à fourrure australe Südamerikanischer Seebär	Males 6 ft, 1.9 m Females 4.5 ft, 1.4 m m About 352 lb, 160 kg f About 110 lb, 50 kg	Sexual dimorphism	Almost 1 year (with ovum dormancy) 1 About 11 lb, 5 kg
Walrus <i>Odobenus rosmarus</i> Morse Walruß	m Up to 12.8 ft, 4 m f Up to 8.3 ft, 2.6 m (Pacific) m Up to 3520 lb, 1600 kg f Up to 2750 lb, 1250 kg (Pacific)	Fanglike elongated canines; conspicuous beard of stiff bristles; no external ears	12 months (ovum dormancy 3 months) 1 110-132 lb, 50-60 kg

sucking power surely plays an enormous role in this connection; evidently, by creating strong suction, they are able to separate the soft body from the shell. Shells that have been dealt with in this manner are frequently found in the vicinity of breathing holes.

Signs of wear on the anterior surface of the tusks and on corresponding parts of the beard have led to the conclusion that walrus stand nearly perpendicular to the seabed, and move in the same manner. Walrus prefer shallow waters for hunting, and it seems that they will not dive for food beyond a depth of approximately 240 ft (75 m).



Naturally, these dietary habits influence their range and their migratory habits as well.

Walrus are quite social creatures that are always found in larger or smaller groups, yet males and females live the greater part of the year separated from one another. They seem to be particularly fond of physical contact. Even when there is plenty of room on land, they lie next to, or on top of each other, often resting their tusks on a neighbor. The spot in the middle of a group is always the one most sought after, because this is the point of greatest contact with one's neighbors.

Sexual maturity usually occurs in females between the ages of six and seven years, and in males between the ages of eight and ten years. It is not until several more years have passed that the young bulls will be able to compete with older bulls. Breeding season, at least in the case of the Pacific walrus, extends from January through April. The females that are ready to mate gather on one side, somewhat removed from the pregnant cows, and each group will be accompanied by an adult bull, who stakes out his claim to the females, and, if necessary, defends it in a peculiar way, specifically by voice. The bell-like tones that were already alluded to are among the sounds they produce. These sounds are produced beneath the surface of the water. The group of females and the bull that belongs to it, remain together if the group should migrate; young bulls without mates stay on the periphery of the group and exhibit no sexual behavior. To date, neither mating nor a birth have been observed; it is assumed that both occur under water.



Life Cycle Weaning Sexual maturity Life span	Food	Enemies	Habit and Habitat	Occurrence
After 1 year Males 7 years; females probably 3 years Unknown	Fish; also invertebrates (squid, crabs, mussels)	Sharks, killer whales	Males polygamous and territorial; harems loosely organized; rocky soil preferred	Not threatened
Probably not before 2 years Males from 8 years; females from 6 years 40 years	Chiefly invertebrates, especially echinoderms	None	Social, polygamous, with temporary separation of the sexes; lives in shallow waters of Arctic, if possible, with ice floes	Eastern Atlantic population is threatened

It must be granted that as far as familial life is concerned, contradictory tasks are performed. There are, for example, researchers who assume that walrus are largely monogamous (Erna Mohr). Alwin Pedersen, who relies on the observations of the Eskimos, finds that mating takes place in Smith Sound in April. The fact that newborns are observed in April may play a part in the formulation of this view; given a gestation of approximately 12 months, the result is the indicated mating season. Evidently, the development of the ovum after fertilization continues to a stage that consists of just a relatively few cells, then there is a dormancy period that lasts for just barely four months. This phenomenon of the so-called delayed implantation (imbedding in the lining of the uterus) is known among many mammals, and in this instance, it results in a delay of continued development until June; this development requires an additional eleven months. This timetable requires that the females mate in the year following their pregnancies at the earliest, that is, it means that at the most, they can have another calf every second year. Approximately 80 percent of the females produce offspring every second year; 15 percent give birth only every third year. The suckling period can take as long as two years, a period that includes a long weaning period. The mother devotes a great deal of attention to the newborn, protecting it between her front flippers under her body. There are data concerning the youngster's measurements after birth which indicate a length of somewhat more than 4 in. (1.4 m) and a weight ranging between 88 and 132 lb (40

and 60 kg). Embryonic hair is lost three months prior to birth, and the newborns have a grayish coat that soon turns brownish. At the age of two months, the coat is changed again, after which the young animals follow the annual rhythm of change of coat, just as in the adults. These animals can reach an age of 40 years.

The way walrus eat is of primary importance in determining their distribution. They are con-



Walrus prefer waters near the coast with ice floes. They like to use large blocks of ice as resting places.

signed to the shallower regions near the coasts of Arctic waterways, and here they prefer areas with ice floes, which makes it possible for them to reach "solid" ground any time they like. Because walrus occur in both the North Atlantic and the North Pacific, that is, all around the North Pole, it is customary to speak of their circumpolar distribution. In keeping with this distribution, science distinguishes two varieties of walrus: the ATLANTIC WALRUS (*Odobenus rosmarus rosmarus*) and the PACIFIC WALRUS (*Odobenus rosmarus divergens*). Many of the distinguishing characteristics of both varieties that have been described upon examination of skulls, have, upon closer scrutiny of the degree of



variation within these characteristics themselves, proven to be of little or no value. Therefore, the only statement that will be made herein is that the Pacific walrus is larger than the Atlantic walrus, and that the skull of the Pacific walrus is broader (in relation to the back of the skull) at the height of the fangs. The walruses of the Laptev Sea, which were sometimes described as a third variety (*Odobenus rosmarus laptevi*), are now generally considered to belong to the Pacific variety; in terms of size, they lie somewhere between the Atlantic and Pacific varieties.

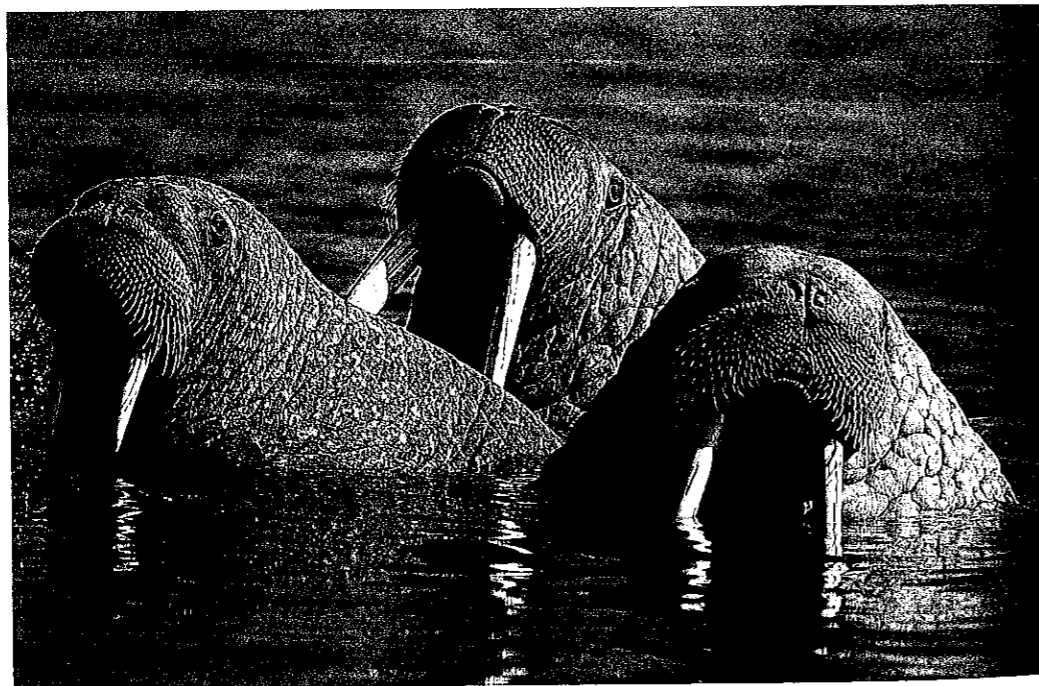
Both varieties consist of populations that are geographically separated from one another. Besides the population of the Laptev Sea, the Pacific walrus includes the animals in the Bering Sea and the Chukchen Sea, which includes the majority of this variety, and indeed, of the species itself. According to recent data, this population is estimated to be more than 140,000 animals, whereas data

from 30 years ago concerning the Laptev Sea population put the figure at 3000, but recent estimates range from 4000 to 5000 animals. In the Summer, the preponderance of the main branch of the Pacific walrus population stays North of the Bering Strait in the Chukchen Sea, the Beaufort Sea, or the Eastern Siberian Sea; several thousand bulls remain South of the Bering Strait, even in Summer, however, and they go onto land on the islands of Bristol Bay, or the Gulf of Anadyr. In Winter, the animals are found in the Bering Sea, with heaviest concentrations in and near Bristol Bay and in areas near the middle of the Bering Sea, South of St. Lawrence Island. The animals follow the ice on its southward advance, and they live along the boundary of the pack ice, where there are enough openings in the ice to permit them to breathe as they remain in the water; however, they can also break through thinner ice with their heads.



(Above) When seen from the side, two typical features of the walrus head become apparent: the small eyes, and the long "stubbly beard", which serves to find food on the bottom.

(Right) Here one can also see that walruses have no ear lobes. In addition, it can be seen clearly that the beard bristles among animals living in the wild are worn down in the search for food.



# Alaskan Fur Seal

by Bernhard Grzimek

Only a few of the 1.7 million Alaskan fur seals now living on Earth pass the Pribilof Islands in the Summer on their way North. There are smaller breeding sites on two islands off the Soviet island Kamchatka, and on Seal Island in the Soviet Sea of Okhotsk. Recently, the fur seals have been breeding once again on San Miguel Island off California and on the Kurile Islands North of Japan. Most of these stately animals breed on the small Pribilof Islands.

The ALASKAN FUR SEAL (*Callorhinus ursinus*) likes water at 46–54° F (8–12 °C). It has approximately 200,000 hairs on each square inch of skin. This heavy fur is completely impermeable to water, and the thick layer of fat beneath also helps to maintain the 100° F (38 °C) body temperature in the cold water. When the animals lie on land in the Sun in summer, they pant and fan themselves with their flippers to cool off. Whereas the Steller's sea lions, which weigh three to four times as much, often come ashore to sleep, fur seals remain in the water all year round, even during the reproductive season. They dive to depths of up to 173 ft (54 m), and can swim at speeds of 16 miles per hour (27 kilometers per hour).

In October and November, the old females are the first to migrate South, either alone or in small groups that are usually 30–60 mi (50–100 km) off the coast of North America or Japan. They swim as far as southern California to the area around San Diego. Most of the males winter on the Aleutian Islands or in the Gulf of Alaska. Their diet consists of 30 different species of marine creatures, including anchovies, cod, herring, shellfish, and squid; they often hunt at night and sleep during the day. A female 5 ft (1.5 m) long, weighs 88–132 lb (40–60 kg), whereas the males are almost 7 ft (2.1 m) long and weigh 600 lb (275 kg)

or more. They range from black to light brown in color, but when lying along the coast they usually appear a uniform yellow-brown, being covered by dirt and manure.

Like the salmon, they always return to their birth-place. At the beginning of May, the old, adult males reach the Pribilofs. The adult females and the older bachelors do not return until June; the two-year-olds return in July; and some of the yearlings do not return until the end of August or September. More than half of the yearlings even



Strict customs are the rule among the Alaskan fur seals: the mother suckles only her own offspring, which she learns to recognize by scent and voice. The two youngsters in the background have no chance of success. They must await the arrival of their own mother.

remain at sea throughout this second Summer of their lives. Once the adult bulls have landed along the coast, they do not eat or drink for at least two months, and according to some reports, not until September. The coastal potentates bark or bellow like steers. Each one fights for his own territory as close as possible to the shore with a good view of the arriving females, each of whom joins a bull. In this way, the "old men" gather more than 100 cows around them, but they do not form a harem in the customary sense, because the females leaving the sea go to other bulls as well, or in some cases mate with them as they cross their ter-