**Hydrodamalis Retzius, 1794**

*Hydrodamalis* Retzius, 1794:292. Type species *Manati gigas* Zimmermann.

*Rhytina* Illiger, 1811:64. Type species as above.

*Neophoca* Fischer von Waldheim, 1814:641. Type species as above.

*Stellerus* Desmarest, 1822:510.

**CONTEXT AND CONTENT.** Order Sirenia, Family Dugongidae, Subfamily Hydrodamalinae. There is one late Pliocene species and one extinct Pleistocene-Recent species in the genus.

**Hydrodamalis gigas (Zimmermann, 1780)**

Steller’s Sea Cow

*Manati gigas* Zimmermann, 1780:416. Type locality Bering Island, Commander Islands, Bering Sea.

*Trichechus manatus* var. *borealis* Gaillain, 1788:61. Type locality as above.

*Manati balaenurus* Boddaert, 1785:173, see above.

*Hydrodamalis Steller* Retzius, 1794:292, see above.

*Stelleris* Desmarest, 1822:510, see above.

*Hydrodamalis gigas* Palmer, 1895:449, see above.

(For other synonyms see Domning, 1978.)

**CONTEXT AND CONTENT.** As given above. All diagnoses of above authors are based on the reports of Steller (1751, 1899) as is the following account, unless otherwise stated.

**DIAGNOSIS.** Largest of the Recent sirenians (double the length of any living species); head small relative to body; functional teeth absent; phalanges absent; anterior margin of ascending ramus of mandible forming angle of 90° with body of bone (Fig. 1); fluke horizontal with notch. Skin extremely thick.

**GENERAL CHARACTER.** Total length of an adult female was 7.52 m. The mounted skeleton of a young male in the Zoological Museum, University of Helsinki, measures 5.3 m. Color was brownish-black; some individuals had white patches or streaks. Skin with thick, uneven epidermis. Hair was sparse on body (Brandt, 1871). Stiff, white, hollow bristles were abundant on lips and inner side of flippers. The single pair of mammas was axillary. Nostrils were round, open, and 38 mm apart. Eyes were small, black, round, and situated midway between tip of nose and ear opening. Eyelashes were absent; a functional nictitating membrane was present. Ear opening was minute, and there was no external pinna. Forelimbs were about 67 cm long, and lacked claws or nails. Bones were compact (pachyostotic). Anatomical descriptions were given by Brandt (1833, 1846, 1862a, 1868, 1974), Kaiser (1974), and Steller (1751, 1899). Illustrations appeared in Büchner (1891); Fig. 2, and a reconstruction was made (considered inaccurate by Domning, 1978) by Kleinhardt (1951).

**DISTRIBUTION.** Steller’s sea cow was limited to shallow waters off the Bering and Copper Islands in the Commander Island Group, Bering Sea. A rib was found on Attu, 350 km E of Bering Island (Brandt, 1861). For a detailed discussion see Domning (1978).

**FOSSIL RECORD.** Late Pleistocene fossils of *Hydrodamalis gigas* are known from Monterey Bay, California (Jones, 1967) and from Anachita Island (Whitmore and Gard, 1977). The following account is from Domning (1976). Fossil Hydrodamalinae are known from the middle Miocene to the upper Pleistocene. The earliest recognized hydrodamaline was derived from the halitheres. The hydrodamaline lineage, comprising a single evolving pantropical population, was characterized by size increase, loss of teeth, and loss of phalanges. Changing food resources and habitat, resulting from late Tertiary climatic-cooling and marine transgression on the west coast of North America were probably the principal selective forces in the evolution of new morphological adaptations. See Domning (1978) for a more detailed discussion of hydrodamaline evolution.

**FORM.** Steller’s sea cow has been called the bark animal because of the rough appearance of its skin. According to Steller (1751, 1899) the epidermis and dermis were 25.4 mm and 4.32 mm thick, respectively. They were underlain by up to almost 229 mm of fat. Long (10 to 12.7 cm), stiff, unpigmented bristles were located on the muzzle and short (3.8 cm) interlacing bristles grew between the lips. Skin on the back was almost smooth, whereas that on the sides was very rough, with crater-like borings of ectoparasites in vertical ridges along the body. Haffner (1957) described and figured a sample of skin in the Hamburg Zoological Museum. Domning (1978), however, believed that this description referred to misidentified whale skin. A large sample of skin is on exhibition in the Zoological Institute in Leningrad.

Selected measurements (in mm) are: condylobasal length of skull, 638 to 722 (n = 12); zygomatic width, 324 to 373 (n = 17); length of jaw, 432 to 491 (n = 14) (Heptner, 1974). The premaxilla was large and downturned; nasal basin on top of skull extended past the eye opening; zygomatic arches were heavy, and braincase was small (volume 1975;2 cm³) (Kleinhardt, 1951). Mastication was by keratinized pads, one each in the rostral areas of upper and lower jaws. Masticatory pads were white, 186 mm long, 82 mm broad anteriorly, and boat-shaped. Upper and lower pads had corresponding V-shaped crests and valleys, between which the food was ground. The structure of the pads resembled that of the skin; pads consisted of vertical tightly packed, keratinized, tube-like cylinders 8 to 14 cm tall (Brandt, 1833, 1846, 1974).

Axial skeleton probably consisted of 7 cervical, 17 thoracic, 3 lumbar, 1 sacral and 34 caudal vertebrae (Brandt, 1846, 1974; Domning, in litt.). There were 17 pairs of ribs, 5 of which connected to the sternum. Ribs were large and clavicles were absent.

**FIGURE 1.** Dorsal and lateral views of cranium of Steller’s sea cow. After Heptner (1974).
The large scapula had a short acromion process. Pelvic bones were rod-shaped.

Function. Apparently Steller's sea cow was unable to submerge because of its extreme buoyancy (Doming, 1976, 1978; Stejneger, 1887). The sea cow lived in coastal waters where it was in danger of injury from rocks and ice. The thick, elastic skin may have prevented damage by abrasion.

Ontogeny and Reproduction. Young animals were seen throughout the year, but probably most were born in the autumn. Copulation took place mainly in early spring. The gestation period was longer than 1 year. A single young was born. The milk was thick and sweet.

Ecology. The defenseless sea cow probably had few enemies other than man. Steller (1751, 1889) reported a mass of white worms in the pylorus and in the duodenum. Amphipods lived in the epidermis, especially on the head around the eyes and ears, on the forelimbs, mammae, sexual organs, and anus, and in borings in the skin. Gulls sat on the exposed backs of the sea cows and ate the ectoparasites.

Sea cows occurred in shallow waters where they often congregated in herds. With their backs above water, they pulled themselves through rocky shallows with their hook-like forelimbs. They probably fed principally on algae such as Nereocystis, Agar- rum, Alaria, Laminaria, Thalassiphillum, Halosaccion, and Constantinea (Doming, 1978; Voshinski in Heptner, 1974). After feeding, some sea cows slept on their backs.

When discovered in the 1700's, sea cows were already confined to only a few refugia (Brandt, 1862d). Steller (1751, 1889) erroneously thought that the population was considerably large. In fact, sea cows were fairly numerous only at a few places off the coasts of Copper and Bering Islands. Stejneger (1887) estimated the population at 1,500 to 2,000 individuals in 1741.

The sea cow became extinct only 27 years after Steller (1751) described the animal and compared its meat to beef and its fat to butter. Feeding after Steller brought a darkening of the meat. For hunting parties setting out from Kamchatka for the Aleutian Islands and Alaska began dropping in on the Commander Islands to stock up on meat and fat. Soon more ships followed. Unlimited hunting pressure quickly led to the disappearance of the slow, peaceful sea cow. Off Copper Island, where the population was initially low, there were no animals left by 1754. Off Bering Island, the last individual was killed in 1768 (Baer, 1840; Stejneger, 1884, 1887). Reports on later sightings have been refuted (Heptner, 1974; Stejneger, 1885). The sea cow was hunted with harpoons from boats. Often more individuals than needed for food were wounded or killed. In addition to the food value of the sea cow, the fat was used in lamps and the skin was used as soles in shoes and for building boats (Brandt, 1871).

Behavior. Sea cows spent most of their time feeding. Feeding animals lifted their heads to breathe every 4 to 5 minutes. The front limbs were used for picking algae, which were then grasped and cut by the interlocking bristles on the lips. The front limbs were also used for walking in shallow water, for swimming, for freeing off from rocks, for defense, and for clapping the partner during copulation. By moving the fluke from side to side, the sea cow slowly advanced while grazing; strong vertical beating of the fluke advanced the animal more rapidly.

Sea cows lived in family groups consisting of a bull and cows with calves. Adults were monogamous. Feeding sea cows kept the young at the front of the herd, well surrounded on the flanks and rear. Steller (1751, 1889) observed indications of altruistic behavior when one animal in a grazing herd was wounded by a harpoon; the others gathered around and gave assistance. When one cow was caught her bull followed and lay 3 days near the beach where she had been killed.

The sea cow was almost mute, making only deep breathing sounds when coming up for air and loud moaning sounds when wounded.

Copulation occurred mostly in the evening, in still weather.

Remarks. We wish to express appreciation to Dr. Daryl P. Domning who commented on an earlier draft of this report.

Literature Cited


Principal editors for this account were DANIEL F. WILLIAMS and SYDNEY ANDERSON. Managing editor was TIMOTHY E. LAWLOR.

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