

Letter From the Desk of David Challinor
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In *The Odyssey*, Homer described the presence of the Sirens (but not their appearance) who lived on one of the small volcanic islands just north of the narrow strait (Messina) between the monster, Scylla, and the whirlpool, Charybdis, on the opposite shore. A nymph who had been turned into a six-headed monster by the jealous witch Circe, Scylla had caught and eaten six of Odysseus' sailors. Once past the straits, Odysseus next encountered the Sirens, beautiful maidens whose songs lured sailors to their death by shipwreck on the rocky shore of the sirens' island. Odysseus avoided this disaster by plugging the ears of his crew and having himself tied to the mast. In this fashion the crew, deaf to the songs, rowed past the Sirens, but their incapacitated captain with hearing intact, could hear their beautiful song and survive.

Sirens turn up in many ancient maritime cultures and such fanciful images are not surprising when we consider the wretched conditions endured by ancient mariners on their long voyages. Bereft of women for endless months, it is no wonder they so easily fantasized a beautiful woman (see Grzimek, Bernhard, *Animal Life Encyclopedia* Vol.12, p. 523) when they caught a fleeting glimpse of a female heavy-breasted Red Sea aquatic animal we now call a dugong. This large marine mammal was undoubtedly known to Greek sailors of Homer's time, despite a lack of scientific evidence that dugongs ever lived in the Mediterranean. This month's letter is about Sirenians (named for Homer's Sirens), a worldwide family that includes dugongs from eastern Australia to the east coast of Africa and their close relatives, the manatees of west Africa, Florida, the Caribbean, and the Amazon basin.

My first encounter with these remarkable creatures was a female manatee in a large tank at Chicago's Shedd Aquarium. Its face was one that only a mother could love. The eyes are small, the nostrils are placed high, and the front of the face is dominated by a set of vertically separated upper lips designed for efficiently eating large quantities of aquatic vegetation. On close observation their relationship to elephants becomes apparent, for the females' breasts are also between the forelimbs, a characteristic that surely nurtured the mermaid myth. When manatees were kept in tanks, keepers began to find worn molars on the bottom. Like in elephants, when teeth become worn the jaw muscles move the newer, shallow-rooted molars to the front of the jaw to replace the worn ones that drop out. Elephants are limited to three sets of teeth during their lifetime and generally starve when the last set wears out. Manatees lose their incisors (the two upper front teeth—tusks in an elephant) before attaining maturity. That loss leaves them with only their replaceable lower jaw molars, five to eight on a side.

The three species of manatee are currently allopatric—that is, their ranges do not overlap. The Florida manatees occupy the Atlantic coast as far north as Georgia and South Carolina, with individuals swimming in the summer into the Chesapeake Bay and

even as far north as Rhode Island. On the state's west coast, manatees occasionally wander as far as Louisiana, south to Cuba and into the Caribbean. Historically, they ranged west to Texas and northern Mexico. Today, the manatees south of Florida are considered a subspecies and once ranged as far south as Espirito Santos (20° S) in Brazil. The coastal population south of the Amazon was extirpated more than a century ago, probably by over-hunting for their meat and loss of habitat.

I have seen the Caribbean subspecies swimming in the shallow coastal waters of Belize from a small, low-flying plane. First visible were black lines of swirls as four or five of them swam slowly north. Each time their broad flat tail elevated, the dark silty bottom mud trailed them in neat circles.

Today, the Brazilian species is confined to the Amazon basin and never reaches salt water. It is very similar to the Florida and Caribbean species, but lacks the vestigial nails on their front flippers, a distinguishing characteristic of their northern relatives. The third manatee species, now rare, lives in rivers and shallow inlets of Africa's west coast.

All three species spend five to eight hours a day consuming vast quantities of aquatic vegetation; they eat about seven percent of their body weight (\pm 60 lbs.) every day. To handle this vast bulk, manatees have intestines over 20m. long. Humans have exploited their appetite by introducing them into power plant intake channels to clear them of clogging aquatic vegetation. Manatees have effectively controlled Pistia (water lettuce) and Eichornia (water hyacinth), two floating plant pests in Brazil and Guyana, but such efforts have not always been successful elsewhere.

About 30 years ago an Army veterinarian hatched a scheme to release manatees into Gatun Lake—part of the Panama Canal. Hydrilla, a rooted, shallow water plant from China, had completely blocked small boats from many of the lake's shallow bays popular with local sport fisherman who, ironically, fished for "rainbow bass"—another exotic introduction. The Panama Canal Company built pens near the mouth of the Chagres River, a major water source for Gatun Lake. Eventually, seven adult manatees were captured in Bocas del Toro in western Panama and the Air Force flew them to the canal. It turned out that the manatees were reluctant to eat hydrilla because the stem has small calcareous spines. However, they ate all the other aquatic plants offered to them. A few escaped and eventually, when the promoters lost interest, all were released. There is no hard evidence that they are breeding, but one Smithsonian received a call from a man who reported seeing a walrus in the lake! My colleague responded that he "believed" the caller, who had clearly misidentified the beast. The Panama experiment does not seem successful, in part because we know relatively little about manatees; they are hard to track in murky water and they are adept at hiding motionless.

We do know that male-female pair bonds are strong and that females spend long periods with their young before they become independent. The young eat considerable plant material even while nursing. Although seemingly awkward, manatees use their front flippers to crawl partly up tidal channel banks to graze on cordgrass (*Spartina spp*), a nutritious and preferred food. A captive manatee in Georgetown, Guyana used its flippers to raise itself up on the edge of its tank and so supported, would accept handfuls of grass from visitors.

A major breakthrough in our knowledge of manatees was recently published as Wildlife Monograph No. 151 (Jan. 2003). The work, entitled "Seasonable movements, migratory behavior and site fidelity of West Indian manatees along the Atlantic coast of the United States," reports the results of tracking 72 manatees along the east coasts of Florida and Georgia over 12 years (1986-98). Tracked by a tethered satellite-linked radio-tag, the effort provided valuable information on manatee behavior that can be applied to developing protective measures for their safety. The average tracking time per individual was about three months, but the longest continual tracking was three and a half years. Failed tracking units were replaced by experienced scuba divers who gently swam next to the animal and reattached a new tether to the tail band. The thin nylon rod tether was long enough to let the transmitter break the surface while the manatee fed, thereby recording its precise location.

This decadal monitoring showed that manatees generally migrated north from central Florida when the water temperature warmed to about 20° C (68° F). Many would go as far as Georgia and South Carolina, although the vast majority ranged between Biscayne Bay (Miami area) and Georgia's Brunswick River. One male, however, was tracked north to Rhode Island in August 1995, and he went at least as far as Virginia the following summer before his tag broke off. Most manatees traveled inside the barrier islands, although a few swam in the open ocean (close to shore) when migrating. Not all manatees migrated, however, and some never left their home territory. Migration was closely tied to water temperature. In winter, groups often assembled at warm water outlets of power and pulp plants' cooling systems. I once saw several score of them assembled at the Smithsonian's original marine facility at Linkport near Ft. Pierce. Most manatees tracked in this study returned regularly to the same winter range. The young evidently learn migration routes while traveling with their mothers, because captive-raised ones, when released as sub-adults, generally do not migrate seasonally.

The future of Florida's manatees is by no means secure. Their greatest mortality is from motorboat collisions, while others drown in nets or are trapped in high-pressure water intake grills. The principal effective strategy for protecting these docile creatures is to extend existing, or create new manatee sanctuaries where motorboat activity is prohibited. Large areas such as the Kennedy Space Center also function as protected areas. Another safeguard is to broaden public awareness of their presence and to enforce

boat speed limits. In the long run, coastal communities must control runoff of pollutants that muddy shallow water, thereby killing or slowing the growth of the rooted aquatic plants on which manatees feed. Tampa Bay is a good example of how municipal action has improved water clarity and allowed the sea grass beds to thrive. One hope for the manatee's future, however, is the remarkable variation in their individual behavior. This characteristic may allow the existing stressed population to adapt to the burgeoning human population that shares their habitat. Thus, with help from us all, there is reason for optimism about the future of the manatee.

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