Sea Squirts

The Marine Iguana

Text and photographs by Edmund Hobson

MARINE IGUANAS (*Amblyrhynchus cristatus*) are the only lizards on earth that feed in the sea. And the only land these creatures know are the barren shores of the Galápagos Islands, where they bask in the sun between feeding excursions into the surrounding waters.

These animals have captivated the imaginations of naturalists for centuries, but the writings they have generated often mix fact with fiction. Thus, when the English seaman James Colnett wrote in 1798 that marine iguanas "go to sea in herds afishing" he correctly described their swim from shore in groups, but incorrectly assumed they hunt fishes. The animals are herbivores that graze on seaweeds, a fact noted by Charles Darwin when in 1835 he visited the Galápagos Islands in H.M.S. *Beagle*.

Darwin wrote that marine iguanas swim "some hundred yards from shore," and dive for plants growing on the seabed. Other observers, however, have doubted they do this regularly. Almost 100 years after Darwin's account, William Beebe contended that marine iguanas grazed only on vegetation growing from rocks exposed at ebb tide. But Darwin was right. Marine iguanas are accomplished swimmers that move with undulations of body and tail, their legs trailing close alongside. Yet despite their submarine capability, these animals stay on the surface when moving to and from offshore feeding grounds. Perhaps they use terrestrial features to navigate, a possibility consistent with their way of swimming at the surface with head held high out of the water. Certainly iguanas see poorly underwater; this became apparent when, moving slowly, close to the bottom, I repeatedly approached to within a foot of submerged iguanas and found them seemingly unaware of my presence.

Iguanas arrive on the surface above their feeding ground, then dive to the sea floor. I have seen them grazing in 35 feet of water, and probably they seek food even deeper. The depths to which iguanas dive are not limited by how long they can stay underwater—Darwin long ago found them able to remain underwater more than an hour when necessary. Their submergence times relate to how deep the water is over the feeding ground. Thus, iguanas grazing near shore in water less than ten feet deep generally stay down less than five minutes, whereas those in deeper water often stay down fifteen minutes and longer. Considering their longer swim from shore, and their effort in getting from the surface down to the ocean floor, iguanas that feed in deeper water probably find it more efficient to stay longer on the bottom. Also, it is probably easier for them to remain on the bottom at greater depths. Iguanas are buoyant in shallow water, and bob to the surface as soon as they let go. Once free, they must swim vigorously to stay down. This difficulty is alleviated at greater depths because the increased water pressures compress their lungs, making them denser. At about 20 to 25 feet they show no noticeable tendency to rise or sink, but much below this they are denser than seawater and must actively swim to rise. Thus, an iguana I had chased to a depth of sixty feet appeared heavy in the water, and

swam with obvious effort when it headed toward the surface. It seems likely that iguanas can regulate their relative density somewhat by varying the amount of air in their lungs. If so, they would carry more air on deeper dives, and this would let them stay longer at greater depths.

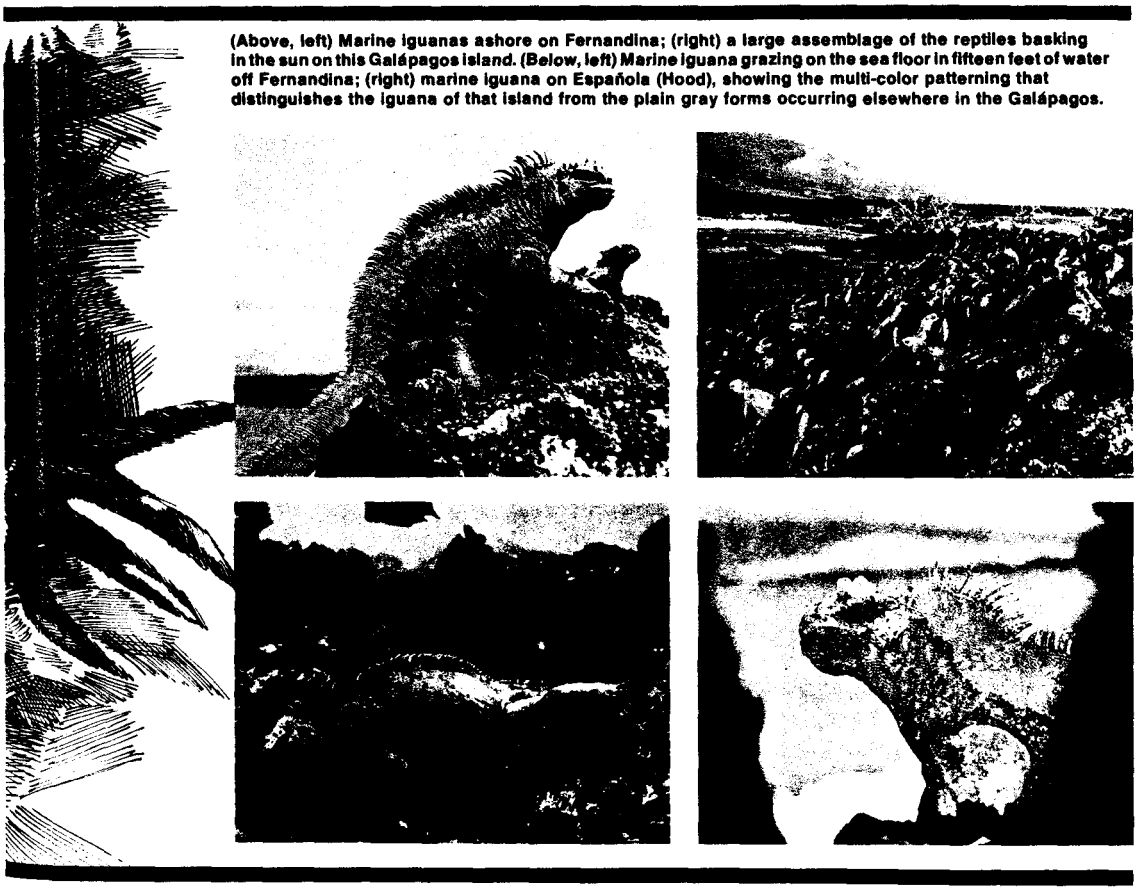
Even though foraging iguanas may range far afield, and dive to the bottom in relatively deep water, much of their grazing occurs at the edge of the sea. Here their hook-like claws cling securely to rocks exposed with a falling tide, and though often they are periodically submerged under the thunderous crush of breaking waves, the surging tons of white water fail to dislodge them.

When marine iguanas enter the sea to forage, their body temperature drops to that of the surrounding water. And in those parts of the Galápagos Islands where iguanas are most numerous, sea temperatures often hover around 70° F, which is cold for equatorial waters. Thus these unique creatures are most active at their lowest temperatures—a striking exception to the valid generalization that reptiles are most active at their higher temperatures, and here a vital adaptation.

Marine iguanas basking on rocks ashore during the day are warmed by the equatorial sun. George Bartholomew of the University of California found that basking iguanas actively maintain their body temperatures within narrow limits —95 to 98° F—by changing position, and thus their angle of exposure to the sun. This throws new light on one of Darwin's better-known observations. Darwin noted that basking iguanas refuse to be driven into the sea, and when he hurled one into the water it immediately returned to shore. These animals want to stay out of the water, Darwin reasoned, because they fear sharks. Other observers over the years have duplicated Darwin's experience, and have accepted his reasoning. But Bartholomew's work suggests a more plausible explanation: having attained body temperatures up to 28° F above that of the sea, iguanas basking in the sun are simply reluctant to cool off suddenly, and will enter the water only to feed. Iguanas that have not warmed up fail to show this aversion to getting wet. Thus, when iguanas have just returned to shore from feeding, and their body temperatures are still that of the sea, they will reenter the water without hesitation when approached by a human being.

Iguanas do not suffer the threat from sharks that Darwin imagined. Certainly it is unreasonable to suggest that iguanas avoid the sea through "fear." They might seem especially vulnerable when swimming at the surface, especially with their heads out of the water. But though occasionally sharks take iguanas as prey—some have been found in shark stomachs —there is no good reason to assume that sharks threaten iguanas more than they threaten other marine animals. I have seen several sharks (gray sharks, white-tipped sharks, and hammerheads) pass close below iguanas swimming on the surface, and they gave no sign of regarding these lizards as prey.

Marine iguanas still fascinate visitors to the Galápagos Islands, and science is continually assessing new information about them. But we remain far from fully understanding the unusual biology of these extraordinary animals. ■



(Above, left) Marine iguanas ashore on Fernandina; (right) a large assemblage of the reptiles basking in the sun on this Galápagos island. (Below, left) Marine iguana grazing on the sea floor in fifteen feet of water off Fernandina; (right) marine iguana on Española (Hood), showing the multi-color patterning that distinguishes the iguana of that island from the plain gray forms occurring elsewhere in the Galápagos.