

Green Turtle Farming

A Growing Debate

By GEORGE REIGER

FROM A VANTAGE POINT on a promontory overlooking the northwest corner of Grand Cayman Island, it is hard to imagine that any of the various species of sea turtles should be in danger of extinction. Spread below are dozens of different size tanks and pools containing over 100,000 green, hawksbill, and ridley turtles. Even more difficult to imagine is how this 10-acre turtle farm should be at the heart of an emotional controversy affecting trade between nations throughout the world. Yet it is, and the clamor of opposing forces is being heard in such cities as London, Bonn, and Washington, D.C.

In order to understand what is being debated, it is necessary first to appreciate that sea turtles and turtling have been an essential ingredient of Cayman Island history for over 470 years. When Christopher Columbus discovered the islands in 1503 on his fourth and final voyage to the West Indies, he called them *Las Tortugas* to commemorate the vast schools of turtles that came out in curiosity to meet his ship.

The islands' name was changed by subsequent visitors who were impressed either by the crocodiles once

found there (now extinct) or by the large blue iguanas which they confused with the caiman crocodile of South America. Turtles, however, continued to be the most important wildlife in the Caymans. In 1592, Captain William King of the *Solomon* "landed at Grand Caiman (sic), being the westernmost, where we found no people, but a good river of fresh-water; and there we turned up three score great tortoises or turtles. Two of these, with the eggs, fed ten men for a day."

Sea Turtles as a Provision

The relative isolation of the Caymans (130 miles—209 kilometers—southeast of the Isle of Pines, Cuba, and 180 miles—290 kilometers—northwest of Jamaica) was, in the beginning, the turtles' salvation. The fact that the Caymans were stepping stones in the Spanish trade route from Panama and Costa Rica to Cuba and Florida, however, quickly brought them to the attention of all Europe. Spanish ships frequently stopped there for water and to capture turtles which they then stored tied down on their backs on the decks of the ships. In pre-refrigeration days of ocean travel,



FOR CENTURIES, tortoises, turtles, and their eggs were sought as ship provisions by voyagers sailing the tropical seas. This reproduction of a copper engraving depicts the activities of seventeenth-century voyagers who had made port at the Canaries.

only turtles, porpoises, and fresh-caught fish offered sailors any respite from their regular diet of salt cod and dried beef.

Northern Europeans, denied the right to commerce and colonization in the Caribbean by the powerful kings of Spain, took to making hit-and-run attacks on the Spanish Plate Fleet and shore settlements to gain their "fair share" of the booty of the New World. They, too, used the Cayman Islands as a provisioning port and, in 1643, British Captain William Jackson observed that Grand Cayman "is much frequented by English, Dutch, and French ships that come purposely to salt up the flesh of these tortoises." An early historian of the islands added, somewhat wryly, that visitors to Grand Cayman were "attentive to two points only: turtling and plundering."

When the British conquered Jamaica in 1655, the Caymans were considered part of the prize. Since no government official dared live there in those days, however, the Caymans were difficult to administer. The best the English government could do was to commission the Cayman-based buccaneers when they ransacked French and Spanish ships and to condemn them as pirates when they seized an English merchantman.

Similar to Chicken and Veal

The islands' history is so closely linked to men the likes of Sir Henry Morgan and Edward Thatch (alias Teach or Blackbeard) that it is appropriate to find the first full account of Caymanian turtle fishing in Charles Johnson's *General History of the Pirates*, first published in 1724. John-

son interviewed a number of Cayman-based sailors and learned that the turtles there ranged in size from the smaller hawksbill, "with its fine, natural-wrought shell, and beautifully clouded," to 800-pound (360 kilograms) green turtles whose "meat was sweet and tender, some part of it eating like chicken, some like veal."

The sailors reported that the big females came ashore to lay their eggs "in the night only, when they must be watched, without making any noise or having any light. As soon as they land, the men that watch for them turn them on their backs, then haul them above the high-water mark and leave them till next morning, when they are sure to find them, for they cannot turn again, nor move from the place."

Fallacies About Turtle Meat

Continual and uncontrolled depredations on the turtles led to a decline in their population. Even as early as 1790, the green turtle had become so scarce in Caymanian waters that island settlers turned to raiding the southern Cuban coast for their meat and shell. A large export business had developed based on a feminine craving for tortoise-shell combs, bracelets, and earrings, and on a masculine faith that eating turtle flesh would restore youthful vigor and guarantee a long life. This faith was reinforced by such learned doctors as Patrick Browne who, writing in 1756, not only praised the green turtles for all these qualities, but suggested that a green turtle diet would heal "all manner of skin infection" as well.

Soon almost every freighter returning to the Old World with a supply of

timber, fiber, salt, and sugar also carried its share of live turtles lashed to the decks upside down. By 1830, the Cuban coast was already declining as a prime turtling area but, undaunted, the men of Grand Cayman turned to Central America where the fabulous turtle cays off Nicaragua had been discovered. There, instead of waiting for the females to come ashore to spawn, the turtlers caught their prey with nets on the turtle-grass shoals, with harpoons, and even with shark-suckers, *Echenis naucrates*, tied to lines and thrown in the water near a sleeping turtle. In the latter method, the fish would swim to the turtle, take hold with the sucker disk atop its head, and permit itself and the turtle to be retrieved without letting go. A good turtler might take 200 turtles fishing a week of nights using such methods.

Determined Turtlers

Today, despite Nicaragua's determination to manage the resources of her offshore islands, the Caymanian turtler still sails 300 miles (483 kilometers) to the Mosquito Cays where, with or without a permit issued by the government, he proceeds to take on a load of turtles. Regularly, the Nicaraguan coast patrol arrests, fines, and confiscates the boats of turtlers found operating without a permit, but the Caymanian seems to take such an experience in stride. He merely goes to the British Embassy where he arranges for transportation back to Grand Cayman and, once home, proceeds to build another boat for a return trip to Nicaragua.

All these risks seem to be worth it to these fishermen. Despite the advent

of synthetic tortoise shell, demand for the real thing has inflated prices. Better yet from the turtlers' point of view, a renewed faith in the restorative powers of turtle soup has greatly enlarged the market for calipee, which is interstitial cartilage from the green turtle's bottom shell. Thus, an increasing tragedy of the Central American coast is the discovery of a female turtle at dawn rolled on her back and feebly sculling at the air while vultures perch on her carapace and pluck out the entrails where they have been exposed by a hunter who took only a few strips of its belly shell.

A Pioneer Farming Project

History has shown, however, that no great turtling ground can long withstand uncontrolled harvesting. Thus, today, even the fabled Mosquito Cays are not producing turtles as they did even a few years ago.

To bring turtling back to Grand Cayman, to provide livelihoods for those who seem to have the reptile in their blood, and to give relief to the

HELPLESS ON THEIR BACKS, these green sea turtles were transported by schooner to Key West where they were unloaded and processed primarily for their calipee, a prime ingredient in turtle soup. This photograph was taken at a time when these giant reptiles were still captured in great numbers.

Florida State News Bureau

few feeding and breeding areas left in the Caribbean, a turtle-farming venture was started in 1968 by Dr. Robert Schroeder, a marine biologist, and his wife, Jean. The Schroeders had some experience with raising green turtles in the Florida Keys. (Also see "Buffalo of the Sea," *Sea Frontiers*, Vol. 12, No. 3, May-June, 1966). There they discovered that while the adults are largely herbivorous, young green turtles will eat nearly anything. Ground fish, canned dog food, even table scraps, were eagerly consumed by the small turtles; the kind of food seemed less important than its abundance and continuity.

The next step in the development of a genuine turtle farm was to find a place where captive turtles would be able to live through a complete life cycle from egg to adult size, including successful reproduction. Schroeder hoped that if and when his scheme involving green turtles became profitable and self-perpetuating, he could devote more time to the study and the conservation of ridley and hawksbill turtles.

The project, officially dubbed Mariculture, Ltd., had a slow start. A site was chosen in Grand Cayman Island's North Sound not far from a small estuary called Salt Creek. Turtles





MARICULTURE, LTD., officials believe that their green sea turtle farm is providing hope for survival of this threatened species. Shown in the company's ponds at Grand Cayman Island are turtles in varying stages of development, ranging from those a few days old (left) to one that will be on its way to market in a few months time (right).

George Reiger



were hatched from eggs flown from Costa Rica, Surinam, and Ascension Island. Each year, by agreement with authorities where the eggs were collected, approximately 1 percent of the hatchlings were returned to their place of origin for release as healthy year-old turtles, and the remainder were put in floating pens for rearing.

It was soon apparent, however, that an insufficient tidal exchange was causing water in the turtle pens, or crawls, to become foul, rank, and a source of disease. In addition, a large housing project was started just in-shore from the crawls, adding to the water problem. Finally, there was no beach where the large females could attempt to lay eggs.

But the concept of turtle farming appealed to such financial backers as Anthony G. A. Fisher, founder of the largest poultry-processing company in Europe and, with a fresh inflow of funds, the project was moved to Goat



Rock, 2½ miles (4 kilometers) west of the old location, on an attractive site overlooking the sea. Here the pens are land-based and connected by pipes and spillways through which ample clean water is pumped from the ocean below. Greater circulation of seawater provides several benefits: the captive turtles eat more and, therefore, grow faster; they are less susceptible to disease (though the adults are still sometimes disfigured by a fungus infection on the neck and flippers); and the individual pens are easier and more efficient to maintain.

The young turtles are fed a varied diet, with a special soybean-derivative pellet providing the bulk of the food. Later on, they eat mostly turtle grass, *Thalassia*, cut by an underwater harvesting machine, and whole frozen fish. Such feeding brings a green turtle

to the ideal 100-pound market weight in about three years. Then they are killed with a pistol at the rate of 60 a day and processed into a variety of products including prime, chunk, and odd-lot pieces of steak, calipee, call-pash, belly shell, flippers for the soup trade, fat for the cosmetic trade, liver for sausage, offal for cattle feed, polished shell, scutes, and leather items for the tourist trade.

With the hope that the company will one day become independent of wild stocks, a large breeding pond was blasted from the rocky shore and a wide sandy beach was provided for nesting adults. In April, 1973, it was found that the introduction into the captive turtle colony of two males from a wild breeding beach started, or at least was associated with, an outburst of copulation, followed a few

SLEEPING WITH ITS FLIPPERS folded over its shell, this young turtle in a Mariculture, Ltd., rearing pond is the subject of a hot controversy. Certain conservationists oppose the company's farm for a number of reasons, one of which is that its success may, ironically, become a catalyst in increasing, rather than decreasing, the market for green sea turtle products.

George Reiger



weeks later by the first successful nesting under artificial conditions. Of 60 adult females in the breeding pond, only seven are thought to have been involved in this historic nesting, with some 4,000 fertilized eggs recovered.

Critics' Complaints

While publicity of this event cheered investors, it raised further questions among critics of Mariculture, Ltd.'s program. For one thing, critics argue, Mariculture still does not have a closed breeding system since production of these first captive produced eggs was inspired by the introduction of two wild males. Then, too, 4,000 eggs are a tiny percentage of the company's present annual requirements and, if it is talking about producing 200,000 eggs from domestic sources before the end of this decade, it has a long way to go.

Mariculture's president, Irwin S. Naylor, suggests that such criticism is generated by jealous would-be rivals who are excluded from competition by the company's unique world monopoly headquartered in a tax haven. Not liable for any taxes in the Cayman Islands, Mariculture, Ltd., has further been granted a guarantee of exemption from any possible taxes until 1994. It has also been guaranteed exemption from any customs duty on all imports until 1976 and on all packaging and crating materials and turtle food for the duration of its 99-year franchise.

The Debate Still Goes On

On the other hand, members of the Cayman Island Conservation Association have expressed concern about

the real issue—saving the various sea turtles from extinction. Although 1 percent of hatched turtles are returned to Costa Rica, Surinam, and Ascension Island, they believe that turtles want to nest where they were hatched, not where they are released. Therefore, they doubt that any of those turtles will ever return to the beaches where they are released. Another matter of concern is the water that is discharged from the turtle tanks directly into the sea. The company's present outfall, according to some reports, creates a fecal-laden, grimy slick for a long way offshore.

Such controversy might have remained local in character, or at least concentrated in the Caribbean, but recent proposals to put all sea turtles on the United States's endangered species list has suddenly made Mariculture, Ltd., a well-known company in the corridors of the Department of Commerce and Interior. The United States represents one of Mariculture's principal markets. Not only is the company concerned that the green turtle's proposed addition to the endangered species list would close off American sales, but that the example of the United States might spread to other nations.

Proponents of classifying the green turtle as an endangered species argue that eliminating the market for the meat and shell is the only hope for saving all species of sea turtles. Mariculture, Ltd., insists that man's craving for these products will not decrease, and meeting that need with domestic stock is the only ultimate hope for saving sea turtles in the wild. It is a hot debate with no settlement in sight.