THE GREEN TURTLE *(CHELONIA MYDAS MYDAS)* IN FLORIDA[1]

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ABSTRACT

This paper records the first definite observations of nesting emergences of the Atlantic green turtle on the coast of North America. Two females were found laying their eggs on the East Coast of Florida, as follows: (1) two miles north of Vero Beach, Indian River County, July 11, 1957, T. C. Cheatham, observer; and (2) about a mile north of the House of Refuge Museum, Hutchinson Island, Martin County, June 27, 1958, R. C. Byrd, observer. Eggs from the latter nest were hatched by Mr. Ross Witham, and young are in the collections of the University of Florida. The possible desirability of using such Florida-oriented hatchlings (should more intensive searching show them to be available in worth-while numbers) in any future restocking project is discussed.

During the course of separate bibliographic studies of the primitive status of sea turtles in Florida (Ingle and Smith, 1949, Carr, 1952, 1956) the writers were struck by the scarcity of information on the character of green turtle populations in the state prior to the settling of the lower East Coast. Since the days when the earliest accounts of Florida resources and natural history were written the green turtle has been cited as a typically Floridian production. So consistently has Florida been named as a center of green turtle abundance that it comes as a surprise to find in print no definite record of a green turtle nesting on a Florida beach, or for that matter anywhere on the mainland of the United States.

The closest approach to such a record is to be found in Audubon's essay "The Turtlers" (1926), in which he says (p. 199) "On certain parts of the shore (of Florida) hundreds of turtles (by clear implication including green turtles) are known to deposit their eggs," and (p. 197) "I have several times observed them in the act (of laying)." Catesby said that the depleted green turtle populations of the Bahamas of his day no longer bred there but came from Cuba and the mainland. Holbrook (1842) implied that besides their breeding activity on Dry Tortugas, green turtles nested on Florida beaches. Although

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William Tecumseh Sherman (1889) said nothing of turtle nests he was strongly impressed by the importance of the green turtle in the economy of the Florida East Coast. Of green turtles at Fort Pierce, where he was stationed in 1840, he said: "They were so cheap and common that the soldiers regarded it as an imposition when compelled to eat green turtle steaks instead of poor Florida beef or the usual mess-pork. I do not recall in my whole experience a spot on earth where fish, oysters and green turtles so abound as at Fort Pierce, Florida" (p. 19). By 1896 we find Brice saying, "The fishermen comment upon the fact that for the past few years the green turtle has not been depositing its eggs on Key West and adjacent keys." Inquiries today produce much the same comment. It is curious that the recording of a definite nesting emergence had to await the present paper, written at a time when Chelonia has been practically extirpated as a breeding entity in the fauna of the United States.

Some time ago, in looking about for the nesting ground of the ridley turtle (*Lepidochelys kempi*), Carr circulated a questionnaire among people familiar with the loggerhead colonies, asking about arrivals of species other than the loggerhead. This revealed that it was common knowledge that green turtles still come ashore on the beaches between Palm Beach and Melbourne; but it was admitted by all that such occurrences were rare and that the chances of anyone's seeing a green turtle on a night's tour of loggerhead rookeries were slim. The somewhat extensive beach-walking experience that Carr accumulated at that time bore this out.

Three years ago, Ingle asked Florida Conservation Agents to watch for green turtles on the beach. In two successive years this campaign yielded a record of nesting, each substantiated by clear photographs that we both have seen, and one supported by examination of hatchlings from the eggs laid. The records are as follows:

1. Two miles north of Vero Beach, Indian River County, Florida; July 11, 1957, 10:30 P.M.: T. C. Cheatham, Agent, observer. No eggs were collected. Black and white photographs were taken and are in our files.

2. About a mile north of the House of Refuge Museum, Hutchinson Island, Martin County, Florida; June 27, 1958; R. C. Byrd, Agent, observer. Kodachrome pictures were made. This turtle laid 130 eggs, which were removed and reburied on the premises of the House of Refuge Museum where they were watched through hatching by Mr.

Ross Witham. Eighty eggs hatched August 24, 1958, and on that date Mr. Witham telephoned Carr, who went down to Stuart and brought 40 hatchlings to the University of Florida for study. A sample from this batch shows the following measurements (in millimeters): greatest straightline length of shell, maximum - 58, minimum - 50, average - 55; greatest straightline width of shell, maximum - 47, minimum - 37, average - 42.

The minimum measurements shown above were from an individual that was conspicuously less advanced than the others and had a yolk-sac of half-inch diameter protruding from its plastron. All had yolk scars and egg teeth and none had fed prior to being measured. Although none had as much yolk as the runt, the considerable variation in degree of absorption of yolk probably indicates that the young had been hatching for several days prior to eruption of the nest.

That green turtles were once extremely abundant in Florida is not questioned, but it is difficult to determine, from the accounts of the time, whether populations here were largely transient, non-breeders as those of the green turtle in the Cedar Key-Crystal River area are today (Carr and Caldwell, 1956), or whether Florida really was a major center of reproduction as most early writers said or implied. Some generalized statements were no doubt merely repetitions of earlier hearsay. Other writers apparently assumed that breeding occurred in Florida because the grazing flats on the Gulf Coast and in Indian River were so heavily populated with turtles. This does not necessarily follow. It is possible that nesting loggerheads, and the feeding aggregations of green turtles in adjacent waters may have been incorrectly assumed to be aspects of one phenomenon.

It seems more likely, however, that primitive Florida actually was the gathering ground for great nesting assemblages of green turtles. These were quickly blotted out when the Seminole and the white man came, just as they were in Tortugas, in the Cayman Islands, and in Bermuda, and as they will be all through the American tropics unless protection for the few remaining rookeries is provided.

An unexpected aspect of the reproductive pattern apparently shared by sea turtles, which current studies have revealed, is a capacity to breed either in aggregations or as isolated individuals. The full implication of this dual pattern is not clear. It is not known, for example, whether it is a question of resident-versus-migratory breeding, as in the case of some birds, or whether the solitary nesters are simply the die-

hard remnants of once populous nesting colonies wiped out by man.

In any case, these lone females would seem to be in a reproductively hazardous position. Mating occurs at nesting time and the chances of a detached female meeting a male might seem slight, although, to be sure about that, we must wait till we learn whether the sexes go separately to the breeding areas or make the trip together. On the other hand, the eggs laid at a given visit to the beach are not the ones fertilized at that time. They were probably fertilized three years before (Harrisson, 1956, 1956a, Hendrickson, 1958, Carr and Ogren, ms.) and their viability thus depends not on the female's luck that time, but on whether she failed to meet a male on the previous occasion also. With respect to this whole question, we can only say that several egg complements of isolated nesters that we have watched through incubation have proved to be fertile.

Thus, the occasional arrival, for whatever reason, of a gravid green turtle at a Florida beach suggests the practicability of a management program to restore the lost colonies of this most valuable of all reptiles. The ease with which young green turtles may be brought up to shell lengths of six and eight inches makes it feasible to protect the highly vulnerable, post-hatching stages and bypass the heavy predation that eggs and newly emerged sea turtles must hurdle. Although we still know nothing of the ecology of young sea turtles after they have passed the surfline, there can be no doubt that the releasing of a thousand half-pound turtles would be an operation more likely to increase the population than the natural emergence of a thousand hatchlings.

To produce six-inch green turtles in a year you need only impounded, unchangingly warm, salt water and a steady supply of chopped fish and marine invertebrates. Possibly, once enough people who recognize green turtles start systematically searching Florida beaches, nesting will prove to be frequent enough to furnish all the eggs needed for a pilot nursery. It would seem sensible to use Florida eggs insofar as possible, simply because they might conceivably hatch out turtles with a genetic inclination to return to Florida when they reach breeding age. On the other hand, if the Florida yield proves insufficient, either eggs or new hatchlings could easily be brought in from Caribbean nesting grounds.

The propitious qualities of the green turtle as a subject for conservation and management have been discussed elsewhere (Carr, 1956). To the virtues of the mature animal there can now be added the un-

expected toughness of the newly hatched young, which Carr and Ogren (ms.) found can be carried about, without food or water, in light crates or even bags, provided only a moist interior is furnished. The discovery that they do not require water in shipping containers enhances the practicability of management practices. They thrive in crowded quarters and show strong resistance to fungus attack and nutritional ailments. At Tortuguero, Carr and Ogren (ms.) kept six for more than a year in a narrow four-foot wooden trough; and at the Institut Francois d'Afrique Noire in Dakar Carr was shown healthy two-year old specimens in *fresh* water, in a garden pond.

From every aspect, then, and at all stages of development, the green turtle appears to be a fit subject for management. It can be only a matter of time until somewhere this opportunity is exploited. Although more immediately pressing problems preempt present conservation budgets in Florida it may be possible to undertake such a project in the future. The growing interest in the subject indicates that considerable popular support could be expected.

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