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11. CAPTIVE REARING OF MARINE TURTLES

(With two plates)

Introduction and Summary:—The Madras Snake Park Trust began sea turtle studies in 1972 on the Coromandel coast near Madras where one species, the Pacific (Olive) Ridleys (*Lepidochelys olivacea*) nests in fair numbers. In 1973 Madras Snake Park Trust started India's first hatchery and transferred 11 nests of 1272 eggs from the beach where human, dog and jackal predation is over 90% (Valliappan & Whitaker 1974). During the December-March nesting seasons over the next 4 years, Madras Snake Park Trust collected 197 nests of 21,760 eggs which resulted in 13,059 hatchlings which were released into the sea (Whitaker 1977). Also about 50 nesting females were tagged with numbered monel metal inscribed SEND TAG TO MADRAS SNAKE PARK 600022-INDIA. In April 1977, 15 *L. olivacea* hatchlings were retained for rearing at the Madras Crocodile Bank Trust premises near the sea. During 1977, 2 subadult female green turtles were collected, one from Lakshadweep and one from the Coromandel coast; both were accidentally caught by fishermen in nets. A hatchling Ridley was collected in Lakshadweep in November 1977. In late 1977 a hatchling hawksbill turtle was collected in the Indian Ocean by the Indian Navy and given to the Trust.

The following notes discuss housing, feeding, management and treatment of sea turtles of 3 genera in captivity at a site a few metres adjacent to their natural habitat.

1. *Ridley*—Eggs were collected from a natural nest laid on 12-2-77 and incubated in a simulated nest inside a wire mesh enclosed, partially shaded beach hatchery. Temperatures and approximate humidity were checked re-

gularly (Bhaskar 1978) 46 days later the eggs hatched and 15 of the 80 hatchlings were retained for rearing. Later, in November 1977, the hatchling Ridley from Lakshadweep was included in the rearing trial. Plastic wash basins (50 cm diameter × 18 cm deep) were used initially with 5 turtles per basin. Water was kept at a depth of 6 cm and care was taken that the basin remained at least 3/4 shaded throughout the day. An experienced Madras Crocodile Bank Trust employee, Miss Mangai was put in charge and their optimum growth rates and relative good health are largely due to her personal efforts. The 5 cm hatchlings began feeding on the 3rd and 4th day on small bits of chopped clams (*Donax* sp). Later, chopped fish (mixed) and small ghost crabs and mole crabs were offered and usually eagerly taken. Though several types of sea grasses, algae, and various vegetable greens were offered the turtles rarely took more than a few sample bites. As the turtles were fed daily the sea water had to be changed daily after feeding. Water is brought to the basins by hand from the sea about 100 metres away. 4 of the hatchlings died within 3 months and 6 were released. The remaining 3 are being reared at this time.

Coloration: The coloration of the juveniles has gone through several changes starting at almost black with a few small white patches on the plastron and edges of flippers. The turtles are now considerably lighter (greenish-grey). The Lakshadweep specimen is still very dark with prominent white patches over each eye. From about the 6th month of growth, the carapace develops sharp edges on

the marginal and vertebral scutes, which, like the knife-like dorsal scutes of some juvenile crocodiles, would serve to deter predators.

Behaviour: The long wing-like flippers of a marine turtle are apparently very vulnerable to attack. We have been several nesting females missing flippers and it is commonly reported in the literature that it is probably due to shark attack. The resting posture of a juvenile Ridley while floating on the surface is apparently protective. The turtle folds its hind flippers over its tail and cloaca, the front flippers are folded back on its carapace, reminiscent of a human with his hands behind his back. The mobility of the front flippers also allows the turtle to "clean" its plastron and carapace. This purposeful and regular brushing of its flippers over the shell appears to be a type of grooming to get rid of the algae, barnacles and other adhering plants and animals which abound in the sea. We have observed this species of turtle using similar flipper movements to stir up the sandy bottom of its pond. We had found prawns and crabs (*Doclea* sp.) in the crop of trawler-drowned Ridelys and several times nesting females came ashore covered in mud, pointing to the likelihood that they use their flippers to stir up the bottom to find prey. The single "nail" on each flipper is well developed and sharp. While handling yearling Ridelys, they at first struggle and repeatedly attempt to scratch the hand that is restraining them with the flipper "nail". At no time have the juvenile Ridelys attempted to bite except when food objects are offered.

Though used to human presence the turtles are quite timid and are wary but curious at first contact with almost any object.

Floating: The Ridley has been described as being the "highest" floating turtle. All juvenile sea turtles have a higher specific gravity and

are apt to bob on the surface unless actually diving with forceful flipper thrusts. The specific gravity gradually decreases and we noticed that at 12-16 months (length 12-18 cm weight 500-800 gm) the turtle is about neutral in sea water and can dive, stay at the bottom or float with equal ease.

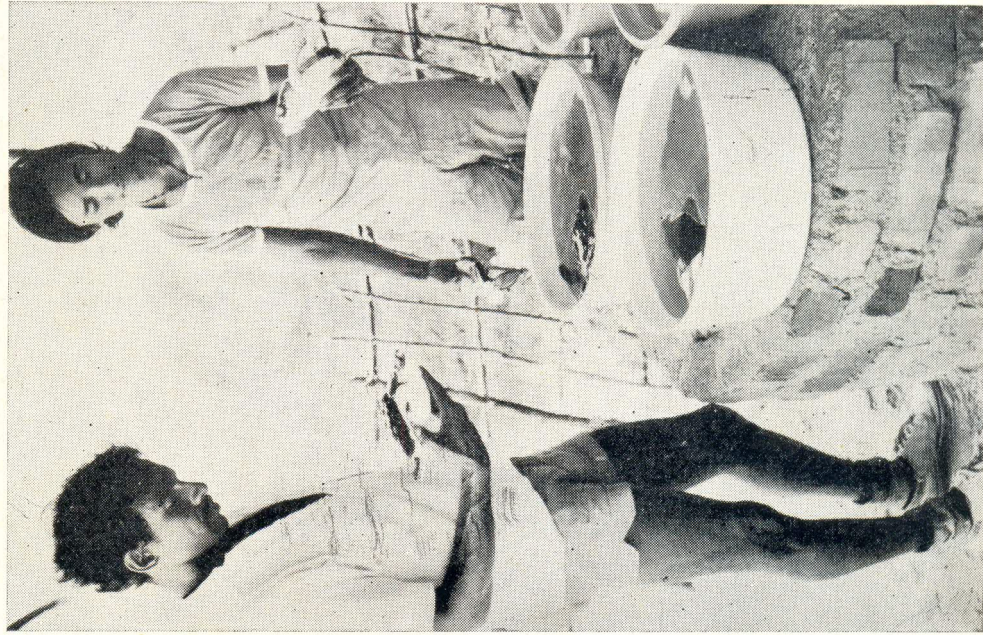
Tanks: The plastic basins are still usable for one 25 cm animal. Even though cramped, health, activity and growth rates are acceptable for experimental rearing. Larger asbestos/cement basins (90 cm diam. and 30 cm depth) have been provided. Rubber based paint in several coats has been applied in these basins to prevent abrasion of shell and flippers. These tanks are also manually emptied and filled. The turtles are placed in plastic basins with 10 cms of water at feeding time. After feeding they are rinsed and placed back in the asbestos/cement basins; this system is useful because the water need only be changed twice a week.

Problems: Keeping the water clean, regularly changed and offering the turtles a wide variety of food as possible (including sea weeds, crabs, shrimp, fish, clams, jelly fish etc.) has assured a fair growth rate and normal health.

The biggest problem so far encountered (and which could have an important implications for turtle farming) is a yellow fungus (possibly *Mucor* sp.). When the hatchling Ridelys were only 7 weeks old the first small yellow dots of fungus appeared on neck and flippers. The yellow patches become larger and are nipped at by other hatchlings. The scabby area may eventually become necrotic and the flipper edge or other affected skin sloughs off. This is especially serious around the eyes and cloaca and can cause death in days. First treatment was with methyl violet, iodine etc. to no avail. Then "Tinaderm" (tolnaftate 1% solution) was used on a rinsed and dried turtle



Above: Recording Ridleys nesting data on Madras beach.
Below: First sea turtle hatchery in India.



Left Yearling basins and yearling Ridley's. Right: Three yearling green sea turtle.

which was kept dry for 3 hours after application. This drug resulted in rapid clearing up of the fungus, usually within 7 to 15 days. The younger turtles are more susceptible to fungus attack but recently the yearling from Lakshadweep was affected in the laminae of

the carapace. It did not respond well to treatment so "Jadit" solution (Auclosamide and Salicylic Acid) by Hoechat was tried with success after a prolonged healing time of about 2 months.

CHART I

RIDLEY

Measurements on 1-4-77

Carapace (cms) length	C. width	Plastron length	P. width	Headwidth	Weight (gms)	
Maximum	5.0	4.2	4.3	3.7	2.1	—
Average	4.9	4.1	4.1	3.6	2.1	20
Minimum	4.8	4.0	4.0	3.5	2.0	—
22-4-77						
Maximum	5.9	5.4	4.9	4.5	2.2	25
Average	5.5	5.1	4.6	4.3	2.2	22
Minimum	5.1	4.6	4.3	3.9	2.1	20
9-9-77						
Maximum	9.5	8.4	8.0	7.1	3.0	175
Average	8.9	8.2	7.6	7.0	2.9	—
Minimum	8.3	7.6	7.5	6.6	2.8	100
20-12-77						
Maximum	14	12	—	—	3.5	600
Minimum	11	10.5	—	—	2.9	360
30-7-78						
Average	18	20	—	—	—	1000
30-12-78						
Maximum	26.5	27	—	—	5.5	2700
Minimum	21	22.5	—	—	5.0	1500

GREENS

	CL	CW	HW	WT
30-7-78				
A(Madras)	64	62	—	32kg
B(Lakshadweep)	48.5	46	—	16kg
30-12-78				
A	64	62	95	32kg
B	51.5	47.5	8	18kg

HAWKSBILL

	CL	CW	HW	WT
27-6-78	10	10	—	125gms
31-1278	23	22.5	4.5	1500gms

CHART II

Approximate Feeding Schedule (chopped fish, crabs, clams)

		<u>Quantity per day</u>
Hatchling	— 6 months (5cm to 10cm length)	5-10gms
6 months	— 12 months (10cm to 16cm length)	10-30gms
12 months	— 24 months (16cm to 28cm length)	30-65gms

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