Protected from man’s depredations for thousands of years by vast stretches of the ocean, the Andamans offer unique opportunities to the naturalist.

Here is a first-hand report, specially written for Yojana, by two scientists who had carried out pioneering investigations in one of the Islands, the South Sentinel.

Dr Altevogt, the world’s leading authority on crabs, came all the way from the University of Münster to study the robber crab, and Dr Davis, a Professor at the Indian Institute of Statistics, Calcutta, interested in a variety of scientific subjects, accompanied him.

Giant Turtles and Robber Crabs of the South Sentinel

T. ANTONY DAVIS and RUDOLF ALTEVOGТ

The South Sentinel Island is one of the over 300 large and small islands that constitute the Andaman and Nicobar Islands, administered as a Union Territory of India by a Chief Commissioner appointed by the Government of India. It is located within the Andaman islands at about 11°N latitude, about a hundred km south of Port Blair, the capital. South Sentinel is a flat coral island, almost circular, with a coastline stretching to about 6 km. Lagoons mark about half the length of the shore, the rest being rocky or sandy. A magnificent sandy beach extends along the north-western coast which surpasses in beauty any other known beach of India. It is here that turtles, especially the green turtle, periodically come for nesting and/or sunning.

South Sentinel is uninhabited by man, and not many feet seem to have trod its soil since the great British naturalist, A. Alcock, visited it in 1905. The island has no sweet water for sustaining human life. Also, the suspicion that the Sentinelese, the isolated and protected tribals who inhabit the larger North Sentinel Islands, periodically visit the South Sentinel, keeps people away from entering the island even for collecting valuable timber and other forest produce. It is our earnest desire that notwithstanding the fear of the unfriendly tribals, South Sentinel should continue to be protected from man, who could be the worst enemy.

With permission granted by the Ministry of Home Affairs, we conducted two expeditions to the South Sentinel in 1973 and 1974, and studied the local fauna and flora with special attention to the coconut crab, also known as the Robber Crab.

Nesting Site for Green Turtle

Green turtle, scientifically known as Chelonia mydas, is the most valuable of all reptiles and famous the world over as the soup turtle. Its shell is a dirty green and its fat a light green, and hence the popular name. An adult green turtle weighs between 450 and 750 kg, and exceptionally healthy ones can weigh as much as 1,200 kg. The female becomes sexually mature when she is about 10 years old attaining a body length of about a metre. Green
turtle lives chiefly on marine grasses and algae although occasionally it devours jelly fish, molluscs and crustaceans. The present-day turtles do not have any teeth unlike some of their past ancestors.

Even though the meat of green turtle is regarded as a delicacy in most countries, in India, by and large, the importance of this protein-rich food is not yet relished by most except perhaps the Bengalees. A kilogram of turtle meat in Calcutta fish market is sold at rupees six or seven (mutton costs twice as much), and there are over 50 such markets doing daily business in turtle meat. A modest estimate suggests that about 10,000 turtles (green turtle and its cousin, the hawksbill turtle as well as the soft-shelled Gangetic turtles) are consumed annually in Calcutta alone. The meat of freshwater turtles is inferior to that of the sea turtles. Turtles caught along the Orissa and Andhra coasts are brought to Howrah by train, with their flippers tied and in an upside-down posture. The way they are slaughtered by the meat vendors is extremely cruel. Keeping the turtle in the helpless posture, limbs and chunks of meat are scooped out bit by bit from the live creature. The head is usually the last bit to be removed from the shell. A humane way of slaughtering the meek animal must be adopted. Instant death

during the hatching period, the eggs of some species are eaten by birds. In India, however, the eggs are preserved by means of salt. One can sometimes see a female lizard patiently waiting for the eggs of one of the lizard species. The hatching period is usually 80-90 days. After hatching, the young reptile is just like a chicken. It is never seen without its mother, and the fate of the eggs is left to the elements. When the young reptile is one month old, it is released into the wild and grows into a solid rock. If a sentient animal is found, the lizard is washed, dried, and placed on her lap. When the lizard eggs are hatched, the female lizard is released back into the wild. When the female lizard is not able to dig a burrow for her eggs, she leaves the place and attempts to nest elsewhere. The eggs are laid in a burrow or a crevice. When the eggs are ready to hatch, the female lizard moves to a nearby water body and shades the nest with her body. The young reptile is then released into the wild. The female lizard leaves her eggs to the young reptile and attempts to move on to another place.

Farrar writes: 'On the breeding grounds, the female does not attempt to nest in the wild, but prefers to lay her eggs in a burrow or a crevice. The eggs are then left to hatch in the burrow or crevice.'
can be effected by firing a captive bolt gun into the brain which can stun the nervous system resulting in immediate death.

South Sentinel is an ideal place for the nesting of green turtles as, fortunately, so far there is no human predation here. Among the other known predators of turtles, the only one we could encounter here was the monitor lizard (Varanus sp.). It is known that the mother turtle never shows any concern for the fate of her eggs which are left to be dug up by other predators. Some birds too take away the hatchlings as they emerge from nesting pits and march to the sea. In South Sentinel we actually saw a monitor lizard waiting impatiently as a turtle was laying. When the turtle finishes her job and moves into the sea, the lizard commences feasting on the eggs left behind.

During our expeditions, we saw female turtles at night surveying or digging the sandy beach, although none was sighted during the day. When we spotted mating turtles, as they do in the afternoons in shallow waters, we were sure of spotting the females on the beach at night. One of the several nests when dug out yielded 137 eggs which are of the size of table-tennis balls, but with a leathery shell. Turtle eggs are also considered a delicacy by many people, especially the Chinese. When we prepared omelette out of some eggs, people at Port Blair could not distinguish it from that prepared from hen’s eggs.

Farming and the difficult task of breeding green turtles have been attempted in some countries. But it is more popular to collect eggs from nature, hatch them at special pits (nests) and rear the young ones in protected tanks or lagoons. When they reach slaughterling size (about 50 kg, generally attained in 3 years) they are killed and the meat processed for making soup or steak. The U.S. firm, Mariculture Ltd., operating in the Grand Cayman islet of the Caribbean, is perhaps the first turtle farm. It is reported that over 60,000 turtles are being grown by them under cultural conditions, created in huge tanks with circulating sea water. Turtle meat requirement of the U.S.A., U.K., West Germany, Japan and the Caribbean are largely met by this firm. Turtle fisheries also operate in Cuba, in the Yucatan, other parts of Mexico, Costa Rica and Nicaragua. Similar turtle farms can be established in South Sentinel and a few other islands of the Bay of Bengal, and a small industry established at Port Blair or on the mainland, to process and export the meat. At present small quantities of meat as live turtle are sent from the Coromandal coast to Sri Lanka.

Den of Coconut ‘Robbers’

It is alleged that in some Pacific Islands, the world’s largest land crabs climb coconut palms, pluck the fruits, descend, peel off the husk, smash the shell, drink the sap, eat the kernel, and disappear in the jungle before the dawn of day. The crab is known as Robber Crab, and its scientific name, Birgus latro, also conveys the same meaning.

More fantastic attributes came from travellers, explorers, traders and even scientists. Charles Darwin, during his famous voyage on the ‘Beagle’, gained indirect knowledge and reported that a crab kept inside a metallic container escaped on making an exit by cutting open the bottom of the container with its powerful pincers. Rumphius described as early as in 1703 how a Birgus tied to a bar on board a ship lifted a goat passing by, clear off the deck. Explorers narrated how the huge claws of the giant would break easily a child’s forearm. To add to these accounts, tourists before the last World War would pay about Rs 50 to sip the fatty content of the crab’s abdomen to benefit from the alleged aphrodisiac effects.

Our present-day knowledge on the coconut crab has not improved appreciably from the status that could be surmised from the accounts given above. During our expeditions we could examine in the field hundreds of adult males and females as well as some juveniles, and study and film their behaviour as much as we could. Moreover, preserved specimens were taken to
Calcutta and Munster for further detailed studies on the form, structure and anatomy of the important organs of the crab.

South Sentinel is the northern-most locality in the Indian Ocean where Birgus survives. As the island has no human habitation and dangerous predators are absent, the crab is both diurnal and nocturnal in habit, whereas in most other regions in the Pacific and Indian Oceans, it has turned nocturnal, which makes scientific studies difficult.

By an unknown cause, the coconut crab in this island is deep blue in colour, which contrasts very stri-

kingly with those of others of its kind in other parts of the world which are predominantly yellowish or orange red. The reason has to be probed into.

Birgus can climb the coconut palm with ease. The form of the walking legs suggests that the crab is meant for climbing cylindrical objects. When it climbs upwards, it keeps the head always forward, and when it descends, the head is always directed towards the ground. There are contradictory reports in regard to the capacity of the crab to dehusk a whole coconut and break open its shell, some people believe it. In our investigations, an adult crab was found to lift a load of about 28 kg, pull a weight of 30 kg, and hang on even when one of its legs was tied to a weight of 5 kg.

The feeding habits and the mechanism of feeding were also studied. Among other subjects, the agonistic behaviour, digging behaviour and locomotion were studied in detail and also recorded by 16 mm cine sequences.

Using scanning electron microscopy (SEM), the structure of the sensory organs was studied. The SEM photographs revealed the sensory organs located on the ventral side of the antennula neatly arranged in a row. There are two types of organs, a hairlike one for tactile perception and the other, a chemosensory organ. The delicate chemosensory organs are protected by tactile receptors originating from the margin of the tento-labatory groove along its almost total length. According to these findings and in view of its visual and tactile stimuli, it seems that Birgus apparently relies on chemosensory and tactile stimuli rather than on visual or vibrational ones.

Plentiful Fish

The sea around South Sentinel abounds in a variety of fish, the most important species being tuna. Within 30 minutes of our stretching two nylon lines from our boat, our crew caught about 100 kg of fish, mostly tuna. Deep-sea fishing in the Bay of Bengal should yield plentiful harvests, and Calcutta can always be a good market provided cold storage facilities are adequate on the fishing vessels. Flying fish is plentiful here which is another potential creature for study.

South Sentinel does not appear to be suitable for oyster culture. But there is good scope for business on many species of ornamental shells, the important among them being the chambered nautilus which has an attrac-
Attracted the attention of mathematicians and biologists for centuries. Our tents were decorated with numerous nautilus shells, big and small, collected from the beach. It is reported that divers are not adequate in the Andamans to collect ornamental shells such as trochus, turbo and nautilus. There is no coral growth in close proximity with South Sentinel that could be harvested for ornamental purpose. However, the coral deposits would offer good material for carrying out research.

Ever-green Vegetation

Forests are by far the most important natural endowment of the Andamans. While 78 per cent of the total land is under forest, the entire South Sentinel is canopied by dense forest trees, lianas and brambles. A perfect ecosystem has evolved with interdependence of plants and animals over centuries of competition between species. Even the coconut crab for which the coconut diet is a must in several Pacific islands, has learned to live almost exclusively on non-coconut plant and animal food. This is a great encouragement for farming the crab. Introducing a few more species of wild fruit trees which can co-exist without competing with other species may provide additional food for some of the animals.

Field Investigations Essential

Fundamental knowledge on most of the unique animals that are associated with South Sentinel and some other islands of the Andaman and Nicobar groups is lacking. For example, the chief breeding areas of green turtle in other islands have to be marked and the season for each area and its annual egg harvest determined. The annual clutches and their size per female have to be studied. Methods for adequately safeguarding the hatchings from predators require to be evolved. Above all, studies on the migrations of the adults may yield very rewarding results. Archie Carr, an eminent authority on turtles, and his collaborators have brought out the astounding fact that a sub-population of green turtle living on the coast of Brazil swims with great precision to the Ascension Island in the central equatorial Atlantic Ocean 2,000 km away where it nests and breeds. This involves a journey of not less than sixty days each way. With the robber crab, the secrets to be unveiled are: 1. How do they communicate in the dark jungle and at night on the beach? 2. How are courting and copulation accomplished? 3. How well are the crab’s senses of smell, hearing and vision developed? 4. Is coconut absolutely essential for the crab’s healthy living? A thorough knowledge on the life history, from egg to adult, is essential to finally farm the creature as a source of food for man.

Deep-sea fishing especially for tuna has to be speeded up. Adequate knowledge on their population and migration will help avoid over-fishing. The large number of dolphins available here makes the area wonderful for study into their behaviour.

Before we conclude, we make an appeal to the Government to protect the South Sentinel and as many other islands as possible from the destructive hands of human beings. These surviving evolutionary laboratories may even excel the Galapagos Islands and India can be rightly proud of them.

We are grateful to the Ministry of Home Affairs for permitting us to carry out research work at the South Sentinel Island. We are also indebted to Messrs. Harman-dar Singh, the then Chief Commissioner, Jayakar-Blakion, the then Development Commissioner, and Captain Dennis-Heale of Port Blair for their generous help and guidance.—The Authors

15 August 1976