

## CHAPTER XI

### A TWO MONTHS' CRUISE IN THE LACCADIVE SEA

Ruins of a Stronghold of Mahratta Pirates. The Fauna of the Depths of the Laccadive Sea. Illustrations of the Philosophy of Thales. Cherbaniani Atoll. Byramgore Atoll and Chitlac Island. Dredging off Calicut. Kiltán Island: Life Assurance among Sea-urchins. Cardamum Island: The Feints of Crabs: A very rough Bed of Pumice-stone.

IN the second week of October 1891, having been relieved of my duties as Professor of Pathology and Resident Physician at the Calcutta Medical College, I rejoined the *Investigator* for my fourth and last voyage, and on the evening of the 17th the ship left Bombay to carry out her eleventh annual programme. Captain R. F. Hoskyn, R.N., was in command, with Lieutenants C. V. Smith, R.N., and W. G. Beauchamp, F. Dobson, and C. G. Sinclair, R.I.M., as assistants; and we also carried with us a boat-party, consisting of Lieutenants G. S. Gunn, R.N., and W. B. Huddleston, R.I.M., and a native surveyor.

We dropped the boat-party at Deoghur, or Deogad, a picturesque little port about 180 miles south of Bombay. This Deoghur was at one time one of the

headquarters of Mahratta piracy, and for such nefarious practices it is most villainously adapted; for, being a land-locked harbour opening on to a rocky coast by an almost hidden passage, impassable at low-water to any but light craft, it affords at once an ideal ambush and an ideal retreat. On the southern side of the harbour, overlooking the sea and commanding the entrance, is a fort, said to have been built at the beginning of the eighteenth century by pirates of the Mahratta clan of Angrias. Though now a ruin, its broad ramparts of hewn laterite are still in good enough preservation to give some idea of its former strength, and to make one wonder what sort of answer Melpomene would give if certain thrilling questions of its past history could be put to her; for in bygone days many a portly argosy of Europe veiled her high-top to the Angrias pirates, and the fate of many a white captive must have been decided in their inhospitable forts. Walking back to the harbour, I slew a deadly little carpet-viper (*Echis carinatus*), over whose body I preached a warning sermon to the boat-party who were having their camp pitched close by.

From Deoghur we went, south-west by south, into the Laccadive Sea, where we cruised for nearly two months, sketching and checking the position of the islands, running lines of deep-sea soundings, and occasionally taking a turn with the deep-sea dredge.

During this happy period, in addition to the usual out-turn of ordinary surveying work, eight successful hauls were made in depths of 700 to 1200 fathoms and one in 45 fathoms, about sixty specimens of deep-sea deposit were brought up and roughly analysed, and cursory zoological and botanical explorations were made of numerous reefs and atolls.

But before I give any account of my zoological observations on land, I must explain that they were the result of a series of short and hurried visits made, often late in the day, in company with survey-officers, whose primary duties were to take sights of the stars or to sketch in a bit of coast-line. In such circumstances it was quite impossible to form any opinion of the structure of the reefs visited: this can only be done by making large collections of growing corals, which demands exact local knowledge, very fine weather, and opportune tides—conditions, in short, that can only be secured by residence. With this limitation of my subject, I may now speak first of the Laccadive Sea, and then of its islands.

We have been accustomed to give the name Laccadive Sea to the narrow basin included between the Malabar coast on the one side and the peaks or plateaux that lodge the Laccadive Islands on the other. On the Malabar side, its bottom, which consists of dark mud brought down by small rivers from the Western Ghats, slopes very, very gently, the

gradient varying from 1 in 660 to 1 in 300, to a depth of 100 fathoms; but after that, at a distance of 75 to 35 miles from shore, it makes an exceedingly steep descent—the gradient being about 1 in 19—down to 1000 fathoms, the bottom still being mud derived from the land. In fact, if the water could suddenly be run out of this sea, we should find the Malabar coast fringed by a shelf of mud from 50 to 100 miles wide, and having a steep fall of more than 5000 feet. On the Laccadive side the bottom is utterly different: here from a broken and uneven bed of calcareous ooze the reefs and islands rise suddenly up, as a chain of mountain peaks rise out of an undulating plain. The calcareous ooze is made up partly by the waste of the coral-reefs themselves and partly by the shells of Foraminifera that fall from near the surface of the sea. Besides the mud and calcareous ooze already mentioned, we find in places “green sand,” which largely consists of the shells of Foraminifera — or casts of them — impregnated with glauconite. As to the depth of the Laccadive Sea, the deepest sounding yet taken, a little south of lat.  $10^{\circ}$  N., is about 1500 fathoms. Its surface temperature ranges between  $80^{\circ}$  and  $90^{\circ}$  Fahr., according to the time of year; but its temperature at 1300 fathoms is only  $35^{\circ}$  Fahr., at about 1000 fathoms is only about  $38^{\circ}$  Fahr., and even at 300 fathoms is not higher than  $51^{\circ}$  Fahr., which is

about the summer temperature of the sea-surface in the neighbourhood of the Shetland and Faroe Islands.

Not to speak of the countless animals that inhabit the shores and shallows as well as the surface waters of the Laccadive Sea, we already know of nearly 250 species that dwell in its cold and dark depths below 300 fathoms, species which, for reasons already noticed, are of very diverse kinds, belonging to over 160 genera, about eighty different families, and nearly thirty different natural orders. Corals flourish with surprising vigour in its profound gulfs: at one spot, at a depth of 1000 fathoms, over two hundred specimens of *Caryophyllia ambrosia* were dredged, and at another place, in 430 fathoms, the trawl brought up nearly half a ton of *Caryophyllia*, *Desmophyllum*, *Lophohelia*, and *Solenosmitia*: altogether, thirteen different kinds of corals have been dredged in its depths between 430 and 1070 fathoms.

The starfishes are another class of animals that appear to find in the abysses of the Laccadive Sea a particularly pleasant residence: sixteen species of true starfishes have already been discovered there, and eighteen species of brittle-stars—most of them in great abundance. Crustaceans also are abundant, nearly eighty species having already been found, half of them being forms that cannot swim, and so must live actually on the bottom. Of mollusks we know of nearly forty species: the commonest of them seem to

be the blind scallops of the genus *Amussium*, and one of the strangest is *Pontiothauma mirabile*, whose shell grows to a length of  $4\frac{1}{2}$  inches, and looks just like that of a large whelk from the northern seas. The creature itself is without eyes, and although it is a Gastropod, has, according to Mr Edgar Smith, no radula. Lastly, in depths where there is such a plentiful supply of food, in the shape of crustaceans and mollusks, it is not surprising to find that fishes are numerous. Nearly fifty species have already been discovered, of which twenty are, so far as our present knowledge goes, peculiar to the shades of this sea.

To sum up: if we could make a Brobdingnagian picture of the basin in which this deep-sea fauna lives, we should first of all be struck by the abundance of rare corals: we should see large solitary species growing like flowers of the field, while the branching species would form thickets in whose grottoes crustaceans of many kinds would be observed lurking. In some places the bottom would be carpeted with a mosaic of starfishes of beautiful red and orange hues, in other places multitudes of the reed-like tubes of the sea-worm *Hyalinœcia* would show like fields of stubble, while in other places we should find beds of strange bivalves (*Amussium*, *Lima*, *Limopsis*) like the oyster-beds and mussel-beds of shallow water; and through the dead-still waters above, shoals of curious

fishes and prawns would be seen cautiously feeling their way.

Intrinsically attractive as this fauna of the Laccadive deeps is, it excites our interest still more when we discover that many of its most striking species are also inhabitants of the Atlantic, and in particular of that part of the Atlantic in which the West Indian Islands lie. Two of the most remarkable of the Laccadivean crustaceans, namely, the huge Isopod (*Bathynomus giganteus*) and the blind spiny-lobster (*Phoberus cæcus*), are Caribbean species, as also is the spiny hermit-crab (*Lithodes agassizii*), not one of the three being endowed with any but the most moderate powers of locomotion. Perhaps the most conspicuous, and one of the most abundant of the Laccadivean sea-urchins is a *Palæopneustes* (*P. Hemingi*), which is very doubtfully distinct from the *Palæopneustes cristatus* dredged by Agassiz off the West Indies. But if I were to name all the species that are common to the depths of the Atlantic and of the Laccadive Sea, it would be necessary to make quite a long list, including corals, echinoderms, crustaceans, and fishes.

We may now pass on to the reefs and islands of the Laccadive Sea, of which it may be said that in strict accordance with the theory of Thales of Miletus, their origin is water ; for, in the first place, coral rock

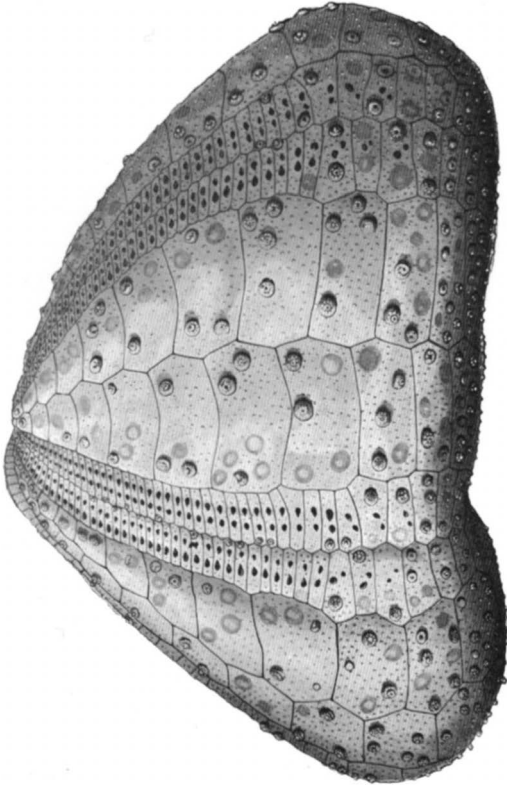


FIG. 22.—*Palaeopneustes hennigi*, Anderson, a Sea-urchin discovered by Dr. A. R. S. Anderson in the depths of the Laccadive Sea. It is hardly different from the *Palaeopneustes cristatus* dredged by Professor Agassiz off the West Indies. The shell has been denuded of its spines, so as to lay bare its sculpture.



secreted from seawater by sea-anemones, was piled into a low crown of dry land by the waves, and then this dry land was overspread by coconut palms, whose seeds were very likely carried by ocean currents. Again, from these coconut palms that probably owed their birth to Oceanus, a cycle of life starts and comes back by way of articulate-speaking man to coconuts again; for in such of the islands as are inhabited, the people live upon the products of the palm, and after death, being buried beneath the palms, restore to these their borrowed elements.

The first place that we visited was Cherbaniani, which from afar showed up from the universal blue as a disk of emerald, girdled by a ring of snow-white foam. The emerald disk was the lagoon, and the white ring that encircled it was the surf breaking upon the submerged atoll. Even in the finest weather, when the sea appears to be perfectly calm, the surf is one of the most impressive features of these atolls; for the gentle vertical undulations of the water, which pass unnoticed in the open ocean, break into impetuous horizontally-moving waves whenever they encounter the sudden obstruction of a reef. This surf, which only the turtles seem to enjoy, makes landing a matter of much inconvenience at all times.

Cherbaniani is a simple ring of coral rock, which only at two small and far-distant points rises a few feet above high water, as two dazzling white eyots

of coral sand. It is one of the most desolate places that I have ever set foot on. Almost all the coral that I saw was dead; not a sign of a plant, or even of a cast-up seed or nut, was visible; and the only animals to be seen, besides a flock of small sand-pipers and an occasional bo'sun bird, were hermit-crabs of the genus *Cænobita*, and grapsoid crabs of the genera *Grapsus* and *Ocypoda*. Even the lagoon supported but little animal life, though there were plenty of seaweeds in it, and in a whole afternoon of steady work I got nothing of any very great value; perhaps my most interesting find was two pairs of little shrimps (*Pontonia*), each consisting of a male and a brooding female, living comfortably, each pair in the mantle cavity of a giant clam (*Tridacna*). Mr A. O. Hume, who visited this atoll in February 1875, in the survey ship *Clyde*, found the noddy and the sooty tern breeding; but nothing of this sort was going on at the time of our visit at the end of October, and we did not see so much as an egg-shell.

From Cherbaniani we sounded away southwards to Byramgore atoll, which only differs from Cherbaniani in being a little larger, and in being completely covered at high tide. As it was far too rough to land on the reef when the ebb laid it bare here and there, I addicted myself not to sack but to fishing, but without success, owing to the multitude of small sharks, which appropriated everything that I hooked.

Our next line of soundings took us to Chitlac, but here again it was impossible to land on account of bad weather, so we went on to Calicut for supplies, and on the run down the Malabar coast we trawled with most satisfactory results in 45 fathoms, bringing up a deck-load of fishes and crabs and mollusks, many of which were new to science. Among the fishes there were nine specimens of the little *Minous inermis* mentioned in a former chapter, eight of which were overgrown with the commensal polyps (*Stylactis minoi*) that are never found elsewhere; for not a single polyp of this species was detected on any of the hundreds of specimens of other animals that came up in the trawl. Of the many kinds of mollusks the most attractive was a fine new species of *Murex*, which Mr Edgar Smith has named *Murex malabaricus*. We have since, however, found the same species in the Bay of Bengal.

After leaving Calicut, where we had more than our share of foul weather, and where the ship took on such abominable fits of rolling as to quite stop my work, we went to the island of Kiltán. Here we found the inhabitants in much distress and anxiety, for not only had the recent storms destroyed, so they said, 8000 of their coconut trees, but the boat which had taken a large cargo of their coir to the mainland, and was expected back with a much-needed supply of rice, was overdue, and in such

weather they feared greatly for its safety. Accidents of this kind are not uncommon in the Laccadives.

As we lay at anchor off Kiltán, I fished for coral with a grapnel, the bottom in 6 fathoms being as clear and plain as a picture, but the only piece that I brought up was dead. On breaking it open I laid bare the burrow of a small species of sea-urchin (*Echinostrephus molare*), in appearance something like the bud of a Scotch thistle, which digs into hard coral rock after the fashion of a Pholad, or of a shipworm into timber. The sea-urchin was in the bottom of its burrow, resting upon a small hoard of boiled rice, which it was eating. Of course it will be said that the rice, which no doubt had been thrown overboard from the ship, had simply fallen into the burrow during the sea-urchin's absence, but I convinced myself, by a very careful examination, that this could hardly have been the case. It is certainly difficult to give a sea-urchin credit for so much intelligence and activity as is implied by the storing up of food, but there is a good deal of evidence on record to show that among echinoderms the senses are acuter and the intelligence greater than some of us have hitherto imagined.

By the time that we landed on Kiltán the stars were shining, and although this suited the surveyors it sadly interfered with my plans.

The following morning we went on to Cardamum Island, which occupies the eastern arc of a large atoll

THE MALABAR MUREX.

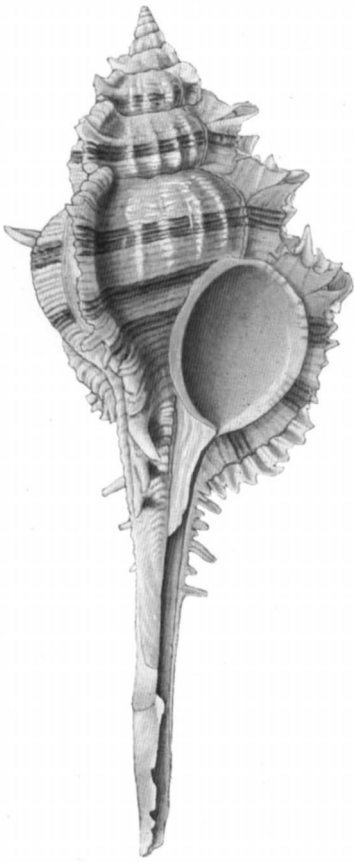


FIG. 23.—*Murex malabaricus*, dredged off the Malabar coast from a depth of 45 fathoms. This species is also found on coral ground in the neighbourhood of the Andamans, at a similar depth.

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south of Kiltán. Though it is the largest island of the whole archipelago, if Minnikoy be excluded, yet it is—or at any rate was—singular in being very little inhabited. The northern half of the island, instead of being covered with coconut trees, was a waste of coarse high grass, scrub jungle, and thickets of screw-pine, tenanted only by the inevitable hermit-crabs. As the soil is quite as good as that of any of the other islands, and as there is the usual abundant supply of fresh water a few feet below the surface, I could not account for this appearance of neglect; but Mr A. O. Hume, who explored the island in 1875, seems to think it is the result of an oppressive influence exercised by the capitalists of the adjacent small but thickly-populated island of Ameni. At the southern end of the island, sequestered in a grove of coconuts, we found a small village of very second-rate huts, built for the most part of palm-leaf matting. Here, too, there were fine lime-trees growing, and bearing fruit such as one seldom sees in India; so that I began to think that with such trees and such suitable soil, and with the markets of India so close at hand, the Cardamum Islanders were sinfully neglectful of their opportunities. However, these tranquil folk are probably the best judges of their own affairs: they are few; there are coconuts enough and fish more than enough, and the climate if not always afternoon, is always balmy; and perhaps they are vaguely aware that—especially if their power-

ful neighbours of Ameni are, as has been said, jealous and overbearing—riches only lead to trouble, and that desires gratified only beget further vain longings, and that after all light sleep beneath ancestral palm trees untroubled by fear or greed, means a pleasant if unromantic existence.

On the sandy beach of the Cardamum lagoon there were many swarms of the large grey Ocyode crab (*O. ceratophthalmus*). This crab, instead of flying swiftly to its burrow when pursued, as most of its congeners do, simply crouches close in a rudely-scooped hollow, and there lies perfectly still, looking like a stone partly embedded in the sand. Whether this curious feint is to be regarded as the starting-point of the burrowing habit of the Ocyodes, or as a convenient simplification of that habit, it is difficult to say. Judging, however, from the prevalence with which, among the higher Crustacea, species are protected by their resemblance to inanimate objects, such as bits of worm-eaten rock, etc., I should imagine that the ancestors of the Ocyodes were a stock of crabs that escaped the eyes of their enemies by crouching motionless in unlikelike attitudes, and that one branch of this stock was perpetuated by certain individuals that crouched so close as to make a "form" or hollow in the sand. This would give abundant protection to a species such as *Ocyopoda ceratophthalmus*, whose colour harmonises with that of sand, but would be insufficient for conspicuously

coloured species such as *O. macrocera*. But among those descendants of the original stock that happened to be brightly coloured, some individuals would certainly—since inequality of powers and performance is one of the facts of nature—have scratched deeper holes than others; and as those which did not scratch deep would be the most likely to be seen and destroyed, we should in the course of long generations have only the very good diggers left to form an active, deep-burrowing species.

One of the most singular observations made on Cardamum Island was due to Lieuts. Smith and Sinclair, who discovered, a little inland of the northern end of the island, a bed of pumice-stone. Lieut. Sinclair was particularly and very literally impressed by it, because, going ashore to “take stars” one evening, he had to sit upon it, nor was he able either to dig down to softer ground beneath, or to find a convenient spot that was free from it. Both officers were quite sure that it was pumice, and even the lascars, who are constantly using the article, took notice of it. Unfortunately when I heard about it next morning, Cardamum Island was far astern of us. How did the pumice-stone get there, above the ordinary high-water mark on an almost uninhabited island? This, like Sir John Falstaff, I must leave—a question to be asked; for I unhesitatingly dismiss the explanation which has since been made, that two intelligent and experienced naval officers do not know what pumice is.



I still retain happy memories of Cardamum, for it is the only one of the inhabited islands that we visited where I was able to stroll about and collect without being followed by a crowd of importunate patients afflicted with hopelessly chronic and incurable diseases.

NOTE.—In a paper published in the *Journal of the Asiatic Society of Bengal*, pt. 2, for 1895, Captain C. F. Oldham, R.N., gives, in some detail, an account of the bed of pumice discovered on Cardamum Island by Lieuts. Smith and Sinclair. Captain Oldham differs from me in thinking that the phenomenon demands no special explanation.

# A NATURALIST IN INDIAN SEAS

OR, FOUR YEARS WITH THE ROYAL  
INDIAN MARINE SURVEY SHIP  
"INVESTIGATOR"

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