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XXIX. *Account of the Pearl Fisheries of the North-West Coast of the Island of Ceylon. By Captain JAMES STEUART, Master Attendant at Colombo. Communicated by Lieut. Colonel WILLIAM M. G. COLEBROOKE, of the Royal Artillery, F.R.S., M.R.A.S., &c. &c.*

Read the 2d of February 1833.

It would give me great pleasure, were it in my power to explain the little I have remarked on the nature of the pearl-oyster, in the style the subject requires. Having had opportunities of obtaining a general knowledge of most fisheries, I cannot but regret that my attention was so wholly absorbed by professional pursuits, that very little was bestowed on the natural history or habits of the animal in question.

Encouraged, however, by a desire to assist inquiry, I shall feel most happy if I can be the means of furnishing the naturalist with any information respecting the pearl-oysters of Ceylon, which he may not have the means of acquiring by personal observation.

The natives of this country have an idea, that pearl-oysters are rained from the clouds; the origin of this supposition I attribute to the well-known effect of water-spouts passing over the sea.* Leaving the subject of generation (on which the natives have many ridiculous opinions) to the learned and scientific, I shall notice the first appearance of pearl-oysters, when they are seen in immense clusters floating about the sea, so minute in size that a casual observer would pass the floating masses as fish spawn of some kind, but never would suppose them to be oysters.

In this state, the sport both of the wind and the current, they are driven round the coasts of Ceylon, until increased size causes them to sink to the bottom; they then attach themselves to rock (which is generally coral) or any heavy substance, by means of a beard, with which nature has furnished them similar to the muscle, or they adhere in clusters to each other. I have heard that some naturalists consider what is called the pearl-oyster to

* Perhaps also to the fact that, in some parts of the East, the spawn of certain fish is suspended in vapours, and brought down by the rain.

be properly a muscle, on account of its beard and the broad hinge of the shell. I will venture to say, however, that all fishermen would call them oysters, not only from the appearance of the shells, but also from that of the fish itself. On removing a wooden buoy that for about six weeks had been attached to an anchor in this port, it was brought on shore covered with pearl-oysters nearly as large as a shilling. The finest pearl in possession of the *Maricair* of *Killicarre* is said to have been obtained from a bank off *Chilaw*, but it appears that oysters very seldom arrive at perfection on any banks except those off *Arippo*; the coral banks off the coasts of this island, lie from one to six or eight miles from the shore, generally exposed to the strength of the monsoons and currents: those near *Arippo* appear to be the least exposed.

The three last fisheries on the *Arippo* banks have been in five and a-half to seven fathoms water, protected on the west and south-west by a ridge of sand and coral extending from the north point of an island called *Caredivan*. Coming from sea-ward, the depth of water over this ridge is two and three-quarters or three fathoms, but it rapidly deepens to seven fathoms in the immediate neighbourhood of the oyster beds, while, besides this peculiar protection from the violence of the south-west monsoon, the coral banks to the northward of the pearl banks are in many parts nearly level with the surface of the sea, and may form an essential safeguard to the oysters from the effect of the currents in the north-east monsoon.

Thus secure in deep water lie the quiescent oysters, adhering to their coral homes, until age has enfeebled the fibres of their beards, when most of them break from their hold, and they are found in perfection on a sandy bottom near the coral beds. Two-thirds of the oysters taken up last fishery were from such a situation.

One of the most intelligent divers I have met with, fixes the age of the oyster at six years and a-half, when it breaks away from the rock: he does not think it can forsake the rock at its own pleasure, but when separated, it has the power of moving, on a sandy bottom generally, with the hinge directly in advance. When I first sounded on the ridge which runs from *Caredivan* Island, I was struck with its importance as a guide to the particular spots of oysters, and was surprised I had never heard of its existence. I caused inquiry to be made, and after some time, was informed that the traditional account of it by the natives of that part of the country is, that a powerful queen once resided at *Codremalli*, and that the dead from the city were

placed on an island thus situated in the sea, and which has since disappeared. I am however inclined to believe the ridge is rising coral and sand.

The best pearls are generally found in the most fleshy part of the oyster, near the hinge of the shell, but they are also found in all parts of the fish, and adhering to the shells. I have known sixty-seven pearls of various sizes found in one oyster. It is by no means certain that every oyster contains pearls, and they are seldom found in those oysters which would be selected as the finest for eating: this favours the opinion that pearls are produced by disease in the fish, and therefore pearl-oysters are seldom eaten, being considered unwholesome. If a pearl be cut in two pieces, it will be seen that it is formed of separate coats or layers similar to an onion, and is no doubt composed of the same matter as the shell.

Persons who may have been in the habit of considering a pearl-oyster as a treasure, will be astonished to learn that a bushel of them can be purchased at *Aripipo* during a fishery, for a less sum than a bushel of common oysters at Feversham or Colchester. What therefore could have been the idea of those who induced the pearl-fishery company to send out diving-bells to fish with?

Before the fibres of the beards break, and the oysters separate, they are in immense heaps and clusters; a diver, describing how thick they laid on the bank, placed his hand to his chin; but a more intelligent diver estimated the depth of the beds of oysters seldom to exceed eighteen inches, and explained that large rocks at the bottom, when covered with oysters, may be mistaken for heaps of oysters.

Pearl-oysters are said to arrive at perfection in seven years; and after attaining this age, they soon die. I have heard of an attempt being made to remove pearl-oysters, as common oysters are removed in Europe, to richer and more secure ground, but without success. I once attempted to convey some alive from *Aripipo* to *Colombo* by sea, having the water frequently changed, but on the second day they were all dead.

The boats used at pearl-fisheries measure from eight to fifteen tons, and are without decks. The head and stern are nearly alike, the latter having a slight curve, and the stern-post being generally straight: both have considerable rake, but the stern has most; a boat that will measure forty feet over all, will not exceed twenty-eight feet in length at the bottom. They have no keel; the bottom is round, and the breadth of the boat increases to the top of the gunwales. They are rigged with one long rude mast, and

carry one lugsail, made of light cloth loosely sewed to a tight coir rope, so that it blows out very much ; or, as a sailor would say, it is roped tight, bags, and stands badly on a wind. These rude fittings subject them to frequent accidents ; and they often require the assistance of the boats of the master-attendant's department to tow them to shore.

With a favourable wind they sail very well, but cannot hold to the wind, or beat against it. They leave the shore with the land-wind about midnight, to proceed to the bank, a distance varying from nine to twelve miles ; they are led by the *Adapanárs'* boats, in the direction of the government guard-vessel, which is at anchor close to the fishing-ground, with lights hoisted on board to guide the boats to the place.

If they reach the bank before daylight they anchor close to the government-vessel until half past six o'clock, when the inspector hoists the signal to commence diving. When the weather is settled and favourable, the land-winds begin to die away as the sun gets up, by nine or ten the sea is quite calm, and at noon (when the gun is fired from the government-vessel for all diving to cease) a pleasant sea-breeze springs up, with which they run the boats to land.

When the regular land and sea-breezes are interrupted, which frequently occurs, they have to use their paddles (long sticks, with an oval piece of board lashed on the end), for the purpose of oars ; and sometimes the fishery is stopped, until the return of favourable weather with regular land and sea-breezes.

The crew of a boat consists of a *tindal* or master, ten divers, and thirteen other men, who manage the boat, and attend the divers when fishing ; each boat has five diving stones, the ten divers relieving each other, so that five divers are constantly at work during the hours of fishing.

The weight of the diving-stones varies from fifteen to twenty-five pounds, according to the size of the diver ; some stout men find it necessary to have from four to eight pounds of stone in a waist-belt, to enable them to keep at the bottom of the sea till they have filled their net with oysters : the form of a diving-stone resembles a pine, and it is suspended by a double cord.

The net is of coir-rope yarns, eighteen inches deep, fastened to a hoop eighteen inches wide, fairly slung to a single cord. On preparing to commence fishing, the diver divests himself of all his clothes except a small piece of cloth ; after offering up his devotions, he plunges into the sea, and swims to his diving-stone, which his attendants have hung over the side of the boat ; he then places his right foot or toes between the double cord on

the diving-stone, and the bight of the double cord being passed over a stick projecting from the side of the boat, he is enabled, by grasping all parts of the rope, to support himself and the stone, and raise or lower the latter for his own convenience, while he remains at the surface; he then puts his left foot on the hoop of the net, and presses it against the diving-stone, retaining the cord in his hand; the attendants taking care that the cords are clear for running out of the boat.

The diver being thus prepared, he raises his body as much as he is able, drawing a full breath, and pressing his nostrils between his thumb and finger, he slips his hold of the bight of the diving-stone double cord, from over the projecting stick, and descends as rapidly as the stone will sink him.

On reaching the bottom, he abandons the stone (which is hauled up by the attendants to be ready to take him down again) clings to the ground, and commences filling his net: to accomplish this, he will sometimes creep over a space of eight or ten fathoms, and remain under water a minute; when he wishes to ascend, he checks the cord of the net, which is instantly felt by the attendants, who begin hauling up as fast as they are able; the diver remains with the net until it is so far clear of the bottom as to be in no danger of upsetting: he then pulls himself up by the cord, which his attendants are likewise pulling, and when by these means his body has acquired an impetus upwards, he forsakes the cord, places his hands to his thighs, rapidly ascends to the surface, swims to his diving-stone, and by the time the contents of his net have been emptied into the boat, is ready to go down again. A single diver will take up in a day from one thousand to four thousand oysters.

They seldom remain above a minute under water: the more common time is from fifty-three to fifty-seven seconds; but when requested to remain as long as possible, I have timed them from eighty-four to eighty-seven seconds: they are warned of the time to ascend by a singing noise in the ears, and finally by a sensation similar to hiccough.

Many divers will not venture down until the shark-charmer is on the bank, and has secured the mouths of the sharks: while some are provided with a written charm from their priests, which they wrap up in oil-cloth perfectly secure from the water, and dive with it on their persons. Others, being Roman Catholics, appear satisfied with an assurance from their priest that they have his prayers for their protection; but I am informed they are all happy to secure the interest of the shark-charmer.

This worthy man is paid by the government, and is also allowed a perquisite of ten oysters from every boat daily during the fishery.

On my first visit to the pearl banks, the shark-charmer informed me that he obtained the charm from his father ; that the only real power of securing the mouths of the sharks was possessed by his family, and that it would be exceedingly dangerous to trust it to any other person ; he also gave me to understand that if he were to explain the charm to me, it would lose its virtue in my possession. I requested him to charm a shark to appear alongside the vessel ; he said he could do it, but it would not be right, his business being to send them away. At several subsequent visits I renewed my request without effect.

During the few days we were employed marking off the ground to be fished, a shark was seen and reported to me ; I instantly sent for the shark-charmer to be brought before me, and desired him to account for permitting a shark to appear at a time when alarm might have a serious influence on the success of the fishery. He replied that I had frequently requested him to summon a shark to appear, and he had therefore allowed this one the liberty to please me.

When on board the "Cumberland" south-seaman, I remember seeing a man bitten by a shark ; the crew were employed cutting the blubber from a dead whale alongside the ship, and on these occasions it is necessary for a man to go on the whale to hook on the blubber to be hoisted into the ship : the man has a belt of canvas round his waist fastened to a cord, held by a man on deck. At these times innumerable birds and hungry fish assemble round the ship. The unfortunate man had one foot pressed into the flesh of the whale, and the other stretched in the sea, when the second mate observing a shark in the act of seizing the man's leg, with great presence of mind and admirable precision, darted his spade (the instrument he was using to cut the blubber) at the neck of the monster, and nearly severed the head from the body, at the moment that the animal had seized the man's leg ; the teeth of one jaw made a serious wound, but the teeth of the other jaw only made a number of small holes in the skin ; in six weeks the man was able to resume his duty. It is only when pressed by hunger that sharks are so bold ; they are naturally timid, and would rarely venture near a body of divers. The noise made by the boatmen when at work is the great protection.

The pearl fisheries off *Arippu* take place in March, when the north-east monsoon has abated, and before the south-west has commenced. The pearl

banks are examined in November, between the close of the south-west monsoon and commencement of the north-east, by the collector of *Manár*, who is the supervisor, attended by the inspector and the interpreter. The vessels employed on these examinations are a government guard vessel, two sailing-boats from the master-attendant's department at *Colombo*, and about eight native fishing-boats (as before described) from *Manár* and *Jaffna*; on these occasions the boats are furnished with one diving-stone and two divers. Five or six native head-men, called *adapanárs*, also attend, and go in the boats to see that the divers perform their duty, and to take notes of the reports given from time to time by the divers for the information of the supervisor. Samples of the oysters are taken up and forwarded to *Colombo*, with a report on the state of the banks, by the supervisor. On these samples depends the decision of government as to a fishery in the following March.

So many years had passed since the fishery of 1814 without one of any consequence having taken place, that it gave rise to various conjectures as to the cause of the failure. Some were of opinion that violent winds and currents buried the oysters in the sand, or drove them entirely away; some supposed the *adapanárs* and divers employed at examinations, gave false reports, and that the banks were plundered by boats from the opposite coast. It was also said that former fisheries had been so extensive as to have injured the oyster-beds; the natives attributed it to various devouring fish, and also to a failure of seasonable rain, which they deem absolutely necessary to bring the oysters to perfection.

To prevent plunder, a government vessel has been kept stationed on the banks during the season of the year that boats can visit them; and to insure correct reports, diving-bells have been used to enable Europeans to go down at examinations.

Without venturing to contradict a pretty general opinion, that the failure of the pearl fisheries for so many years has been owing to the effect of strong winds and currents, I am not at the same time prepared to admit that this has been the cause. Too much confidence in the knowledge of the *adapanárs* may have led to error, and consequent failure; they are not like the experienced fishermen of Europe; indeed they are not fishermen at all, they do not even know how to manage their boats.

How often for weeks, during winter gales, cod-smacks cruise about the North Sea, without a glimpse of land, the master unable to write his name,

and yet so skilful is he, that without the use of figures, when he has obtained his cargo of fish, he shapes his course for a market, making Cromer or Lowestoff with a precision that would do credit to a circumnavigator. Ever anxious for the success of his voyage, if the wind be contrary, the master will not trust the helm to other hands, but night and day continues at the helm until favoured by the wind, or until worn out by fatigue he can stand no longer. Energy like this is no where to be found within the tropics, and cannot be expected of the *Adapanárs*: but I certainly did expect to find them leading men in their profession, excelling the common fishermen of the country. They appear to read the compass, and to have the same fixed courses, as steered by their ancestors, from *Arippo* to their variously named pearl banks; but they are useful men, only as a medium of communication between the divers and the officers of the fishery. Little, indeed, appears to have been the improvement of the fishermen, or their means of fishing, since the days when the pearls of CLEOPATRA's ear-rings were landed at *Condatchy*.

The pearl banks off *Arippo* and *Condatchy* lie at a considerable distance from the low land, with few remarkable objects in view; the banks are extensive, the masses or beds of oysters are of various ages, according to the season in which they may have settled. Very many of these masses or beds are by no means so extensive as has been imagined, and nothing is more easy than to mistake one bed for another, particularly by the *Adapanárs*, who are guided chiefly by the course they steer from the *dorric* at *Arippo*; and that which they call the north-east *Chival*, to-day, may be called the south-east to-morrow.

I have heard that samples of oysters have frequently been taken up by order, from banks inspected the previous year, and found nowise improved, and sometimes the samples have been younger. This, I venture to say, shews that although there has been no difficulty in finding plenty of oysters on the banks, there has been great difficulty in finding the same spot a second time; and it proves that the greatest care and skill are necessary to mark the particular spots, beds, or masses on the bank from whence the samples are taken, and that this cannot be expected by mere compass bearings and soundings, or even by astronomical observations. It requires an union of talent and professional tact, with alacrity in the pursuit; and should it ever happen that the person possessing these requisite acquirements, be placed at the head of the establishment for a sufficient length of time,

considerable improvements in the fishing, with a facility and certainty of increased revenue, will be the result; and all difference of opinion, doubt, and suspense, will be at an end.

* * * THE following letter from the Right Honourable Sir ALEXANDER JOHNSTON, V.P.R.A.S., with the Note accompanying it, is inserted as bearing reference to the Map of the Pearl Banks, which has been prepared to illustrate the preceding paper.

To GRAVES C. HAUGHTON, Esq., M.A., F.R.S., Secretary to the Royal Asiatic Society.

19, Great Cumberland Place, March 30, 1833.

SIR :

I beg leave, in answer to your letter of the 16th of February, to recommend to the Council that Captain STEUART's "Account of the Pearl Fisheries on the North-West Coast of the Island of Ceylon," be printed in the *Transactions* of the Society; and that, in order to enable the public to become better acquainted with the relative situation of the Pearl-banks, a copy be annexed to it of the map of the gulf of *Manár*, framed by Mr. HERBERT, of the Colonial Office, principally from the materials which I presented to that office some time ago, and which I collected while I was on the Island of Ceylon, with a view of explaining a report upon the fisheries, geology, and natural history of the gulf, which I made to the late Marquess of LONDONDERRY, the then Secretary of State for the Colonies, in 1809, when I submitted to his Lordship a plan for changing the system observed by the Ceylon government, in the management of the Pearl and Chank* fisheries on the North-West Coast of Ceylon, for placing all the Pearl and Chank banks in the gulf of *Manár*, as well those belonging to the East-India Company as those belonging to the Crown, under one and the same management; and for executing without delay a survey of the whole of that Gulf by able and scientific men, who could procure on the spot for His Majesty's Government such information relative to the history,

* The Chank-shell, or *Voluta gravis*.—Vide *Transactions of the Royal Asiatic Society*, vol. i. p. 543†, note (B).

the winds, the currents, the marine productions, and the coral formations* of every part of the gulf, as might enable them to form a scientific and a deliberate opinion upon all the questions connected with the Pearl and Chank fisheries, upon the practicability, expense, and advantages of widening and deepening the passage between the peninsula of India and the island of *Rámiseram*, called the *Paumbam*, and that between the island of *Manár* and the island of Ceylon, called the *Manár* Pass; and upon the measures necessary to render those two passages again what they were from the remotest age to the fifteenth century, an efficient cause of the agricultural and commercial prosperity of the several countries situated between Cape *Comorin* and Point *Calymere*, on the peninsula of India, and between the ancient town of *Mantotte* and the celebrated harbour of *Trincomalee* on the island of Ceylon.

I have the honour to be, Sir,

Your most obedient humble servant,

(Signed) ALEX. JOHNSTON.

NOTE.

IN this Report, Sir A. JOHNSTON alludes, in addition to other information, to that which he had derived from the following sources:—First. From the accounts given by the *Hindús* of the several historical facts, upon which the *Hindú* poet who composed the *Rámayana* (a Sanscrit poem, said by the *Hindús* to have been composed many centuries before the Christian æra), founded the description which he gives of the conquest of the island of Ceylon, the destruction of its tyrant *RÁVANA*, and the deliverance of *SÍTA* from her imprisonment on that island by *RÁMA*, whom he supposes to be the tenth incarnation of *VISHNÚ*: of the manner in which *RÁMA* and his army crossed over the gulf of *Manár* from the peninsula of India to the island of Ceylon, along the ridge of rocks known at present by the name of ‘*ADAM’s Bridge*,’ and of the various circumstances under which *RÁMA*, after his return from Ceylon, built a temple on *Rámiseram*,

* The late Marquess of LONDONDERRY, upon the recommendation of Sir ALEXANDER JOHNSTON, intended in 1810, had he remained in office, to have sent a naturalist out to Ceylon for the express purpose of investigating the natural history of the Pearl-oyster, the Chank-fish, and the Coral insect in the gulf of *Manár*. The Pearl-oyster and Chank-fish are sources of considerable revenue to the Ceylon government, and the coral insect is a most active agent, as is well known, in bringing about some of the greatest changes on the surface of the globe. Such an inquiry, therefore, must be at all times an object of great public interest.

the *Insula Solis* of the Romans, an island situated between the peninsula of India and the island of Ceylon, from the meridian of which many of the *Hindú* astronomers commence their calculations, and a place as celebrated in the south as *Jaggannát'ha* is in the north of the peninsula, for its sanctity amongst the *Hindús*, and for the number of *Hindú* pilgrims who resort to it annually from every part of India.

Second. From the accounts given by the *Muhammedans* of the historical facts to which they trace the traditions that prevail amongst them, that the island of Ceylon was the place to which ADAM retired after he had been driven out of Paradise; that the high peak on that island, called 'ADAM'S Peak,' was the spot on which he was buried; that the ridge of rocks extending across the gulf of *Manár*, from the island of *Rámiseram* to the island of *Manár*, and known by the name of 'Adam's Bridge,' is the bridge by which he passed over the gulf of *Manár*, when coming from the peninsula of India to the island of Ceylon, and that the two large tombs on the island of *Rámiseram* are the tombs of ABEL and CAIN.

Third. From the accounts given by the Portuguese histories of the introduction of the Catholic religion by St. FRANCIS XAVIER, in the sixteenth century, amongst the people called the *Parawas*, and *Marawas*, who lived along the northern shores of the gulf of *Manár*, of the martyrdom suffered by six hundred of the Catholic converts in the island of *Manár*, of the success of the Jesuits in the conversion and instruction of the inhabitants of the kingdom of *Jaffna*, and of the political, moral, and commercial effects which were produced on the natives of the different countries situated on that gulf by the measures which the Catholic missionaries adopted for the purpose of extending the Christian religion amongst all the different castes of fishermen who were employed in the Pearl and Chank fisheries.

Fourth. From the accounts given by the Dutch histories of all the Dutch factories established along the Southern Peninsula of India between Cape *Comorin* and Point *Calymere*, particularly from the history of that established at *Tuticorín*, which is near the Pearl and Chank banks off the coast of *Madura*, and is the place of residence of some of the most wealthy and powerful of the *Parawas*, who possess considerable influence over most of the divers who are employed in the Pearl and Chank fisheries which are situated along the south-east coast of the peninsula and the north-west coast of the island of Ceylon.

Fifth. From the ancient traditions that prevail in India relative to the great convulsion of nature which, in a very remote age, is believed to have caused the sea to break through the Southern Peninsula of India, and form the gulf of *Manár*, separating what is now the most southern part of that peninsula from the island of Ceylon.

Sixth. From the description of all the different Pearl and Chank fisheries in the gulf of *Manár*, of which there are accounts in any *Hindú*, Greek, Roman, Venetian, Portuguese, Dutch, or English history, and from the several *Hindú* works upon the size, weight, colour, shape, and various species of pearls which are found on the different Pearl Banks.

A CHART Shewing the Positions of the PEARL BANKS

—OF—
CEYLON
and
TUTICORIN

From Documents presented by
SIR ALEXANDER JOHNSTON
to the
Royal Asiatic Society.

