Rec Dept
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6.12.86

Revenue Department
No 688
Dated 19th May 1859

Ordered that the following letter be despatched.

No. 12. From J. D. BOURDILLON, Esq., Secretary to the Government of Fort Saint George; to the Colonial Secretary, Colombo, dated 19th May 1859, No. 688.

The Governor in Council of this Presidency has had the opportunity of reading the interesting and valuable reports by Dr. Kelaart on the Pearl banks and the Pearl Fisheries of Ceylon. You are aware from correspondence that has passed, that this Government have lately been giving attention to the Pearl banks on the Coast of Tinnevelly, which formerly productive have for many years yielded nothing, with a view of restoring their former productiveness. It occurs to His Excellency in Council that it would be a valuable assistance to this end if Dr. Kelaart could visit these banks and report on them, their condition and capabilities, and the best method of dealing with them. I am therefore instructed to request you to bring the matter before His Excellency the Governor of Ceylon in the hope that he will obligingly spare Dr. Kelaart's services for that purpose. This Government will gladly make him any compensation for his time and services that may be thought suitable besides paying all his actual expenses.

To the Colonial Secy.	28*th Sep.*	1857,	*No.*	992.
To do.	15*th Oct.*	1858,	,,	1407.
From do.	30*th Oct.*	,,	,,	84.

2. In the event of the Government of Ceylon being able to comply with this request, I am to beg that you will acquaint me with the fact; and this Government will depute to accompany the Doctor in his examination of the banks the gentleman who is to have charge of them and of the arrangements for the fishery, in order that he may thus, by personal intercourse, obtain practical information and an insight into his new duties.

attention to the pearl

banks

2)

Dear Mr Bowdillon,

The information contained in this letter & its accompanying Pamphlets from Dr Kelhart about the Pearl Fishery may be of value to us - Pray speak to me about it after you have looked them over

Sincerely Yours

W Stimpson

15 May 54

Toronto
1st May 1859

My dear Sir

In compliance
with your request
I have much pleasure
in sending you copies
of my two Reports
on the Pearl Oyster.-
I have not yet
presented to Govt
my Report for
this Year - as
it will be finished

I want to make
it very plain and
if possible and then
I cannot be expected
to be till the next
examination of the Oysters
when the fate of the
old oysters will be
ascertained, and
the result of my
experiment in
collecting spawn
according to McCosta
plan. If we are

as successful here
as McCosta was
with his handles or
fascines on the Atlantic
coast with the
magnificent
oyster spat
Eastern oysters
I expect some pecu
liar. Peculiarities
can only be tested by
receipt & readjustment
of internal anatomical
conditions the dentition
blood &c &c

I am very sorry to
hear of Captain
Rotation's death
& his large family
and to Govt. such a
great, although
account of the Fatcher
banks now & upon
& their entire dependency
I have no doubt
but there are large
banks there nearly
matured for fishing.
If we Ceylon Govt can
fishery next year
at Condatchi. I hope it

and we can get to
learn where the
oysters banks
are situated
to be observed
it highly important
for the Ceylon Govt. Lest
Parties under by premature
fishing in 1857. Oysters
that year were sold
for 15 & 12 Rupees a
1000. But year oysters
from the same bank
sold for 70 & 85 Rupees
per 1000.

with not interfered with pass. Insert contrast. enquiries can easily be made. The Capt. Davis we can only say our correct accounts of the extent of a Bank - and Mr Jay & Mr Henry Nash will lend the Dress to the Madras Govt who they get out their own.

The good results of securing portions of Bank for preservation in Museum would very widely be spread. The work we could with enquiries I fancy Mr Ind I expect that the interior of this region left unfinished, nice Chelsea like out, ill cover miles & round by rail Tour with fancy Oysters

I shall send a in & the Records may & Natural History containing

REPORT

ON

THE PEARL BANKS OF ARRIPO,

FOR SEASON 1858.

By E. F. Kelaart, M. D., F. L. S.

Having concluded by researches for this season, on the the Pearl Banks of Arripo, I have the honor to submit the following Report to His Excellency the Governor.

The Condatchy Bank, which was reported to contain, last year, large quantities of Oysters in shallow water, (three fathoms), does not at present contain many matured Oysters. A few only of a middle size are found there. But in deeper water, near the former bed, Oysters of various sizes are found in small clusters on stones, and a few large ones, attached to sea weeds. This looks as if the Oysters are spreading into deep parts of the sea. There not being sufficient quantity of large Oysters in this Bank, I have not been able to determine what quantities of pearls these Oysters yield. One out of about twelve opened, contained a few small pearls.

A few small Oysters are found scattered in various parts of the sea, in all depths. But it will be years, before large beds can be formed from these scattered ones.

The Cheval Paar Bank, fished this year, has, in my opinion Oysters of two different ages, but so intermixed one with the other, that it is impossible to fish for the larger, without bringing up also the smaller ones. The proportion of small to large ones, is, in some parts of the banks, 1 to 3, in other parts as 1 to 2.

I totally differ in opinion from the Adigar of Manaar as to this large number of small Oysters being of the same age as the larger ones. His comparison of them to "small men

and women, and large men and women, though of the same ages," may hold good in few cases. But when we find so large a proportion of Oysters, whose shells and internal parts positively demonstrate their youth, I am certainly disposed to place more confidence in my own opinion, and that of the Maniagar of Jaffna, and natives who are purchasers of the Oysters; viz., that the Oysters found in this bed, are of more than one age. The Oysters whose growth has been stanted, have very different characters;—their shells are thick, and there is not the same length of pliable edge, which young Oysters have; the adductor muscle and other parts of the Oyster bear also the marks of age. The muscle is hard and stouter, in the adult, and further removed from the hinge; the foot is firmer and more speckled, and the groove under the foot is irregular; the liver cuts firmer; and the nacreous part of the shell has a thick edge in the adult Oyster.

The fact that good Pearls are also found in these second sized Oysters, does not shew, that they are as old as the larger ones. There are other causes which doubtless come into operation here, part of which only can, in this second stage of my inquiry, be demonstrated. The presence of a worm (a species of Filaria) found in the Oysters, has, I am positive, much to do with the formation of Pearls. I would rather reserve this part of my investigation for longer experience. But this much I can say at present, with perfect safety; that whenever I found good pearls in a batch of Oysters, I found this worm and its eggs in large numbers in the liver, ovary, mantle, and other parts of the Oyster.

My researches here, have quite proved to me, and will also prove to others, who will carefully and without prejudice examine for themselves, that the ova of the Oysters and the ova of worms, form the nuclei of many pearls found in the soft parts of the animal; and that sand, portions of sea weed,

larva of insects, &c., form the nuclei of the shell pearls, or pearls attached to the shell. I have specimens demonstrating this even to the naked eye.

It was the celebrated Sir Everard Home, who, I believe, first started the doctrine of eggs being the nuclei of pearls. But this theory has been contradicted by other writers. I have however, in my Report of last year, stated how escaped ova could readily form such nuclei, and now I have the pleasure of announcing to the scientific world, that I found the ovaries of a Pearl oyster filled with pearls of various size and shape. I have preserved the specimen for transmission to Professor Owen, to be by him placed on the shelves of the Museum of the Royal College of Surgeons as a proof of the accuracy of the late Sir Everard Home's doctrine, which has for many years been exploded. I obtained from one of the ovaries as many as thirty-two pearls, and the other egg bag, still unopened, seems to contain as many more. It will now indeed be a curious question, where the pearly matter forming the pearl found in the ovaries was derived from. Sections of these pearls shew the same form of nuclei as pearls found in some parts of the mantle; and the large irregular ones, have more than one such nucleus. The mantle was found adhering to the ovaries as if it was the result of adhesive inflammation. And as the mantle is acknowledged to be the secreting organ of pearly matter, could this matter have been introduced into the ovaries? or is it likely that other parts of the Oysters, such as the walls of the ovaries, occasionally secrete pearly matter under abnormal circumstances? It will be premature now to decide upon this interesting physiological subject.

The Modregam Bank, which is intended for fishing next year, contains Oysters in clusters of three, four or five, attached to each other. In most parts of the bank, the clusters are formed of Oysters of the same size, but in other parts,

Oysters of various sizes are clustered together. In one or two places, very small Oysters adhere to larger ones; some of these small Oysters could not be more than a few months old. This is a very favorable sign. Very rarely, indeed, was a young Oyster fished up this year in the Cheval Paar bank. This difference leads us to an inquiry of a very practical nature, which may perhaps require years for its solution; viz., why there are so few young Oysters in the old banks? What became of the spawn which even middle sized or young Oysters certainly have? Are the spawn of young Oysters of speedy decay. Analogy leads me to think that the progeny of the old Oysters are more likely to reach maturity. This indeed will form the subject of further inquiry, particularly as in banks, in shallow water, Oysters of all ages are found together. It is reported to me, that some years since, the clusters found in the Modregam Bank were formed of more Oysters. If so, it is natural to conclude, that as Oysters grow large, they detach themselves and form smaller clusters. Their faculty of doing this, I have proved by my investigation in Trincomalie, which is recorded in my Report of last year. The larger Oysters of the Modregam Bank are at the present moment, of about the same size as those fished this year from the Cheval Paar, but there are other marks of difference of age about them, which make me inclined to believe that they are younger than the larger sized Oysters found in the Cheval Paar. The shells of the generality of them, although broad and long, are very thin. These Oysters also have the worm above mentioned. But I have not been able, as there is no fishery of this bank, to open a sufficient number, to ascertain what is the relative proportion of pearls to the worms found. The pearls I have found in these Oysters are in general small, less irregular shaped, of a whiter and more brilliant lustre than the pearls found in the Cheval Paar Oysters. The

Superintendent of the Pearl banks has washed 5 or 6,000 of these Oysters, but I have not yet ascertained the result of this washing.

Had there been inspections by the Inspectors, of other parts of the sea during my stay here, I could perhaps have ascertained many other facts. But as the Inspector has neither time, nor can I, single handed, without boats find out other banks with Oysters, I must hope for other opportunities. It would have been more satisfactory to have extended my researches to large banks with *smaller* Oysters than at present found in the Cheval Paar and Modregam, but as there are no such banks known, even to the Inspectors or Native headman, my observations have been so far limited. But as I hope that Captain Higgs and his assistants will bring to light other banks before next year's fishery, I may have the opportunity then of completing my researches, and bringing them to a conclusion.

I cannot close this Report without expressing my thankful acknowledgment for the facilities offered to me (for making these researches) by Mr. Vane, Captain Higgs, and other officers connected with the Pearl fishery.

I have thought it necessary to make certain suggestions to the Superintendent of the Pearl Fishery for the better preservation of the Pearl Oyster Banks, which I had already the honor of communicating to the Honourable the Colonial Secretary for the information of the Ceylon Government. The unfortunate visitation of Providence (prevalence of Cholera among the divers) has closed the fishery sooner than expected; but it is to be hoped that as some large portions of the bank have not been fished at all, and there are many young Oysters among the older ones, Government will be able to have a small Fishery next year on this Bank. For further information on this subject I have to refer to my former Reports.

E. F. KELAART, M.D.

Suggestions for the better preservation of Pearl Oysters. By DR. E. F. KELAART.

Being convinced from what I have seen, heard, and read on the subject of Pearl Banks, that the method of fishing them from one end to the other, and only leaving small patches, or detached masses behind, is not the most likely one of keeping up the breed of Oysters, or rather of encouraging the formation of banks worth fishing, or from whence even a moderate revenue could be derived, I have, therefore, advised Mr. Vane, the Superintendent of the Pearl banks, to reserve a portion of the bank, say about half a day's fishing, for breeding purposes; in fact, to do that as a rule, which he, to use his own words, "unwillingly" did last year. Owing to bad weather and other causes, the fishing was brought to a conclusion sooner than intended, and consequently, a tolerably large part of the bank was left unfished.

As Mr. Vane and Captain Higgs, the Inspector, while agreeing to do what I recommended, have thought proper to record their dissent from my opinion on this subject, I shall briefly give, in writing, my reasons for making this proposal, as I have already done verbally to the Superintendent and Inspector, I regret to say, without convincing them.

It is my opinion, and that also of abler men, that while Oysters have no sexual differences, the ovaria of some secrete a seminal fluid, and that this fluid is the fertilizing fluid; or, to use a popular phrase, there are male and female Oysters; and as I have found the former bear a very small proportion to the latter, having frequently examined 50 Oysters without finding a single one with the seminal fluid, I believe therefore, that the chances of females reaching the influence of males, will be far greater in a large portion of Oysters than in small ones.

Supposing even that fertilized ova are formed in small clusters of Oysters, such as those which Captain Higgs and others allow to remain in the banks after fishing for the season, these eggs, comparatively small in number, are likely to be drifted about in various directions, their contiguity destroyed, and they are likely to settle down in small numbers in various parts of the sea: but it may take many years, till the patience of Government is exhausted, before, by the aggregation of small clusters, a large bank be formed out of these small original elements. The contrary is observed, when the ova proceed from a large area,—the spawn is seen floating in hundreds of yards, and wherever it settles large banks must be formed; and the history of the banks now being fished, and the one to be fished next year, shew that they were formed by large deposits of Oyster spawn, and not by the gradual introduction of small quantities. When the condition of the small banks of Trincomalie is compared with that of the larger banks of Arripo, the cause of the difference is very evident.

There have been for years no deposits of spawn in large masses in these waters; and why? Because for years these banks have been fished on the old plan, a plan older than the period when Cleopatra obtained the famous Pearl, and under which plan and regimen the banks of the Red Sea, North America and India failed, and are now mere matters of history. And, I must add, that under this plan the Negombo, Chilaw, and Calpentyn banks were lost to the Ceylon Government, and this plan, long pursued by Captain Steuart, terminated in the failure of the Fisheries at Arripo for nearly twenty years. Would it do now, when science has thrown some new light on the subject, to persist in what is objectionable? Captain Higgs may say, he leaves a sufficient number of Oysters, perhaps even a larger number than that which can be found in the patch which he has reluctantly

spared for this year; but in what condition will he leave the small clusters? In a condition any thing but natural. It is true, that the Oysters I have shewn him were in spawn, but he did not wait until I could explain to him under what conditions the Oyster spawn could come to maturity, or become fertilized.

I have reason to believe, that the injury done to the bank by the divers, and the anchors of their boats, has a fatal effect, from which it does not recover for years.

In my former Report, I stated that the Oysters will die, if the water is impure. Now, let us examine what takes place, when the divers have kicked, splashed, and torn every thing before them while in the water. Not only do some Oysters left behind die immediately, but other Molluscs, Zoophytes and sea weeds die, and must necessarily stagnate the water at the bottom of the sea. The result of all this must be, the gradual dying off, not only of the old Oysters left on the bank, but also of the young. I have seen sufficient numbers of fresh dead Oysters brought up, from that portion of this year's bank already fished, to shew what the higher rate of mortality must be in a very short time. Captain Higgs, in his letter to the Superintendent states, that the Oysters I thought had died since the fishery began, looked as if they had been recently opened. The matter is too serious to remain uncommented on, and I take this opportunity of giving the *post mortem* appearances of gradual decay of Oysters, and those dead from death caused by the divers or other men in the boat, killing an Oyster with the hope of obtaining pearls. When an Oyster dies, the two valves of the shell remain for months united at the hinge. When an Oyster is opened, the valves are disunited. The so-called recently opened shells, brought up from the fished part of the Pearl Banks, had all the shells with the valves united at the hinge; a few were separated by me after they were brought into the boat.

I have recently gone through most part of the bank fished ast year, in company with the Maniagar of Jaffna, and was ot surprised to find grounds of Oyster shells of all sizes, nd dead shells of so young Oysters as to be considered of ne or two year's growth. From amid this wreck and ruin, he divers brought up occasionally a large live Oyster, but o small ones. But on coming to that part of the bank which was "unwillingly" left unfished last year, the Oysters were alive and in good condition, and very rarely was a dead shell brought up.

I have also gone through many of the parts of this year's anks, and found, wherever the divers have been, there were many dead shells, and only a few dead ones were obtained rom those parts which have not yet been fished.

The above facts require no further comment from me in his Report, and I shall, therefore, draw to a conclusion, hoping that the adoption of my suggestions will be approved of by the Ceylon Government, especially, as the loss to the revenue by reserving a part of the bank, can be made up by sending a large number of boats, again and again, over the fished parts, but which perhaps will not be found necessary, after so very handsome a return as is expected this year. I only claim for the future interests of Government, the observance of those natural laws of God, a part only of which, HE has permitted man to know, and which, when known, it is but just that we observe them, especially, when any natural production is required, year after year, for economical or ornamental purposes. I need scarcely remind the reader, that the non-observance of such laws has before this brought down its own punishment in other matters than Pearl Oysters.

When we examine the old method pursued in Pearl fisheries, we must acknowledge it to be sadly defective, as too much is left to the divers and the interests of native Headmen. Sixty or more boats, manned by 10 divers each, are sent on a bank to dive for Oysters. The divers go on, from

banks

day to day, fishing up Oysters from one end of the bank to the other, and after the whole bank is gone through, a larger number of boats are employed for two or more days to go over the bank again, and it is only when the boats do not bring up a remunerative quantity, that the fishery is closed. By this method the quantity of Oysters left cannot be regulated. It all depends on the diver's exertion. In some fisheries, a large number may in the aggregate, be left in small patches, or single ones widely scattered. But it may happen, sometimes, that very few are left. The quantity cannot be well regulated by the Inspector or his assistants, for all the information is got from the divers, who are interested in giving a false impression. Whereas, by buoying out a portion of the bank at the commencement of the Fishery, the Inspector can calculate, almost to a nicety, the quantity he reserves for reproductive purposes. Surely, it is not too much to claim for this wise purpose, 1-40th portion of the bank.

For the sake of meeting the objection of some to my plan, on the score that I cannot be sure of the spawn proceeding from one bank being deposited on the banks of Arripo, I would ask them, where did the spawn which formed the Oyster banks of Arripo come from? The answer given, is, I believe, that they came from a distance,—from banks unknown. Supposing this to be really the case, are we not to reciprocate the benefit? How are other banks from whence Ceylon derived the spawn to be kept reforming, if we do not preserve our banks on reciprocal principles. My opinion is, that while some of the spawn is carried to some distance, other portions find prepared beds in the neighbourhood of the old banks. To no other conclusion can we come, if even we only consult Captain Steuart's maps, on which are inserted the dates of fishing, and the distance of one fished bank from another.

E. F. KELAART, M D.

Arripo, March, 1858.

Pearl Fishery Dept.

No 688.

To

The Colonial Secretary

Colombo

Sir,

The Governor in Council of this Presidency has had the opportunity of reading the interesting and valuable reports by Dr. Kelaart on the pearl banks and the pearl fisheries of Ceylon.

You are aware from correspondence that has passed, that the Government have lately been giving attention to the pearl banks

To The Colonial Secretary 28 Sept 57
No 992
To —— do —— 15 Compartment
From —— do —— 30 Cancelled

banks on the Coast of Jaffnapatam, which formerly productive have for many years yielded nothing, with a view of restoring their former productiveness. It occurs to His Excellency in Council that it would be a valuable assistance to this end if Dr. Kelaart could visit these banks and report on them, their constitution and capabilities, and the best method of dealing with them. I am therefore instructed to request you to bring the matter before His Excellency the Governor of Ceylon in the hope that he will obligingly spare his

Dr. Kelaart. the

services for that purpose. This Govt. will gladly make him any compensation for his time & services, that may be thought suitable besides paying all his actual expenses.

2. In the event of the Government of Ceylon being able to comply with this request, I am to beg that you will acquaint me with the fact; and this Government will depute to accompany the Dr. in his examination of the banks the gentleman who is to have charge of the part of the arrangements for the fishery, in order that he may thus by personal intercourse

obtain
intercourse & practical
information and an
insight into his new
duties."

Fort St. Geo: 19 May 1859.

Copy in a Letter to England
D/ 1st June 1860 No 54 -

8-10-08

Revenue 1859 Dept.
Cons: 27th May.

No 688.

To the Colonial Secretary
Colombo.

D/ 19th May 1859.

Requesting to spare
the services of Dr. Kelaart
for visiting and reporting on
the condition and capabilities
and the best mode of dealing
with the Pearl Banks on
the Coast of Tinnevelly.

No 12.