

No. 5. Read the following letter from the Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce (Fisheries), to the Secretary to the Government of Madras, dated Simla, 20th August 1872, No. 59 :—

I AM directed to forward the accompanying copy of a letter from the Inspector-General of Fisheries, dated 26th ultimo, with a short digest of some of the investigations made by him in respect to the "sea fisheries" of India and Burmah, and to request that, with the permission of His Excellency the Governor in Council, the digest, with the questions put in paragraphs 7 and 8 of Dr. Day's letter, may be circulated to the officers of districts on the sea coast and their opinion invited on the subject. It is necessary that the information required by Dr. Day should be furnished on such a date as will enable him to compile a full report in May 1873.

ENCLOSURE No. 1.

From F. DAY, Esq., F.L.S., F.Z.S., Inspector-General of Fisheries in British India, to the Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, dated Simla, 26th July 1872.

I HAVE the honour to submit a short digest on some of the investigations already made respecting the "sea fisheries" of India and Burmah, and which I would suggest should be circulated along with the following questions (paragraph 8) to all the Civil authorities near the sea coasts, in order that I may be in a position to compile a full report on the subject in May 1873...

2. It would appear from the materials at hand that the sea fisheries in those localities far removed from large towns require some stimulus in order that the harvests of fish which frequent the shores of India and Burmah might be rendered more conducive to the general good.

3. Near large and populous towns or districts doubtless the sale of the fish in a fresh state reimburses the fisherman for his labours, due to the local market absorbing his captures. But it is in the sparsely populated and poorer districts, where the takes of fish might be abundant and a source of profit to the local fishermen, that this calling offers so few inducements unless fish-oil is manufactured and isinglass or sharks' fins are collected for export to a foreign market. In such badly favoured localities it would appear to be most provident for the good of the people of the country at large that fishing in the sea should be carried on to the greatest possible extent, in order that those fish which are not consumed in the local markets should be cured and exported to other places where they would find a ready sale.

4. In what direction this stimulus could be applied, especially if it is shown that such is possible and that without involving local Administrations in expense, is a question which it appears desirable to solve. That more sea-fish could be taken is evident, why they are not so is perhaps nearly equally clear in some places.

5. Several of the officials assert that the monopoly price of salt is such as either to entirely preclude its use for this purpose or only admit it to such a limited extent that the article is of an inferior description. Salt-earth and sea-water appear to be surreptitiously employed, as were the salt purchased at the monopoly price the cost of the salted fish would be beyond the reach of the classes who now principally use it as food. The present inferior article (in places) must be conducive to some diseases.

6. If the fishermen have no means of disposing of their captures, of course but few will follow the occupation and the harvest of the sea remain uncollected, and this to the general loss. But did a market exist it seems probable that the necessary stimulus might be found, as there does not seem to be any paucity of fishermen near large towns where the captures meet with a ready sale.

7. It is unlikely that the local sale of salted and sent elsewhere. All the Collectors who have given their opinions point out that reduction in the monopoly price of salt is augmented. This being generally effected, it is very improbable; but it may not be amiss to suggest that if large enclosures were made in favourable localities (away from large towns and where fish could be salted, would the fish be impracticable? That salt might be sold inside them at rates just remunerative for the wide salting of fish. This question seems worthy of consideration, and on which the opinion of the local Civil officers is highly desirable.

8. The questions which I would suggest being circulated are the following:

For Collectors of Maritime Districts.

1st.—Are breeding and immature fish destroyed in the tidal estuaries of your district to any extent?

2nd.—Could the salting of sea-fish be increased in your district; and, if so, how?

3rd.—Would the proposition in paragraph 7 be advisable or practicable in your district?

For Tahsildars or Native Officials on the Coast.

1st.—What is the selling price of salt per maund in your district?

2nd.—Is Government salt used for curing fish?

3rd.—Is salt-earth or sea-water employed for this purpose?

4th.—Has the practice of salting fish increased or decreased of late years?

5th.—In old times had the fishermen caste any peculiar privileges they do not now possess?

6th.—Are there any headmen of the fishing castes; is such hereditary, or how obtained, and what are his duties and his emoluments?

7th.—Does any one claim any rights in respect to the sea?

8th.—How are the fishermen supplied with boats or nets?

9th.—Have the sea-fishermen increased, decreased, or remained stationary?

For the Resident of Travancore and Cochin.

1st.—What is the price of salt per maund?

2nd.—A return of the export and import trade of salt or dried fish from each State for the last ten years.

THE SEA FISHERIES OF THE INDIAN EMPIRE.

In the year 1869 a series of questions was circulated to various officials in the Madras Presidency respecting the present state of the fisheries of the sea and backwaters, as well as the condition of the fishermen. To these answers have been returned by most of the Collectors and Tahsildars along the Coromandel Coast, but none from Malabar or South Canara. Under these circumstances it appears desirable to circulate to them, as well as to the maritime Collectorates of Bengal, Burmah, and Bombay, a synopsis of the answers received along with a fresh series of questions, in order that a more detailed report should be compiled in May 1873.

The fishermen in India who carry on their occupation in the sea or backwaters appear to be mostly distinct from the class who employ themselves in fresh-water fisheries. In some districts those who fish in the sea are of a different caste (or sub-division of caste) to those who employ themselves in backwaters, estuaries, or the sea, so far as they can wade in.

As to the individuals who fish in the sea information as to their numbers is not given; but there are some remarks in the returns from the Madras Presidency as to whether these classes have increased, decreased, or remained stationary. In the Ganjam Collectorate the Tahsildar of Chicacole states that the fishing population continues nearly the same, about 200 boats go to sea; in Berhampore likewise no change has been

Distinction between the maritime, estuary, and fresh-water fishermen.

Whether the sea-fishermen are decreasing or stationary.

observed, about 400 boats and 500 catamarans. In the Godavery Collectorate the Tahsildar of Ramasheer reports that the fishing population have decreased, some have migrated to Burmah and in Cocanada a decrease, about 40 boats go to sea; the same diminution is reported in Peddapuram an increase is noted, and 1,500 boats occurred at Pillapur, due to emigration, famine, and cholera, about 50 boats are employed in Coringa an increase is recorded, about 200 boats go to sea, the numbers of which last, and of the nets, have remained stationary. In the Kistna Collectorate the Tahsildar of Nellore considers the fishing population have remained stationary; the Tulis alone go to sea, others employ themselves on rafts: the Tulis only came, it is asserted, some ten years, and due to their advent the number of boats and nets have augmented. In Bunder and also in Repalli a decrease in the number of fishermen is reported; in the former taluq 20 boats are engaged in the sea fishery, in the latter 695 canoes and rafts. In the Nellore Collectorate the fishing population is reported as decreasing during late years in the taluqs of Ongole, Nellore, and Kaveli; but in Gudur and Kandukur an increase is reported, only 87 fishing boats are recorded for the whole Collectorate. In the Chingleput Collectorate the fishing population are stated to have decreased in two taluqs, remained stationary in one, and increased in three; the number of boats employed in the sea fishery are given as follows—Chingleput 66, Madurantakum 120, Ponnery about 50, Sydapet 64: boats and nets are said to have continued stationary in all but one of the taluqs in which they have increased. The Collectors of Vizagapatam, Madras, Tinnevelly, Malabar, and South Canara have not as yet forwarded answers from the Tahsildars on any questions. The foregoing if correct would seem to point out that the people engaged in sea-fishing in the Madras Presidency have decreased of late years.

The condition of the sea-fishermen in Madras is not favourably adverted to. The Acting Collector of Tinnevelly (November 5th, 1869) reports that, as a rule, the fishermen of the coast are a very miserable lot of people and excessively poor; the way in which they now work is by a system of advances from their "chummaties" or headmen, a few of whom reside in each village and supply nets, lines, boats, etc., for the use of which a certain share (one-third) of all the fish caught is taken by the "chummaty," who in times of scarcity makes advances in money or grain, which are re-paid in fish at a contract price agreed on between the fisherman and his "chummaty." Sea-fishing is the daily employment of a large number of the inhabitants living on the sea coast: these men have certain contracts to supply fish with headmen of the Paraver (fisher) caste distinct from "the chummaties." The Acting Collector of Madras (June 1870) remarked that the salt-water fishery appears to be at present monopolized by a few well-to-do fishermen, who employ the poorer members of the same caste to catch fish for them on daily wages. The Tahsildar of Berhampore, in the Ganjam Collectorate, also observes that in the sea fisheries one-third of the captures goes to the owners of the nets and two-thirds to the fishermen. In Sinde, during the time of the Ameers and up to 1858, the sea fisheries were farmed out and the contractor was allowed either to exact his share in money or kind. In 1858 the contract system was finally abolished, and for the following reasons: up to the period just mentioned the fishermen were all more or less involved in debt and entirely in the hands of Bania creditors, by whom not only their boats and nets, but even the necessities of life, were supplied in consideration of the produce of their labours being relinquished to them, the share of the contractor being first deducted. The condition of the Sinde fishermen now does not appear to be anything like so depressed as what is reported from the Presidency of Madras in localities far removed from the larger markets.

What taxes formerly or at present affect the sea-fishermen is a subject worthy of attention, and in examining this the incidence of the salt-tax is omitted. In Madras the Collector of Vizagapatam reports that until the abolition of the moturpha a tax was levied upon fishermen which might perhaps be called a

Taxes which formerly or at present affect the fishermen.

rent for the right of fishing, but which was, in fact, a capitation tax on the castes that exercised the fisherman's profession. At the permanent settlement the amount of this tax was set down at Rs. 3,463-2-9; but this sum included the tax on sea-fishermen, from whom by far the greater portion of it was collected, as appears from the incidence of the tax falling almost entirely on the estates on the coast. At present no taxes are reported to specially affect these people, neither is any license-tax reported to be levied upon their boats or implements for taking fish. In the *Travancore State* each fisherman had formerly to pay a yearly tax on the net he used, and those who lived in the town of Cochin or under Dutch protection had to bring eight pounds weight of fish daily to the senior official; whilst in the Portuguese territory, as at Goa, none of their produce could be taken to market until the clergy were first served with what they required. At present in the Travancore and Cochin States there is no tax upon fishermen or their implements of trade.

In *Sinde*, on the contrary, the following are the dues the contractor of the sea fisheries was authorized to exact from the fishermen at *Kurrachee*, one-sixth of all fish taken inside the harbour or within Manora Point: one-fourth of those netted or taken by hook and line outside the harbour, provided they were less than sixty; but if over that number only one-eighth. On every boat-load taken outside the harbour five fish were selected by the contractor; he also received one-sixth of the fish maws extracted, and a little over ten per cent. of the sharks' fins. On every boat-load of fish taken near Kiamari, one-sixth; on fish exported by sea, Rs. 12-11-1½ per cent.; if to Daraja, Shahbandar, or Sonmiani, Rs. 13-10-9 per cent.; if to any inland village, Rs. 14-10-4½; on fish maws conveyed inland, Rs. 13-8-8 per cent.; on fish caught in nets the share on some kinds was at the rate of Rs. 22 a hundred, the same on some captured by hooks and lines; of others only Rs. 16 a hundred, whilst of a few kinds the share was recovered at the market rate. Other cesses also affected the fishermen, as head-money on lascars, taxes on charcoal or on wood, etc. These taxes were abolished in 1846 and annual licenses adopted instead, which resulted in a great pecuniary loss; and in 1851 those of Kurrachee were again sold by auction to a contractor. Since 1858 the fishermen have been taxed by the levy of a license of Rs. 5 a ton on fishing boats, and Rs. 3 on each canoe or toney employed for fishing. At *Gwadar* the contractor receives one-tenth of the captures, whilst there is a small export duty.

In *Burmah* the system of licensing the fishing in the sea at Akyab was by taxing each piece of the net; this continued until September 1866, when it was levied on a set of nets. Major Broadfoot, *Commissioner of the Tenasserim Provinces* in 1843, published an order abolishing all the then existing fish taxes, substituting a capitation tax; but as in 1862 a general capitation tax for all Burmah was imposed, fish-nets and traps were again subjected to the revenue laws. In the Rangoon sea fisheries for 1867-68 it is observed "under the former head (sea and salt-water fisheries) is included the revenue derived from the net tax used in the main streams. To carry on fishing on the sea-board requires a capital of some Rs. 500, to purchase a sea-worthy boat. The necessary fishing apparatus termed "Hunyoos" having either been worked from bamboos during the leisure moments of the fishermen during the rains, and the month previous to the actual time, they proceed down to the sea-board station; or, if a person is a capitalist, he purchases it from others. In these boats they proceed out to sea to their fishing grounds, and fix stakes and attach the "Hunyoos" traps for the fish. These grounds are visited daily; sometimes by adverse winds, etc., the boats and crew are carried out to sea, never to be heard of again unless fortunately picked up by some steamer or ship. On the whole, this kind of fishing is attended with danger, and generally conducted by needy men with borrowed capital, and who have to pay high rates of interest. The average number of traps to each boat is 15, and each trap pays a revenue of Rs. 4. The various nets and contrivances employed in the sea fisheries in Burmah are taxed.

On the question of the result of taxing sea fisheries, *Sir Emerson Tennent* gave the result of his experience in Ceylon, which it may be desirable to draw attention to, as the Portu-

guese and Dutch imposed license taxes on fish boats and nets both in India and Ceylon. He observed, "So abundant was the capture of fish on the shores of Ceylon that the Portuguese when in possession of the island converted it into a source of revenue, by levying a tax of one-fourth of the quantity caught. This was collected by special officers, who in return for the payment undertook to protect the fishermen, to assist them in cases of emergency and in times of distress, to regulate all the affairs of case and to fix the periods of fishing. The Dutch perpetuated the fish-tax in the form in which it was levied by the Portuguese; but the British on gaining possession of the island sought to change, however, proved most distasteful to the natives. They disliked the direct payment in money, and they grew indolent and indifferent; the fishermen refused to take out a license for their boats, and the natives to their ancestral tax having been restored in three instances was in each unsuccessful, and the fish-tax, with all its inquisitorial and vexatious incidents, was restored amidst the acclamations of the fishermen." Notwithstanding, it was eventually reduced from ¼ to ½ in 1834, from ½ to ⅓ in 1837, and finally abolished in 1840. A diminution of captures is stated to have followed each decrease of tax. "The fishermen had no longer their accustomed stimulus to exertion; the number of fishing boats became annually reduced, the quantity of fish taken diminished, and the price rose to more than double what it had been during the existence of the fish-tax." (Vol. II., p. 131). The same result is observed to have occurred in Lisbon, and, although a tax of 30 per cent. was taken off fish, the supply diminished and the prices rose. In 1843 a duty of six per cent. was restored with the former regulations for protecting and aiding fishermen, and the improvement in the market has been striking, the supply has become regular and abundant, and the price has fallen in consequence. *Sir E. Tennent* considers the result in Ceylon entirely due to the removal of the tax; this, however, may be open to a doubt. It cannot be conceded that the fisheries have become less fruitful, the sea being evidently stocked with abundance of excellent sorts of fish. When the Ceylon Government took the fish-tax in kind, or one-fourth of the captured fish, their special officers sold the Government share at 1d. a pound and the fishermen, of course, could not obtain a higher rate: this kept the price down. When a money tax was imposed instead the check no longer existed, prices rose, and this must have led to decreased demands. Many who could have paid 1d. a pound could not give two; thus the annual supply diminished between 1833 and 1840 by 667,200 pounds. As their protection became less and a smaller supply of fish satisfied the market, the usual results doubtless ensued, less people followed this calling but turned instead to some more profitable work; consequently removing what appeared to be a burden seems to have acted disastrously on the fisheries. *Sir C. Wingfield* in his evidence before the House of Commons (April 1871) is reported to have stated, "If the Government were to give up the land revenue altogether the country would not be the better for it. The proprietors would be indifferent and the cultivators would need the spur the payment of revenue supplies. There are districts in India that are held free, and I have never heard that the cultivation was a bit better there than in neighbouring villages that paid the land revenue."

Respecting the classes which fish in the estuaries and backwaters, the Secretary to the Madras Revenue Board observed (May 28th, 1869) that they are distinct from the fresh-

Estuary fishermen in Madras.

water fishermen, and who have most probably no other support; and if these waters are farmed by outsiders, this class of fishermen, who are already anything but well off, will suffer. The *Acting Collector of Madras* (June 1870) reports that under the existing system fishing in the backwater is carried on most recklessly and to an unlimited extent, and in consequence there is a wholesale destruction of the young fish. The only way of putting a stop to this is by renting out the right of fishing under conditions similar to those recommended in the case of fresh-water fisheries. The *Collector of Madras* (June 14th, 1869) observed, "I do not see why the fisheries of all the backwaters and canals should not be made to produce a revenue which would go a long

*Proceedings of the Madras Government, Revenue Department,
2nd September 1872.*

way in supplementing the very inadequate local funds of the district. * * As, so far as I can see, the fishery now being in common leads to a great deal of idleness, no man willingly accepting work if he thinks he has a chance of catching a few fish; it leads also to the waters being perpetually disturbed and to the fish being frightened away, as a party now intends himself to preserve the fish."

The sea and tidal fisheries of India and Burma (exclusive of turtles, tortoises, and pearl oysters) consist of those which are within tidal influence and are brackish or saline. The Collector of Poore (1858) observed "that they ought to be stimulated—a course by which," he adds, "you not only increase production but you lower prices and raise the standard of diet throughout the country; indeed, the matter appears to me of such moment, involving, as it does, the consideration of the best means of availing ourselves of a 'harvest' hitherto allowed to remain untouched, that I have often wondered the Indian Government did not follow the example of the British and the French and make the advancement of sea fisheries a special object of legislation and care."

Deep sea-fishing appears to be very little carried on along the coasts of India to what it might be; the principal months for it are stated to be those of the cold season, from November to March inclusive, the last three of which are the best. At Calicut, on the Malabar Coast, where sharks are obtained to supply the oil factory with their livers, the following plan is said to be pursued: Putrid beef or porpoise flesh is employed, large pieces of which are buried in the ground for one or two days before being used. The hook is attached by a chain to the line, whilst the fishing is carried on in the deep sea from 4 A.M. to sunset, but not at night time. The fishermen assert that the darker it is the better, and moonlight nights are good for this species of game, but they prefer daylight. Large quantities of mackerel (*Scomber kanagurta*) and oil sardines (*Clupea Neohowii*) are taken off the coast of Malabar.

In Sindh, first, as already observed, the fisherman has to obtain a license for his boat, which he is at liberty to employ in any way and in any place he pleases, the best fishing months in the sea being those of the cold season. The larger sea-going boats are mostly engaged in taking sharks, saw-fishes, and large *Sciænas*; these fish are, as a rule, captured by means of large nets, and not by baits as in Malabar. Moderately-sized boats are also used for fishing in the open sea, but this is more by hooks and lines, the most killing bait being prawns, which are captured in the inner harbour. In this manner most of the edible fish which take baits are procured at Kurrachee; only two hooks are usually attached to each line. A suitable bank having been selected, the boat is anchored and each fisherman only employs one line.

The fish having been captured, the next question is *how to dispose of them?* In some places, as Tinnevely, the fishermen are said to have contracts with the headmen of the fisher caste; in others they are stated to agree to sell their share (two-thirds) of the captures at a given rate to the owners of the boats and nets. At Kurrachee in Sindh, almost all are brought to the fish-market outside the town and there sold by auction in lots by the "Mukaddums," who charge 1 pice or 3 Pies on each Rupee realized, and also take a little of the fish, which they sometimes sell again.

What are the marine and estuary fishes of India opens out a very wide question which can only be briefly alluded to in this place, and that simply for the purpose of pointing out uses to which they are, or may be, employed. Some of these fishes are migratory, whilst others must be classed under a non-migratory division.

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The migratory marine fishes of India are

Migratory marine fishes, some in shoals, others almost singly so.

their weaker neighbours, obtaining food, or a supply of it, from the shoals.

Amongst the migratory fishes which come to the shoals, the Indian mackerel *Ila*, Mal.

Migratory Indian sea-fishes which appear in shoals.

for a considerable period, as well as rendered valuable by thus preserved. These fish average about 7½ inches in length. Quantities from January until April or May are in bundles of about 1,000 each to Ceylon. Many Ceylon fishermen used to yearly cross over to Cochin for the fishing season. At Coringa the Tahsildar adverts to this species of fish occurring there; it is also found at Vizagapatam and Ganjam, but apparently does not visit the Coromandel Coast in such enormous quantities as it does Malabar. In Sindh it cannot be very numerous although a few are to be obtained there. One species of *Polynemus*, the *P. paradiseus*, or the mango-fish, is found in droves at the commencement of the year from Orissa to the Salween River; it evidently ascends estuaries, backwaters, and rivers for some distance for the purpose of breeding. The mullets (*Mugilidae*) swarm along the coast, many of them entering the mouths of large rivers or backwaters during their breeding season, and they are taken extensively for their roe, which is salted or simply dried. The horse mackerels (*Carangidae*) are in enormous numbers and great varieties along the Malabar Coast; but not so numerous on the Coromandel side of India. During the cold months more especially the sear fish (*Cybbium*) and the pomfrets (*Stromateus*) abound along the coast. The herring family is very well represented in the Indian seas, more especially off Malabar, where the oil sardine (*Clupea Neohowii*) is usually abundant, it is known as *charlay*, Mal.; *louar*, Sind; *leegur*, Belooch. In some years it arrives in enormous numbers, and from it fish-oil is now prepared. When Dussumier was in Malabar, about 1827, he observed that those not eaten were employed as manure, being too fat to salt. It is very capricious in its arrival and departure; thus in 1855-56 only 45 cwts. of fish-oil were exported; in the next year 181 cwts. but in 1857-58 the exports rose to 68,499 cwts., which in the succeeding year augmented to 102,924 cwts. and the year after to 133,113 cwts. Again it gradually fell off, until in 1862-63 as little as 115 cwts. were exported, but the shoals suddenly returned and in 1863-64 the exports rose to 148,206 cwts. Again, from some cause at present unexplained, these fish forsook the Malabar Coast, but in 1869 they re-appeared. They are not so common on the Coromandel Coast, but occasionally visit Ceylon and also the Andaman Islands. They extend their range, but in diminished numbers, off Sindh and along the Mekran Coast, but oil does not appear to be prepared from them. The hilsa, *Clupea palasah*, C. and V., has been alluded to, amongst the fresh-water fisheries. Besides these, the bonito, *Thynnus*, at times comes in shoals apparently following the oil sardines or the flying-fishes (*Exocoetus*).

Besides the shoals of migratory sea-fishes there are others which are more individually migratory, as the sharks and saw-fishes, which follow the shoals of sardines. Thus, in 1867-68 the supply of sharks in Malabar fell off so considerably that there were not sufficient to supply the requirements of the fish-oil factory at Calicut but with the return of the oil sardines the sharks re-appeared in their accustomed quantity. Some of the sea perches and *Polynemi* likewise appear off the coast and mouths of large rivers, where they prey on their weaker neighbours and follow the shoals of smaller kinds of fish.

Amongst the non-migratory fishes, or those which appear to be almost invariably present along the Indian coasts, there are an enormous variety; but a detailed description of them would be too long for this place. In the Sunderbunds some *Polynemi* appear to be invariably present, and from one species a rough isinglass is procured. The *Pleuronectidae*, or sole family, do not

appear to migrate very far. The *Gobi* again are almost invariably a littoral family. The siluroid, scaleless, or cat-fish family, abound along the Malabar Coast and at the mouths of large rivers and estuaries, as the Ganges and the muddy waters of the Burmese Coast; but in the more transparent seas of the Andamans, or toward the clearer and colder waters of Sindh and the Mekran Coast, they are comparatively rare. They are valuable for their air vessels, which are exported for the isinglass they contain under the names of fish-sounds or fish-maws, and find a ready sale in the Chinese markets.

Respecting the commercial uses of sea-fish, the first consideration must be respecting salt fish and how it is cured? In the *Ganjam Collectorate* the *Tahsildar of Chicacole* reports that fish are salted to a great extent by means of "sea-water in a fermented state;" but neither salt nor salt-earth is employed. The quality of the salt-fish is considered pretty good, but the supply does not equal the demand. Fish-roe are salted. When I was at Ganjam in 1868 it was supposed that much of the rejected salt at the Government pans was employed by the fish-curiers. The *Tahsildar of Berhampore* observes that fish is salted to a great extent, but salt is not employed, neither is salt-earth used. Sea-water is used by some persons, and the quality of the fish is considered good. Salt-earth is "obtainable from swamps and places near the Chilka Lake, but cannot be taken without the Sircar's permission." The supply of salt-fish is unequal to the demand. Mr. Sewell, in charge of the Government taluqs in the *Vizagapatam District*, remarks that fish-curiers are allowed the use of salt-earth untaxed and without restrictions, except that it cannot be purified before being used without rendering the purifier subject to punishment for a breach of the salt laws. The quality of the article is, like all salt-fish, apparently sufficiently good for the people's tastes. The only way to augment the trade would be by lowering largely the price of salt, which on other grounds cannot be anticipated. The *Collector of the Godavery District* (October 28th, 1869) reports that the fish-curiers in his *Collectorate* are allowed to use salt-earth untaxed and that there are no restrictions against its employment. The salt in it is very impure, containing carbonates of soda and potash, as well as salt. Sometimes this is purified before being used, at other times not so. The quality of the salted fish is good, much being exported to Madras and Haidarabad. No Government salt is purchased by the natives for curing fish. The reports of the native officials do not all coincide with that of the Collector. The *Tahsildar of Ramachendrapur* states that salt for curing fish is purchased at the platforms where it is manufactured: salt-earth is not employed for this purpose, is never collected, and has no value, neither is salt obtained by fish-curiers from the sea-water, whilst the present quality of the salt-fish is considered good. The market for salt-fish is insufficiently supplied, none is exported from this taluq. The *Tahsildar of Narsapuram* states that fish are salted to a small extent, the salt being obtained by purchase in the local markets: salt-earth is not employed nor collected, and has no value. Salt is not obtained from the sea-water by the curiers of fish. The present quality of salt-fish is considered good, and an improved description, even at the present rates, would not induce an increased demand; the market is fully supplied, but none is exported. The *Tahsildar of Peddapuram* reports that some fish are salted, others are preserved by salt-earth. When the former is employed, it is purchased; but the latter is obtained by excavation from the swamps, and except to fish curiers it has no value. Salt is not obtained from the sea-water. The quality of the present salt-fish is considered to be good. The *Tahsildar of Cocanada* observes that for salting fish salt-earth is employed, which is collected from the swamps near the sea-shore free of cost: sea-water is likewise used for this purpose. If salt were obtained free of cost, the salting of fish could be increased. Salt-fish is exported. The *Tahsildar of Pittapur* states that fish are salted with salt-earth, which being mixed with water they are soaked in it and subsequently dried in the sun; saline matter is likewise collected from the tidal creeks, there is no charge for these collections; salt is only purchased for daily consumption. The quality of the salt-fish is considered to be good; sufficient is not cured for exportation. The *Deputy Tahsildar of Coringa* reports that

fish are salted with salt purchased from Government salt godowns, whilst salt-earth is employed in salting mackerel, *Scomber* C. and V.; it is collected from swamps and also from the sea coast; the presence of salt-fish is considered to be good, more could not be cured. The principal fish seen for this purpose are mullets and the cock-up, *Lates calcarifer*, Bloch. Salt-exported. The *Officiating Collector of the Kistna District* observes (November 10th, 1869) that fish are taken in large quantities for home and inland consumption and cured before exportation. Salt-earth is very rarely employed, except by the poorer classes, for very small and inferior kinds; there is no prohibition against its use; its properties are similar to spontaneous salt, the latter of which is obtained after a long condensation of sea-water, but salt-earth is collected from the marshy soil, which absorbs the periodical flow of sea-water. This salt-earth may be purified before being used, but is generally applied in its unclean state and washed off in sea-water. The salt-fish is tasteful, wholesome, and can be preserved for several years if cured with good salt. The trade might be increased by reducing the price of salt required *bona fide* for curing fish. The *Tahsildar of Bellary* states that a considerable quantity of fish is salted, but salt-earth or "chowda" is not employed for this purpose. Salt-fish are not exported by sea, but a considerable amount is sent inland to such towns as Guntur. The *Tahsildar of Bunder* reports that fish are not salted to any great extent, when they are cured salt is purchased for the purpose, whilst salt-earth (which is collected) is only employed for small fish. There is an export trade inland as to Haidarabad. The *Tahsildar of Repalli* remarks that salt is purchased at the kotars for salting fish, salt-earth is not obtainable. Those fish which are under a span in length are dried without salt; in fact, those only are salted that will not dry in one or two days. The *Acting Collector of Nellore* states (October 26th, 1869) that in some taluqs fish are salted to a great extent with salt which is purchased for the purpose; salt-earth is said not to be used, but in Atmakur sea-water is also employed for this purpose. The present quality of the salt-fish is considered to be good, and it is exported from all the coast taluqs except Kavali. The *Acting Collector of Madras* observes (June 1870) that along the coast fish are cured to a certain extent by means of salt-earth that is not taxed. The quality of salt-fish is good; it is largely consumed, and no special stimulus on the part of Government is advisable. In the *Chingleput Collectorate* all the *Tahsildars*, except at Ponnery, report that the fish-curiers are not allowed the use of salt-earth untaxed. The *Collector of Trichinopoly* (October 12th, 1869) reports that fish-curiers are not allowed to use salt-earth, taxed or untaxed; but, owing to the high price of the Government salt, especially in the inland taluqs, no doubt this earth is surreptitiously employed pretty largely. On the sea coast, it is believed, much of the so-called salt-fish is only buried in the sea-sand. It is illegal to manufacture earth-salt, therefore none ought to be produced for curing; but, as the whole subject of earth-salt is kept dark, being illegal, it is impossible to say how they do, or might, employ it in curing fish. The quality of the salt-fish is not reported good, and a superior article would be preferred, except by a few old hands, who might be so wedded to former usages as to prefer the present salted article. No data exist as to the amount of Government salt purchased for fish-curing. If the monopoly price of salt were low, probably the trade and quality of the commodity itself would increase; but if really good salt-fish were made at the present price of Government salt, the product would be beyond the reach of the chief consumers. The *Acting Collector of Tinnevely* (November 5th, 1869) states that fish are dried in the sun, salted, and sent inland or exported to Ceylon. The high price of salt prohibits its use in the quantities necessary to cure the amount of fish captured on the coast, so no doubt they use salt-earth; but it is illegal to gather this spontaneous or salt-earth, and, therefore, illegal to use it for this purpose, although it answers very well for doing so, but is inferior for other uses. "This salted fish is much affected by the Paraver caste on the coast. I never tasted it; the smell was quite enough." It is very cheap,—a great recommendation with the lower classes. The trade of salting fish would be augmented by reducing the monopoly price of salt. In *South Malabar*, in 1865, the natives were permitted to collect the salt-earth as it exuded from the soil and employ it for curing fish free of duty, and no fiscal impediment existed

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against their using it; consequently for this purpose it was almost exclusively employed to the exclusion of Government salt, which was used to a very limited extent. But in the *Native States of Travancore and Cochin*, salt being manufactured by the Governments, the fish-curers had to employ that sold at the salt. In 1870, when at *Calicut*, in March, I found that a boat-load of oil sardines (at this period sufficiently fat for preparing oil from) was computed to contain 14,000, and worth Rs. 15 Annas. If cured with best white salt, their market-value was about 12 Annas a maund; if salt-earth had been used instead, 8 Annas for the same quantity. Fishes were dried as well as salted; if the former, this process was done on the sand, if not on mats; if the latter, mats were invariably used. Indian mackerel were worth from Rs. 10 to 15 for a boat-load of 4 or 5,000; if salted with white salt, their value was about Rs. 2 a thousand; if salt-earth is employed, Rs. 1-8-0 for the same quantity. At *Kurrachee*, in *Sinde*, and *Gwadar* white salt was invariably used.

The methods of salting, smoking, and drying fish employed along the coast differs in some localities from what obtains in others. In the *Godavery District* the *Tahsildars* observe that fish which are cured by smoking are first dried for some time in the sun; those salted are dried, and salting and drying in the sun is repeated as often as necessary. Fish-roe are salted, and small fish are simply sun-dried. Those which have been cured during the summer months at *Cocanada* are stated to be far superior to those which are prepared in the cold season of the year. In the *Kistna Collectorate* the following is the process of salting fish. Immediately after being caught they are divided with a knife, the entrails are removed, they are washed in salt water, rough salt is rubbed in, and they are exposed to the sun; on the next day more ground-salt is applied and they are again placed in the sun, and on the third day a little more ground-salt is applied and on that and the following day they are placed in the sun; subsequently they are stored until sold. In *Cochin* the mackerel are thus cured: first a cooly makes one cut with a sharp knife along the back bone from the head to the tail, and then a second down their ventral surface, exposing the intestines. The fish is thus tossed over to a woman, who, having removed its inside, throws it into a basket which has two handles. This when half-full is carried by two men to the sea-shore, where the fish are washed simply by rapidly rotating the basket in the water. The basket with the washed fish is now brought back, and women and children rapidly put some black salt into each of the cuts in the fish, which is thrown into a canoe drawn up on the beach and containing brine; here they remain for a few hours, and are subsequently spread out on mats in the sun, dried and packed in square bundles of about 1,000 each for export. At *Kurrachee*, in *Sinde*, the fins of the back and abdomen are usually first removed, as well as the head if small; the fish is then split open, salt rubbed in, and the sun does the rest. At *Gwadar* the following plan obtained:—Salt-pans are formed in the ground, and these are sometimes protected from the sun by having a lofty but light shed constructed over them. These pans are about six feet square and three deep. They are puddled with mud obtained from a neighbouring hill, which renders them impervious to water, whilst it is covered with clean bamboo mats. The fish after having been slit open and cleaned, or the fins of the sharks, or the fish-sounds, or all of them, are placed in these pans, a quantity of salt being likewise thrown in, and then sufficient water to cover the whole. After two or three days they are removed, re-salted, and packed in large heaps, as the people of the country will not purchase them if too dry. The brine is not employed a second time. The salt used is of a superior quality, and a camel-load of about 280 lbs. weight costs about Rs. 1-8-0. Great quantities of salt-fish are exported from this place, mostly to *Kurrachee* and *Bombay*.

What is the value of salt-fish to the general population is an important consideration; for if not esteemed inland, an increase in its production would be a matter of but little moment. Were all from the coast conveyed inland by railways, it would be easy to demonstrate

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the amount carried. The following figures, however, the tonnage of salt-fish carried inland from the

1865	...	...	...	...	1,641 tons.
1866	...	...	...	...	1,465 "
1867	...	...	...	...	2,065 "
1868	...	...	...	...	2,565 "
1869	...	...	...	...	1,863 "
1870	...	...	...	...	2,604 "
1871	...	...	...	...	2,274 "

the only ones available, and which show the tonnage of salt-fish carried inland from the Coasts by the Madras Railway:—

No one, however, who has once passed a rail-truck containing fish, as at present cured, would wish to do so a second time. Respecting the coast districts of Madras, they appear to be tolerably supplied with fresh and salted fish. The *Tahsildars of Chicacole and Berhampore* give 225,000 persons in their taluqs as consumers of fish, preferring, however, the fresh to the salted article, those that do not eat fish being said to be Telugu Brahmins, Comaties, a few of the Ooriah Brahmins, and Ranguni and Pattu (a class amongst the weavers). In the *Godavery Collectorate* the *Tahsildars* report that, with the exception of Brahmins, Banians, and some of the goldsmiths, all the people eat fish, some preferring it fresh, others salted. In one taluq it is stated that the Pariahs and lower castes mostly prefer the salted article. In the *Nellore Collectorate* the coast taluqs generally supply the inland ones with fish, but still insufficiently so, whilst, with the exception of Brahmins and Comaties, all are fish-eaters. In the taluqs of Ongole, Kandukur, Atmakur, Udayagiri, and Gudur, fresh fish is preferred to salt: both are said to be indiscriminately eaten in Kanigiri, Rapuru, and Kavali; whilst in *Nellore* the salted article is stated to be most esteemed. In the *Chingleput Collectorate*, all classes, except Brahmins, Sivas, Condacuttu, Velalar, Comaties, and Jains are said to eat fish, either fresh or salted, but the former appears to be preferred, as, for instance, in the *Trivellore Taluq* it is stated that only the lower castes eat the latter; in fact, that it is when there is an insufficient supply of fresh fish that the salted ones are purchased. In short, in many parts of the Madras Presidency salt-fish is chosen in preference to fresh, and its inland markets for this commodity appear to be almost inexhaustible, it being only the very inferior quality of the article which prevents the trade increasing to an enormous extent. The *Collector of Bellary* observes, "I believe the sale of salt-fish in this district at decreased rates might be enormously increased." As the outskirts of Bengal are approached, as in *Orissa*, salt-fish begins to be less favourably received, perhaps from the dread that persons of a lower caste than the consumers might have prepared it. In the coffee estates, now so numerous along the *Western Ghats*, salt-fish are highly prized by the coolies employed there; whilst in the *Ganjam Collectorate* the Brinjarries yearly come down the ghats with pack bullocks and donkeys, exchanging turmeric and other articles with the people for salt-fish. Further to the east the *Burmese* universally consume salted fish in the form of "nga-pee." In the *North-West Provinces* the amount of salt and dried fish brought into the bazaars appears to be very insignificant, and its chief consumers to be Mahomedans and castes who may be classed as foreigners. In the *Punjab*, salt-fish, as a rule, finds little or no sale, or rather none is found in the markets. In *Sinde*, in large towns, as *Ilaidarabad*, there exists a market for it, whilst the *Pulla* fish is salted rather extensively for consumption during those months when it is absent from the river *Indus*.

Nga-pee, or the usual preparation of fish as consumed in *Burmah*, in some parts is made of crustacea, as at *Mergui*. "Nga-pee" is a *Nga-pee* or mode in which fish are prepared in *Burmah*. Talaing word of the following component parts: *Nga*, fish; *pee*: three this last syllable having reference to the three ingredients out of which it is essentially formed—fish, salt, and the action of the sun's rays. It is more strictly divisible into two sorts—*nga-pee-goung*, or "nga-pee, whole," and *nga-pee-toung*, or "Nga-pee, pounded." The general mode pursued, without specifying details in making the former, is—after having removed the head the fish if large is split in two, then washed and dried in the sun for a few hours: salt is now rubbed in, and the fish (along with others similarly prepared) is

packed in a jar, from which the next day salt rubbed in, and are then re-packed as have to be thus prepared, they are laid salt and buried for some time under-ground. "nga-pee" is either made of fish or prawns; the and is known in Rangoon as "ba-lee-choung". When fish are used, they and the salt are placed together in a large trough, which has a tube of pipe opening from its floor. Men wearing wooden clogs now tread the fish into one pulpy mass. The superabundant fluid runs off by the tube, and is collected for sale, and employed as a condiment. The roughly-trodden-down or pounded "nga-pee" is either used as it is, or undergoes refinement. This last is accomplished by pounding it up with the bark of the On-don, which gives it a colour, and now more salt and flour are mixed with it. When it is desired to prepare this "nga-pee" at once, the fish having been cleaned, and their heads removed, are pounded up with salt in a mortar. Different species of fish give different qualities of "nga-pee," the price varying with the quality.

Fish-oils are prepared in India of two descriptions, the medicinal and the simple—the first coming entirely from the livers of sea fishes, whilst the latter is made from either fresh-water or marine varieties. Medicinal fish or sharks' liver-oil is prepared at Calicut on the Malabar Coast, and from April 1855 to 1870 43,538 lbs. were made there; the cost of that sent to Madras in 1870 was 10 Annas and 7 Pies a pound, whilst that of the genuine cod liver-oil was 11 Annas and 2 Pies a pound, all charges included. The oil is manufactured from the livers of sharks and saw-fishes, which are mostly obtained during the months of October and November, but a few are also taken in July and August. The livers appear to be equally good at any season of the year, but the size has much to do with the comparative amount of oil which they yield; thus other things being equal, small livers give only one-third their weight of oil, but large ones nearly one-half; consequently livers under 40 lbs. weight are not retained. One from a female saw-fish, 14 feet long, weighed 185 lbs., but one was brought a few years since weighing 290 lbs. There are three qualities of livers—the best is firm and pinkish; the medium is also firm, greyish externally, and reddish when cut into; whilst the most inferior is whitish externally and internally, has a flabby feeling, and is rejected. About 1½ Annas a pound is given for the livers, which are received at the factory within six hours of the death of the fish. The gall bladder is at once removed, and the gland well washed. The veins are now slit up to admit the blood draining off, and for this purpose the liver is left in a large flat copper vessel, and water frequently poured over it until such is no longer discoloured by blood. It is now cut up into pieces of about 4 lbs. weight each, two of which are placed in an earthen chatty (which is capable of containing from four to five gallons), and over it is poured about one quart of water, or sufficient to cover the liver with 1½ inches of fluid. This is now placed over a slow fire for from 15 to 20 minutes, and when the temperature reaches 130° it is stirred up, froth soon ascends, and the vessel has to be at once removed from the fire and placed on sand to cool. The oil is soon perceived floating, and is skimmed off into large glazed earthenware jars by means of a wooden ladle formed by half of a small coconut shell attached to a wooden handle. This oil, "or rough oil," is now strained through flannel, what will not pass being rejected. The straining stands are merely common ones, permitting four chatties to be fixed one above the other with a slight interval between each. This rough oil has to stand three or four days, when it is again strained, through four layers of long-cloth and thick satin-cloth and four layers of flannel to remove the stearine; after 15 or 20 days the straining is repeated through two layers of long-cloth and thick satin cloth in each bar of the strainer, and two layers of flannel, in addition in the centre bar, and this has to be repeated four times at intervals of 20 or 25 days between each. During these intervals the oil should remain quiet in the jars, and if any portions of stearine are to be seen the straining must be repeated. The sixth, and generally last straining, is through cloth and filtering paper in funnels into the bottles in which it is finally bottled off. This oil should have no deposit, be of a light straw colour, quite clear, and its odour

should closely resemble that of true codliver. Simple fish-oil is differently prepared, the expense incurred in procuring the medicinal for it when made. Fish-oil is a general sort the livers of sharks, saw-fishes, siluroids (ark rays). Should the livers of these fishes be employed above them up to about 130°, and in 15 or with the oil is skimmed off into large vessels washed; clean or dirty, they are put into a purification. It is worth about Rs. 4-8-0 a from the "oil sardines," which breed in June become fat, and about August are in a good about four months. Unless their livers are which is prepared either by removing the liver. A boat, three quarters full of fat sardines, water is poured over the fish in sufficient quantity this is repeated for three successive days. January; by March they are no longer fat, the livers of the sharks and skates. In the from the livers of sharks, rays, and saw-fishes others. In the Kistna Collectorate oil is. In Nellore it is stated that oil is thus obtained fish, is allowed to rot for three days, and is black, and it is used for lights. Fish-oil. A considerable amount of fish-oil is prepared and cooking, but never as medicine. It is

Isinglass is obtained in several parts of

Isinglass from what fishes obtained.

where it is obtained from species of star received from the Brazils and North America to the fact that China, from immemorial 1842, in a pamphlet "On the production of what has been accomplished by others, as well of this article as received in London, both Polynemus is peculiar, more especially fins, and it is only by correctly ascertaining opening the fish, to know whether in the seas and coasts of India, many ones that have five pectoral appendages dried. The elongated form is that most it becomes comparatively rarer in Malabar and the Sunderbunds, the reason being that of fish, which have a perch-like form. air vessels are removed from those perch-like (Serrani), the begti (Lates. arillaris) and the booroo (Otolithus Indian seas. Along the Malabar Coast the Siluroid fishes, their form inches; they are generally torn attachment to the spine. The the estuaries, and some of the

ough occasionally it is somewhat stronger. Manufacturers would not go to the trouble and simple reason that no market would exist

Malabar, and it is prepared from water 1½ inches in depth being stirred, the froth rises, and it this state sold as fish-oil. The livers are not and the oil undergoes no subsequent straining or in the bazaar. Much of the fish-oil is obtained ly, subsequent to which period they commence to tion for the manufacture of oil, continuing so useless attempting to obtain oil from them, already described, or in the following manner. placed in the sun, and about midday boiling for the oil to float; it is then skimmed off, and livers of siluroids give the most oil about ie Ganjan. Collectorate oil is obtained from ery Collectorate oil is extracted in some taluqs list the porpoise is employed for this purpose in red from the livers of sharks and allied fishes. the shark's liver having been removed from the fourth oil is extracted by heat; its colour is id in Sindh is not superior to that in Malabar. Burmah; it is used for lamps, even for curries d by boiling as already described.

world from the air vessels (termed "sounds" or "maws") of various species of sea, estuary, and fresh-water fishes, the best coming from Russia, (Accipenser). Inferior descriptions are also ad so lately as 1839 Dr. McClelland drew atten- ges, had received it from India. Dr. Royle, in nglass on the Coasts of India," gives a resumé of interesting figures and experiments on the value its economic and financial aspects. The genus filamentous prolongations at the base of its pectoral number of these that it is possible, without as not, an air vessel. Out of seven species known useful for this manufacture, and they are the only he air vessel is tongue-shaped, and elongated when amonly received from the Mekran Coast and Sindh; at again increases up the Coromandel Coast, Orissa, ey are obtained from the Acanthopterygian order Kurrachee the fish having been sold by auction, the ch possess them, the chief ones being from the sea fer), and the Sciaenidae as the souwah, (Corvina us). The Polynemi are rare in this portion of the le principal quantity of fish maws is obtained from S, and their diameter both ways from three to four ide, which is done when removing them from their fishes also abounds along the coasts of India, in as well as in those of Burmah, wherever the waters

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1872.

are muddy, but they are rare in India and Sindh they are simple. Fish fins, or those of the

Fish fins prove a considerable portion of the or three days in brine prior to

The other uses to which sea-fishes are said to be put

Other uses to which sea-fishes are said to be put especially gingelly, cumboo, chola crops. Some fish are used as medicine in rheumatic complaints. The whip ray (*Trygon*) is used for trees of the orange tree to be good for trees of the orange tree character of a glue for repairing used as medicine, and the fin of by murrain. In the Nellore grapes, date, and lime trees, by putrify, or burying fish at their fish are extensively employed on the coast that it was proposed to ob of expressing oil from fish, using trees in the Wynaad, the oil th only succeed with the sardines at

Andaman Islands, and Sindh. In Gwadar they are salted. are collected along the coasts of India and for export to China. At Gwadar they are not simply cut off and dried in the sun, but are also removed, and the whole soaked two

thus given by the Tahsildars in the Madras Agency. In the Godavery Collectorate are employed as manure for certain crops, in the taluqs for fruit trees, but not for from the head of the porpoise is employed as for medicinal purposes. The tail of the Collectorate fish manure is said an isinglass is prepared in the the ears of certain fishes are for cattle which are attacked is fish are used as manure for which fish have been allowed to eads, scales, and refuse of the is also informed higher up the use in America for the purpose or manuring the roots of coffee the expense. This, however, will pointed out.

No. 6. ORDER THEREON.

Miscellaneous.

1872, No. 1,274. COMMUNICATED to the Board of the Resident, Travancore and Cochin, with the request that the to Day.

(Sd/-) W. HUDLESTON,
Secretary to Government.

To the Board of Revenue.
the Resident of Travancore and Cochin.

Exd. A. S. Rodgers.

Revenue 1872 Sept.
No. 2906

From
The Govt of India.
Sept. of 1872
Rev. Commr.

Dated 20 August 1872
Recd 2nd Sept 72

No 57

With Order
No 1274 of 4 September 72
Forwarding copy of
a letter from the Inspector
General of Fisheries with a
short digest of some of the
investigations made by him
in respect to the "sea fisheries"
of India & Burmah & requesting
that the digest may be circulated
to the officers of Districts
on the Sea Coast & their opinion
invited on the subject.

No 57-6

FROM

A. O. Hume Esquire, C. B.

Secretary to the Government of India,
Department of Agriculture,
Revenue and Commerce,

TO

The Secretary to the Government of Madras.

Sir,
Dated the 20th August 1872.

Fisheries

SIR,

I am directed to forward the accompanying copy of a letter from the Inspector General of Fisheries dated 26th ultimo with a short Digest of some of the investigations made by him in respect to the "Sea Fisheries" of India and Burma, and to request that with the permission of His Excellency the Governor in Council the Digest with the questions put in paras 7 and 8 of Mr. Day's letter, may be circulated to the Officers of districts on the Sea Coast and their opinion invited on the subject. It is necessary that the information required by Mr. Day should be furnished on such a date as will enable him

compile a full report

May 1873

I have the honor to

Your most obedient servant,

Robert B. Smith

Secretary to the Government of India

Board of Directors - Dec 12, 1872
Review of the same - 1873
Review of the same - 1873

No 1274

Committed to the Board
the President. The same
to be done in the future
that the Board is to be
in the future. The same
to be done in the future.
The same to be done in the future.

1 dupl
Govt. of Madras.

REVENUE.

To

THE BOARD OF REVENUE,

Secy, Secy, Secy.

Dated September 2nd.

Recd.

G. O. 2nd September 1872, No. 1274.

Nos. 56

See Fisheries of India and Burma.
Letter from Government of India forwarding
Mr. Dyer's digest of some of the investigations
made by him, communicated to Board of Revenue
and Resident of Travancore and Cochin for the
submission of the desired information.