

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

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Read the following letters:—

No. 87. From Surgeon FRANCIS DAY, F.L.S., & F.Z.S., on Special Duty,
to the Secretary to Government, Revenue Department, Fort Saint George.

1. I have the honor to submit the following report upon the present condition of some of the fresh water fisheries existing to the south of Madras, which I have visited in accordance with the instructions contained in G. O., No. 1,468, of May 27th, 1868. After making a thorough personal inspection at the Coleroon anicuts, I found it necessary to extend my enquiries to between them and the sea, for which purpose I marched up the coast from Combaconum to Madras, as, although the roads were not very good for travelling at this time of the year, I considered the result would amply repay all personal inconvenience. I deem it best to transmit this account of my enquiries in the South, distinct from my investigation in the North, leaving my propositions for remedial measures to be submitted in my final or comprehensive report.

Agunda, or broad Cauvery; how it is supplied with water; where my investigations commenced.

2. My examinations commenced at the *Cauvery river*, which rises by several sources in the Western Ghauts, and after

passing through the Mysore, Coimbatore, Salem, Trichinopoly, and Tanjore Districts, in a course of about 500 miles, flows into the sea. At its various sources, and for some distance between these and its termination, it is principally replenished by the south-west or June monsoon, but as it reaches the Coimbatore and Salem Districts, and from thence to the sea, it receives a large body of water from the October or north-east monsoon, and, consequently, from the beginning of June to the end of December, it is always more or less full, and subject to sudden and violent freshes, or floods, which, though they rarely exceed ten feet in height, have been known to rise as much as twelve feet. When the river, previously a sandy shallow bed, becomes thus filled, it assumes the character of a rapid and impetuous torrent, carrying down in its course sand, gravel, and mud. The portion nearest the source, where I commenced my investigations, was about ten miles above and west of Trichinopoly, at the village of Wartellé Goodaloor, 100 miles from the sea. The river here is termed the Agunda (great or broad) Cauvery. It is about 4,400 feet wide, and becomes separated into two portions by the Island of Serungum, seventeen miles long, and two broad in its widest part. The most southern and smaller branch of the river is 2,000 feet wide, and retains the name of Cauvery, whilst the largest is 2,400 feet wide, and termed the Coleroon.

Cauvery river, its distribution, and piscine inhabitants.

3. The Cauvery river runs a course of 100 miles, being distributed principally in the Tanjore District, where it gives off

four large branches, and thus decreases to one-eleventh of its original size, as it only receives two small streams east of Serungum. When it reaches the sea, it has dwindled down to a width of only seven yards, whilst even during heavy freshes it is merely four feet in depth. It is probably owing to this deficiency of water that large sea fish, such as the Oolum, or Sable, *Clupea Palasah*, C. and V., which ascend rivers to breed, avoid the Cauvery.

Coleroon river; difference in level from the Cauvery.

direct to the sea. My examinations of it have been made at the Upper Anicut, the town of Trichinopoly, the Lower Anicut, and near Chellumbrum. The difference in the levels of these two great divisions of the Agunda Cauvery in high floods is thus given by *Captain Oakes* in his report of January 7th, 1868, where he observes that, "In a twelve-foot flood, the difference of level between the water in the north branch above and below the anicut is only 3 of a foot. In the south branch, the difference is only 6 of a foot."

Reason for the construction of dams, anicuts, &c.

largest volume of water, it was considered that the channel was thus kept clear; but the Cauvery, on the contrary, yearly silted up, and its bed, in consequence, gradually rose; to obviate this, and also to regulate the distribution of the water after it enters the province, as well as to correct as far as possible those changes which had occurred, or were likely to do so, in the bed of the river, a series of anicuts, dams, &c., were constructed.

Upper Coleroon Anicut and Cauvery regulating Dam.

six feet in height, by means of a barrier or wall, (which received the native name of anicutta; or anicut,) from this a supply is diverted into the Cauvery, whilst some openings lower down in the Island of Serungum, between the two rivers, were partially or entirely closed, to prevent the water subsequently escaping from the higher (Cauvery) into the lower (Coleroon) river, excepting under certain conditions. As after a few years' trial of this experiment, it appeared that the bed of the Cauvery was being washed out rather too deeply at its head, owing to the great rush caused by the diversion of the water from the Coleroon by means of the anicut, a regulating dam was thrown across the head of the Cauvery. This dam is in fact a flooring across the river, raised at either extremity in two steps, each seventy-six feet long, 24 feet above the low or centro portion. "The dam is 1,950 running feet, total waterway, with wings fourteen feet high. The floor of the dam is on a level with the deep bed of the Cauvery and below the average bed, it is covered with sand, on an average, 2.5 feet."—(*Captain Meade*.)

Upper Coleroon Anicut.

completed in its present form, length, and height in 1843, when a cocoanut bridge was constructed across it to enable the shuttermen to work the sluices; three years subsequently, this fragile bridge was replaced by the present narrow and slight masonry one. This anicut crosses the river about 100 yards from its origin; it is 750 yards broad, and divided by a small island, 650 feet wide, into two portions. The height of the barrier to the passage of the water rises from five to seven feet above the bed of the river, and is protected in the rear by a substantial apron,

4. The Coleroon, from the head of the Island of Serungum, becomes the main channel, and continues its course

5. As the Coleroon, on its division from the Agunda Cauvery, received the

6. The Upper Coleroon anicut was intended to raise the water in that river, near its commencement, about

7. The Upper Coleroon anicut was first erected in 1836, and finally com-

thirty-eight feet broad, covered with cut-stone set in chunam, and having twelve feet of rough-stone posterior to the apron. The northern division consists of twelve arches, the two centre of which have under-sluices of three vents, eight feet wide in each; it has a waterway, according to *Captain Meade*, of 343 feet, not including the sluices, which are forty-eight feet, or a total waterway of 391 feet, whilst the dam rises to seven feet, in height. The southern or largest division, which is nearest the Cauvery, has fifty arches "on six feet piers, and five feet rise, but they vary in their span"—(*Meade*), and seven sets of sluices, four of two vents, the other three of three vents, or seventeen vents in all, eight of which are six feet, and nine, seven feet in width; the centre of the dam is one foot lower than the rest of the anicut, and is termed the Tambogee, which, however, may be raised by planks to the same level as the remainder of the dam. The waterway without the sluices is 1,627 feet, and the sluices themselves 111 feet, giving a total of 1,738 feet in all.

Uses of under-sluices and effects of them on the bed of the river.

8. It is necessary, in this enquiry, to remark upon the uses of these under-sluices as regards their permitting or obstructing the passage of fish up the river, as it has been asserted that when unable to surmount the dam during the freshes, they can ascend through these passages. *Colonel Sim* observed in 1830, that the under-sluices instead of permitting the surplus water to escape over the anicut wall, leaving its sediment behind, would allow it to pass through the anicut on a level with the lowest bed of the channel by means of openings, through which the water being forced in high freshes with great velocity, draws with it large quantities of sand, and maintains the bed of the river at its proper level. It is thus evident that if they act as it was intended they should, and as they apparently do, that the deepest channels will be adjacent to these under-sluices, and these will therefore be the spots selected by the fish for their ascent, as they invariably try the highest point for this purpose and the lowest for descent. They will not go through bye-channels or side passages; still their instinct appears sometimes to lead them to try a second channel when the first proves unsuited, as I shall subsequently advert to in paragraph 26.

Obstruction afforded by Upper Anicut to the ascent of fish, and the destruction which then takes place.

9. Prior to recording my personal observations respecting the amount of obstruction offered by these anicuts to the ascent of the fish, it will be as well to observe upon the question of whether the fish in the Coleroon river, above the Lower Anicut, have increased or decreased of late years? On this subject there appeared to be but little difference of opinion amongst the fishermen, and the Monegar in charge of the Upper Anicut agreed with them in stating that the decrease of late years has been very great, and that portions of the river, which a few years since were worth thousands of rupees, are now dear at Rupees 200. This statement, I must remark, must be taken as a mere assertion, which I have not the means of verifying, whilst I am still in doubt as to whether the Monegar intended to express himself that these portions had been worth thousands for the purposes of rent, or to the fishermen who rented them, which I subsequently came to the conclusion, during my investigations, have widely different significations in the fresh water fisheries of this Presidency. The Monegar stated that not only the number but the size of the fish have decreased, whilst the

largest quantities are now captured during the north-east monsoon in the September and October freshes, and the principal place for taking them is where they are detained at the anicut. Two men are partners in renting the right of fishing within twenty-four yards of the Upper Anicut, and one of them stated that they gave Rupees 200 a year, and kept twenty fishermen who captured everything they could whether large or small, young or old, for as he observed, "we paid for this right, and all we can take is our own." The anicut here thus becomes a barrier, where the indiscriminate slaughter of fish is carried on, in fact it is a barrier of death to them, for there mercy is unknown, whilst the amount of present spoils forms the only anxiety, and the destruction of the supply for future years is unheeded.

The Sable fish, its uses. Disappeared in the upper portion of Coleroon after erection of Lower Anicut; when the latter breached they again appeared.

for the purpose of depositing their eggs, was the Oolum or Sable fish, *Clupea [Alausa] Palasah*, C. and V. It appears to be undoubted that before the erection of the Lower Anicut, these fish were very common in the upper portion of this river, but that subsequent to its completion, they have never been captured above it, excepting when a breach in that structure has taken place, as in 1865, when they immediately became common, but since it has been repaired they have again disappeared. It will be a question for subsequent remarks, whether the ascent only of these fish has been prevented, without causing any diminution of the supply in the whole extent of the river, or whether there is any perceptible decrease in the number of fish taken now, to those captured formerly. The amount of Sable fish taken in the river near Trichinopoly prior to 1836, is asserted by the fishermen to have been about two lacs (200,000) yearly, whilst in the *Madras Journal of Literature and Science* for 1839, it is stated that they were chiefly captured for their roe. I observe that this statement is disputed in some of the reports, but the fact is, both disputants are right, as when these fish ascend from the sea they are always in full roe, thus they are eaten or salted in this state, though not actually on that account; the roes are also occasionally preserved for separate eating. At this period the fish is excellent as food, and in splendid condition for the table.

Reason of sea fishes ascending rivers during freshes; and remarks on the breeding of fish.

they will therefore be found full of roe. Fresh water fish also breed at these periods, and appear to be constantly changing their locality, from their generally depositing their ova in the side channels or smaller water courses. The reason for this would be too long for detail here, but it is undoubted, that in India, the Sable fish ascend the rivers to breed, as the Salmon does in Europe. The eggs are deposited, not in deep, but in shallow water, and for the purpose of reaching good breeding grounds, the fish attempt to pass any obstructions in the river. If the eggs are deposited in the shallows near the mouth of the river during freshes, they will be left high and dry before they can be hatched, as the subsidence of these floods is almost as rapid as their rise, but this is not so much the case nearer the

source of these rivers, and therefore they ascend until they reach good breeding beds, where the rise and fall of the water is less rapid. Of course very many of the eggs never hatch; in fact, as I shall subsequently shew, I found that in a female Sable fish upwards of one million eggs were contained; in a common species of Barbel, *Barbus chrysapoma*, C. V., there were upwards of 410,000; in a Carp, *Crossochilus reba*, H. B., above 41,000, and in a Siluroid, *Callichrous checkra*, H. B., commonly known as "the Butter fish," above 47,000, thus shewing the large provision made by nature for such contingencies.

Attempts of fish to pass anicuts.

12. Fish, when heavy in roe, are not so well able to jump any great height, as they are when young or barren. Standing on the bridge over the anicut when the freshes are coming down, it is most interesting to see the numbers of fish, both large and small, which are leaping up against the wall of the anicut; in the vain attempt to surmount this obstacle to their progress, some of them strike against the piers of the bridge, others fall into the cascade coming over the wall, but although I passed hours watching them, I never saw one of them clear the obstacle, though thousands attempted it. Whilst I was carefully observing them, I also found that when nets were employed for capturing them, that the fish, especially if large, were bruised and in parts scaleless, this I believe to be caused by their frantic and unavailing efforts to surmount the anicut wall, or to get up the under-sluiques.

Observation on fish trying to ascend over anicuts.

13. During high freshes the river forms a foaming cascade over the anicut, falling on the stony bed of the apron, and I frequently perceived that the fish on reaching this cascade leaped upwards for the purpose of surmounting the obstruction, when the torrent took them and pitched them head downwards on to the stone apron. Sometimes, after they have ineffectually tried to ascend for some time, they become fatigued and may be seen resting themselves close to the piers of the bridge, where they are protected from the direct force of the current. It is not uncommon to see them spring up against the piers, and after striking themselves against the stone work falling back again into the river. When very high freshes occur, so that the water above and below the anicut is nearly on a level, the fish might pass over the wall, as only a slight ripple points out where it exists, but these times are too rare to need much consideration. The under-sluiques are more on a level with the bed of the river, and it has been supposed that fish pass up through them. It is not impossible that a large strong fish might thus ascend, but this must be the exception, not the rule, as a breeding fish, heavy with roe, could not possibly do so. Some few males or barren females might, however, accomplish it if very strong, but they would hardly be sufficient to increase the population above.

Effect of under-sluiques on fish trying to ascend.

14. When the water is low, these under-sluiques are closed, and only opened when the freshes are coming down. Now it appears to me that the belief, that the fish ascend the river through the sluiques, has arisen from the fact that they may be caught in them, but that is only when the sluiques are closed. It is true that a pretty good current is coming down between the boards which close the various vents,

but it is not sufficiently strong to impede boards, but then these very boards form an effectual bar to their onward progress. These sluices are, therefore, extensively netted. A purse-net is placed across the mouth of a vent, and all the fish inside are driven out and so captured in one haul. At one time, when the vents were shut, I saw seventy-eight so captured, none of which were under three inches in length, whilst two of them were ten inches. The very use of the sluices is to force the water down with such impetuosity, that during high freshes, when they are open, no Indian fresh water fish could possibly ascend; the water shoots from them across the apron and boils and bubbles even beyond it in white foam. My belief, formed from personal observations, that it is impossible for fish to stem such a torrent, was shared by all the fishermen, who did not hesitate to maintain the impossibility of such a thing. The torrent, above six feet in width, is like a mill race, coming down like water stones, &c., in its course, which would try to ascend. It appears to me that the almost total annihilation of the fresh water fishes in the upper portion of the Agunda Cauvery, is that the Cauvery has only a regulating dam built in 1845, below its surface, but no anicut above the water. The large structure on the Coleroon being almost, if not absolutely, impassable for fish.

State of the fish at the Upper Anicut after the river has subsided.

15. Such then is the state of the fishes at the Upper Anicut during the freshes, or spawning season, when they are fruitlessly trying to ascend the river, and as they continue near the barrier, hoping still to find some opening in it, it follows that when the river falls they are prevented from returning to the deep portions of the stream. At these times even the sluices are full of fish, whilst shoals may be seen on the apron, and many below it; as the water still further decreases, shoals are formed below the anicut, to which the fish retire for food. Here they should be allowed to remain undisturbed, or only the larger ones should be captured for eating, but this is not the case. The fishing within twenty-four yards of the anicut has been let to a native, who asserts he gives Rupees 200 a year for it, because he knows the poor animals must be detained. No question of future scarcity appears to have been thought of by either lessor or lessee, but simply the bare question of present gain. I now propose to shew what effects may and most probably will result from this course.

Results when personally inspecting the fishing and condition of breeding fishes.

16. I engaged the services of four fishermen to go out fishing with me for one day, two hours in the morning and two in the evening. They agreed to bring their nets, but on arriving, instead of having cast, or even drag-nets, they had only a trumpery looking purse-net, like a cast-net from which the ropes and leads had been removed. With this most unpromising looking implement we proceeded on our fishing excursion. This was on July 3rd, as the river had previously been too high; we began at 7 A. M., and continued for two hours, the fishermen chose their own localities, and selected the vents of the sluices and the bases of the piers of the bridge. The following were the captures made, which I noted down at the time, 51, 48, 20, 78, 74, 15, 45, 20, 48, 10, or a total of 408, all of which I turned over the anicut wall into the water

above. I must here remark that the water was not flowing over the anicut wall, so that by having the nets handed up to the top of the sluices, there was no trouble in effecting this transference of the captures, but in the evening it was different, as I shall presently remark. The numbers taken did not visibly decrease the shoals. The fish captured were of several varieties, some of them of a large size, one pound in weight, none under two inches in length, and many of them heavy in roe. I examined one Carp, *Crossochilus roba*, and found it contained 166 grains weight of eggs, and on counting out two grains of these, ascertained that they contained upwards of 250 mature eggs, which gives a total of 41,500 in one fish. In a Barbel, *Bagrus chrysopoma*, I found 985 grains weight of eggs and ascertained that every grain contained 417, or a total of 410,745 eggs. In a Siluroid, *Calichrous chekra*, there were 184 grains weight of ova, or a total of 47,444 eggs. I mention these instances to shew the injury done to the fisheries by this indiscriminate slaughter of the breeding fish detained by the anicut. If means of ascent had existed, these fish would have gone over the wall and have deposited their ova in the shallows; of course many of these eggs would never be vivified, but the large numbers deposited are doubtless intended as a provision of nature against the losses likely to be incurred, but not for the wholesale destruction carried on at the anicuts.

Fishing as the river began to rise. Reasons for not recommending capturing fish and transferring them from below to above the anicut wall.

17. The fish in the vents had reached the barrier in their vain attempts to ascend. Again and again no doubt they had gone up, and as they tired, dropped down and rested at the piers of the bridge in comparatively calm water. Now, if it is difficult to stem the water in the sluices when closed, how much more difficult must it be to do so when they are open, to allow torrents of water to rush through them. The same afternoon a slight fresh of about six inches occurred, and the water passed over the anicut wall. This entirely altered the possibility of passing the fish in the net over the anicut wall into the space beyond. At 5 P. M. we again commenced fishing. As the amount of water passing down the vents was greater, the nets could not be held against them, so the water below the piers of the bridge only was tried. The fishermen can only fish the anicut twice a day, once in the morning and once in the evening, as the fish become frightened. They lie so close that the net is submerged within a foot of them, for the water at these periods is always muddy, and, therefore, they do not perceive the net. Owing to the fresh, the numbers of the fish trying to ascend seemed to have largely augmented, and from fifty to sixty were usually captured in each haul. I only went once along the anicut, but the number we took and turned alive over the wall into the stream above was 631, making a total of 1,119 transported during the day in only about three hours' fishing. Besides these, many others were suffocated in the net before I could take them out, probably about 200 so perished. Subsequently, the fishermen, being annoyed at my having put the fish above the wall, became suspicious and sulky, and I could not get them to work as they did the first day. This mode of transference was proposed by Mr. Stuart, Acting Head Assistant Collector of the Kistna District, but irrespective of the numbers killed or injured, it appears to me improbable that the fish once taken below the anicut would ever be restored to their native element above that construction. Besides this, the very fact of capturing a fish commonly

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injures it to a greater or lesser extent, and therefore, as I propose to shew in my final report, a natural pass will probably be the simplest, the most efficacious, and eventually the cheapest method of preventing the present destruction.

Modes of capturing fish; cast nets, drag, round stake, purse nets; basket and rod fishing; night lines; and spearing fish.

18. The following are the different modes of capturing fish which I saw employed in the Cauvery or in the rivers to the south of Madras:—

Cast Nets are most commonly used, and the period they last in accordance with the usage they receive and the trouble taken in repairing them. The Natives appear to be adepts at employing them. The mesh is small, one which I measured was three-fourths of an inch in diameter, and the length of the net was fourteen feet. Fishermen occasionally throw bran into the water, the fish congregate to eat this, and the net is thrown over them.

Drag Nets.—Both short and long ones are used. The mesh is small, but not so minute as in the cast nets, for if it were so, unless very heavily weighted, when dragging it against the stream, it would be raised off the ground and the fish escape beneath it. Still in several of them I found the diameter of the mesh to be only one inch, and these were principally employed for dragging down the stream. With these destructive implements everything that swims is taken, whilst nothing is ever returned. I should here remark that in English Salmon rivers, netting fords is illegal; It is also usually prohibited within 100 yards of weirs, whilst the size of the mesh is eight inches in circumference, which many good authorities denounce as being too small. In Europe also there are fence months, during which it is illegal to net, and breeding or foul fish may not be captured at any period, or if they are taken they must be returned into the water. The freshes in Indian rivers appear to afford the only fenced periods that the fishes ever obtain, and were it not that with most of the species these are the breeding seasons, it seems probable that owing to the merciless modes of fishing pursued, the river fisheries would have been destroyed long ere this. I have heard it said that these fish are too small to be worth protecting, but I give a table shewing the size to which they have been personally observed to obtain, or have been recorded by others.

Round Nets.—I have not seen these any where excepting in the Cauvery, and they appear more adapted for bush fishing, if I may so term it. They consist of two nets similar to cast nets, each attached to a bamboo which is bent and fixed in the form of a circle. They are pushed under bushes and into long grass at the sides of the rivers during freshes. The mesh is about three-fourths of an inch in circumference.

Stake Nets.—These are similar to the drag nets, but fixed to strong stakes across rivers or arms of rivers. Men stand at these stakes, whilst a single or double line of nets is dragged, or rather gently floated down the stream to meet the stake nets. This is the way in which the Oolum or Sable fish is captured.

Purse Nets, or a species of net of this description. In appearance these are most worthless contrivances, but in actual use exceedingly destructive. They are in fact cast nets, with the leads and ropes removed. The usual form is held by two men, and to shew how close the fish lie to the piers of the anicut bridge, the fishermen generally commence about four feet from them, taking whole shoals in this

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way. This net is also placed across the mouth of the vents, when the sluices are closed, and the fish are driven into it by a third man, who goes up there for that purpose. A fisherman stands on each side of the net, and employs one hand to hold the lower part close to the ground, whilst the other hand is used to keep it open. If the current is strong, the foot is made use of to keep the lower part on the bed of the river.

Small Purse Nets are used by one man, who keeps the upper part open with his mouth, and employs one hand on each side to keep it on the ground.

Basket fishing.—A wide-mouthed open basket has a number of twigs of trees fitted into it. When the freshes are coming down freely, and the fishes jumping at the anicut wall, it is let over the bridge by means of a string, and the fish in leaping often fall into it, whilst the twigs prevent their jumping out again. This is at times found very destructive.

Basket fishing, as usually employed, is however very different; a long basket, with a narrow round upper end, and a wide round lower end, is employed; this the fishermen thrust down into the grass along the sides of the river, or into the mud, and remove the fish through the top. At Cuddalore whole lines of men sometimes fish the back-water in this way.

Rod fishing is greatly pursued both from the shore and from boats, which are like the coracles employed at home.

Night lines are of a very destructive kind. The line is fixed to a tree, leaving a large portion of it ready to run out if required. Above the water is a stick cut like a fishing rod and loosely thrust into the ground, the line is twisted round its extremity, and bobs into the water, thus keeping the bait moving about.

Spearing fish is employed at Cuddalore for the purpose of taking the *Kurona*, *Tam.*, or *Cock-up of Bengal*, *Lates calcarifer*. A piece of blue rag is trailed by a string at the end of a boat which moves slowly through the back-water. At its stern stands the spear-man, holding his spear with the head towards the water. The head of this spear is made with a long centre barbed iron, whilst at its base are two pieces of cross iron, like the prongs of a pitch-fork, these are turned up and barbed, so that it has five barbs at its extremity; to this a rope is fixed, whilst the handle is made of long male bamboo, or other heavy strong wood. The aim of the fishermen is said to be unerring.

Fishes of the Coleroon with their Tamil and scientific names; size to which they attain, and whether breeding or not.

19. Such being the methods of fishing, I now come to the fishes themselves, which are here named in accordance with the latest work on the subject, viz., *Dr. Günther's "Catalogue of the fishes of the British Museum."* I must leave the scientific descriptions until time permits me to report upon them fully, which I propose doing to the *Zoological Society of London*. Some are of considerable scientific interest, but these are not the species which are of most importance in an economic point of view.

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No.	Tamil Name.	Scientific Name.	Size attains.	If breeding.
1	Oolooway	Gobius gulosus, H. B.	18 in. in length.	Yes.
2	Coondallum Oolooway	Euctenogobius striatus, Day.	6 "	Yes.
3	Mussoorie	Eleotris fuscus, Bloch.	5 "	Yes.
4	Sennal or paunieyri	Anabas scaber, Dald.	7 "	Yes.
5	Pauni	Polyacanthus cupanus, C. V.	4 "	
6	Veraloo	Ophioccephalus striatus	36 "	
7	Para korawa	" punctatus, Bloch.	12 "	Yes.
8	Munnee.	" gachua H. B.	12 "	
9	Vella ketchellee	Sciaenops tor, H. B.	12 "	Yes.
10	Cul or Mona arah	Rhynchogobius aculeata Bloch.	12 "	Yes.
11	Shaatarah	Mastacembelus armatus, Lacép.	36 "	
12	Shellel	Etroplus maculatus, C.	4 "	
13	Cumboo kellette	Macrones for, H. B.	18 "	
14	Cutta	" cavasius, H. B.	12 "	Yes.
15	Tharlee.	Saccobranchius singio.	18 "	
16	Chelawahlah.	Callichthys chekra.	18 "	Yes.
17	Valldah.	Wallago attu.	40 "	
18	Nah kellette.	Pseudotropheus Sykesii, Jerdon.	4 "	Yes.
19	Wallaké kellette (slippery Siluroid) Poonattee.	Silondia gangetica, H. B.	48 "	
20	Coola kellette.	Pangasius Buchananii C. V.	36 "	Yes.
21	Assaree.	Nemachilus armatus, Day.	2 "	
22	"	" notostigmatus, Bleeker.	2 "	
23	Ven kendé.	Cirrhina L. eschscholtzi, C. V.	24 "	Yes.
24	Shaal	Labco finlayi, Bloch.	24 "	Yes.
25	"	" Lestichthys, C. V.	24 "	Yes.
26	"	" kontzius, Jerdon.	24 "	Yes.
27	Pil aringan	Crossochilus reba, H. B.	18 "	Yes.
28	Coal	Tylognathus ariza, H. B.	12 "	Yes.
29	Pungella.	Barbus chrysopoma, C. V.		Yes.
30	Weimatté	" ticto, H. B.	3 "	Yes.
31	Shellee.	" carnaticus, Jerdon.		Yes.
32	Chevallé	" filamentosus, C. V.	6 "	Yes.
33	Koroon.	" chola, H. B.	6 "	Yes.
34	"	" dorsalis, Jerdon.	8 "	Yes.
35	Oollaree.	Amblypharyngodon melletina, C. V.	4 "	Yes.
36	Marritan kendé.	Barilius bendelisis, H. B.	4 "	?
37	Nooltoo, or Chelapurroovoo.	Danio albunus, Heckel.	3 "	?
38	Purroovoo kendé	Rasbora daniconis, H. B.	4 "	Yes.
39	Purroovoo.	Nuria danrica, H. B.	3 "	?
40	"	Cachias appar, H. B.	3 "	Yes.
41	Vellaché kendé.	Chela clupeoides, Bloch.	6 "	Yes.
42	"	" flavipinnis, Jerdon.	6 "	Yes.
43	Vellangoo.	Muraena maculata, H. B.	18 "	?
44	Oolum	Clupea palasah, C. V.	8 "	Yes.

Besides these there are a few other small species which, however, are not of much consequence in an economic point of view. In many cases in which I did not find the fish breeding, it was no doubt due to having captured only a few specimens, and those mostly of immature size. But out of forty-six species, twenty-nine were found to be in full ova.

State of river at Trichinopoly.

20. At Trichinopoly, where there is a magnificent river, the fish supply in the market is inferior in quality, insignificant in quantity, and consequently but of

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little value, whilst they do not call for any particular notice from this portion of the river lying between the two anicuts.

Return of rents of fisheries in Trichinopoly Collectorate.

21. The following is the return furnished me by the Collector of Trichinopoly of the rents of the fisheries in his district:—

Year	Rupees
1860-61	598 6 6
1861-62	658 11 11
1862-63	637 1 11
1863-64	676 7 5
1864-65	687 7 0
1865-66	693 13 0
1866-67	1,252 15 7
1867-68	872 6 7

Remarks on increase of rents after anicut below Trichinopoly was breached.

22. I exceedingly regret that the information was not more in detail, because a very remarkable fact is shewn,

viz., that the rents rose in the years after the Lower Anicut was breached, and no less than 559 Rupees. Although I do not assert it to be the case, it appears probable that this increase was due to the Sable fish again being found in the Coleroon. The rents, it is seen, again stopped as soon as the breach was repaired. I question whether, if my idea be correct, fish-ladders, permitting the Sable fish to ascend the Coleroon, would not be a pecuniary gain to Government, as well as to the food-productiveness of the river. Time did not permit my writing for further details.

Tanjore, and returns of rent of fisheries.

23. At Tanjore I found, as might be expected, the same state of affairs in

the Coleroon and Cauvery, and complaints of deficiency of fish were no less common and appeared to be well-founded. The following is the total of the returns of the Tahsildar as the yearly rent of the fisheries in his talook:—

Year	Rupees
1858-59	3,180 6 0
1859-60	3,742 12 0
1860-61	3,355 4 0
1861-62	3,918 8 0
1862-63	4,609 14 0
1863-64	6,003 12 0
1864-65	6,058 12 0
1865-66	5,407 0 0
1866-67	4,431 4 0
1867-68	3,411 5 0

In this total the summit of the revenue was in 1864-65, the year prior to the breach in the anicut, but I have not had time to ascertain why the rents still continue decreasing; but the deficiency appears to be, according to the return, mostly in the Agunda or main Cauvery, the Cuddalore or Pennur river, and the Tanjore

Combaconum, with return of rent for the fisheries.

24. The Tahsildar reports that the fresh water fisheries of Combaconum are let in four divisions, and produced the following sums during the last eight years, the only ones which he could furnish, but probably sufficient for the purpose:—

Years.	Combaconum, no Anicuts.	Parpanassum, no Anicuts.	Marganum, two Anicuts.	Lower Anicut.	Total.
	RS.	RS.	RS.	RS.	RS.
1860-61	1,408	345	920	902	3,575
1861-62	1,749	705	814	880	4,148
1862-63	1,360	525	1,000	880	3,765
1863-64	1,100	350	1,000	880	3,330
1864-65	1,010	500	1,000	880	3,390
1865-66	1,030	375	1,000	880	3,285
1866-67	1,030	310	1,000	1,450	3,790
1867-68	1,030	415	1,150	1,450	4,045

Mode of letting the fisheries.

25. The mode in which the fisheries are let appears to vary, being either yearly or for a certain term. The notice of the letting appears merely to be advertised at the spot where the sale is to take place and in the Talook Cutcherry, but not in the District Gazette; in fact, to the south of Madras, I have never found that the fisheries are advertised for sale in the Gazette.

Lower Anicut fishery, and effect of its construction on the capture of the Sable fish.

26. The fishery at the Lower Anicut appears to have been rented by Mahomedans until the auction of 1861-62, when it passed into the hands of Hindoos, the chief of the fishermen and bearer caste having out-bidden his Mussulman opponent. The Contractor states that the number of Oolum fish captured has greatly increased since the anicut was built, or rather they take more below that structure owing to its existence, and that if it were not present he would not give above Rupees 200 yearly as rent; that when the breach occurred in 1865 his fishery was nearly destroyed, as the Sable fish ascended by the breach, but that since this has been repaired the fishery has greatly improved. This doubtless is due to the increase in the number of fish from their having been permitted to ascend and breed, and it also shews that one fish-pass would suffice, although no doubt one in each branch would be better.

Contractor asserts fish can go over anicut wall, but objects to the erection of any pass to assist them, asserting it will destroy his fishery.

27. The Contractor asserted that in high freshes, when the water passes over the anicut in such quantities that the river above and below it is nearly level, the Sable fish can pass over the dam; but on being questioned how it was, if this were the case, that none are now ever caught above that obstruction, he observed that it was owing to the freshes being rarely sufficiently high. Pushing the subject, and enquiring if he would object, as tenant, to a pass in the anicut, or any means being taken which would enable these fish to ascend; he maintained that if any fish-ladders were placed in the anicut, the fishing would not be worth retaining at its present rent. The foregoing statements

must of course be looked upon with caution, and some with mistrust; but it seems that there can be no question but that no Oolum fish ever surmount the Lower Anicut. This is fully borne out by local investigations above Trichinopoly, at that station, at Tanjore, and Combaconum, and by the admission of the Contractor of the Lower Anicut fishery, whilst the statement that fish pass over the anicut dam in high freshes, can be hardly credited, although some few may possibly pass over, but they must be very strong and excellent jumpers. The Contractor attempted to prove to me that young Sable fish could be found at Combaconum, above the anicut. We accordingly sent fishermen out to capture some. About 5,000 small fish were brought in, and I went very carefully through the whole of them, and can positively assert that there was no single specimen of the Sable amongst them.

Habits of Sable fish, with remarks upon its breeding.

28. If the rivers are merely stocked by the young fry raised in those rivers themselves, it seems that, unless something is done, there is a probability of the total destruction of the Sable and some other fishes from the Coleroon. For there can be but little doubt that the river during freshes when these fish come up it, to deposit their ova, contains too much water below the anicut, and thus, should the ova be left in the shallows, they will become high and dry as the freshes subside, which would unquestionably occur before the eggs could become vivified. Therefore, it is probable that none are hatched below the anicut. Three years since, owing to the breach, it is probable that many got over this obstruction into the river, and there deposited their ova; these may be now temporarily keeping up the stock, but it is to be hoped that such breaches will be the exception, and that other means may be adopted to allow them to ascend the river. Now, the destruction of the fish may be deemed theoretical, and that those bred in other rivers may be sufficient for the Coleroon, but this total annihilation has been repeatedly observed in Salmon rivers in many parts of Europe, which are now being re-stocked at a great expense; whilst the Sable fish, from depositing its ova in fresh water, has in this respect some analogy to the salmonoid instincts. The fry are hatched in the fresh water, and proceed to the sea, from whence they only return during the spawning months. If these fish are destroyed from Indian rivers, I do not assert that they cannot be re-introduced from other localities, but the expense will certainly be enormous. The eggs are so small, and so few persons in India, if any, are competent to obtain them, whilst very few have ever seen ova carried in ice, that I do not believe Government could succeed in an attempt of this kind unless they brought men out from Europe to do it. Neither is the carriage of live fish so easy as some persons appear to think, as they die in an almost incomprehensible manner to those who have newly undertaken their conveyance. On these grounds I would point out the urgent necessity of preventing the destruction of species, which must sooner or later take place if the present system is persisted in.

Number of Sable fish captured in the Coleroon, and the Contractor's statement that accounts have not been kept.

29. There was considerable difficulty in obtaining any information respecting the yearly captures of Sable fish, and the following was nearly all which could be elicited from the Contractor, much of which had been obtained from him

by the Tahsildar in 1867. First, the Contractor who rents the right of fishing the Coleroon within two miles of the anicut, personally declared that no accounts existed of the numbers of Sable captured at the Lower Anicut or sent into Combaconum from thence. The correctness of this statement appears improbable, because the proceeds of the fishery are divided into three portions, one of which goes to the men, from fifty to sixty in number, who effect their capture, and who find most of the nets employed, the other two-thirds go to the Contractor; but as all the fish taken (excepting a few sold at the nets) are sent into Combaconum for sale, after which the division is effected, some accounts must have been made out daily, and it seems improbable that such would have been destroyed; because, should any doubt exist in the Contractor's mind as to the results of his fishing, such figures would have been retained for future reference, when the period for the auction again arrived.

Fish Contractor the owner of a Pagoda where the fishermen live.

Ammon Covil Pagoda in Combaconum, and that he is the tenant of three several fisheries, and that the fishermen near Combaconum resort to this Pagoda, sleeping there at night time, eating, and indulging freely in arrack, &c., thus dissipating their earnings, whilst they are so entirely under the Contractor that very little information can be obtained from them.

Tahsildar's report made in 1867 from the statements of the Fish Contractor.

respecting the profits and losses of the Lower Anicut fishery for six years. The statement appears to have been given by the Contractor:—

Year	Receipts Rs.	Profit Rs.	Loss Rs.
1861	Rs. 1,476 12 0	Rs. 101 8 0	Rs. 0 0 0
1862	" " 1,011 0 0	" " 0 0 0	" " 206 0 0
1863	" " 2,401 8 0	" " 721 0 0	" " 0 0 0
1864	" " 805 6 0	" " 0 0 0	" " 343 2 0
1865	" " 200 0 0	" " 0 0 0	" " 747 0 0
1866	" " 2,618 0 0	" " 296 5 0	" " 0 0 0
	Rs. 1,121 13 0	Rs. 1,296 2 0	

Statement of Contractor that fishery is a loss to him, and to pay the rent he has to pawn the Pagoda jewels.

one-third of the fish, there remained a total loss of Rupees 174-5-0, or an average yearly deficit of above Rupees 26, yet he wishes to continue as tenant. This he accounted for in the following manner, that whenever there is a loss in the fishery, the Pagoda jewels are pawned, and the rent liquidated, and that when a surplus exists, these jewels are redeemed and new ones made.

Reasons for doubting the correctness of the Contractor's memory.

same account, that they averaged one lac of Sable fish yearly, but this estimate is

30. It appears that the Fish Contractor is the manager, and apparently the owner, directly or indirectly, of the small fisheries, and that he is the tenant of three several fisheries, and that the fishermen near Combaconum resort to this Pagoda, sleeping there at night time, eating, and indulging freely in arrack, &c., thus dissipating their earnings, whilst they are so entirely under the Contractor that very little information can be obtained from them.

31. The Tahsildar gave me the following as the figures of the report he presented to the Collector in 1867, respecting the profits and losses of the Lower Anicut fishery for six years. The statement appears to have been given by the Contractor:—

32. The foregoing statement purports to shew that after deducting the Government rent of Rupees 1,450, and

33. The Contractor at one time, his head-man at another, and others interested in the fishery, all gave the

considered far too low by residents near the anicut; but admitting its correctness for argument sake, I think it will be very easy to throw discredit on the statement furnished in 1867. The value of the Sable fish in Combaconum is from 1 Anna 6 Pies to 1 Anna 6 Pies, or even more, but taking the average at 1 Anna 6 Pies, which is below what it really is, because more large fish than small are taken, we obtain the following figures—for I should observe that the demand is greater than the supply, however large that may be—we have the receipts for one lac of fish Rupees 9,375, from this if we deduct one-third for the fishermen, viz., Rupees 3,125, and the Government rent of 1,450 Rupees, estimating the cost of carriage at 4 Annas per 100, we must arrive at the conclusion that the Contractor's receipts are Rupees 9,375, and his total expenditure Rupees 4,825, leaving Rupees 4,550 as profit. This estimate is, as I observed, admitting that only one lac is taken, which I now propose to shew is below the mark.

Cost of carriage of fish into Combaconum.

34. I must, however, slightly digress respecting the cost of carriage, as this is a very material point of the enquiry. I estimate it as follows:—I was told, and I also personally saw, that one man usually carries fifty fish, twenty-five being strung on each end of a bamboo which he carries over his shoulder, like a cavady cooly. As the fishermen—who were, and some of them still are bearers—carry the fish at least half way from the anicut, money is not spent on that portion of the road. Cooly hire from the anicut into Combaconum is 4 Annas, and a cooly is only required for half the distance, or 2 Annas, but it is very improbable that it really costs so much, especially as Natives are not charged like Europeans. It is admitted that the average number of persons employed in carrying fish from the anicut in June and July is forty men. Now forty men each taking fifty fish shews the following: $40 \times 50 = 2,000 \times 61 \text{ days} = 1,22,000$ fish during these two months only. Occasionally, when very large captures have been made, as many as 200 coolies have been employed, but it is said, that as they cannot carry the fish on bamboos, these extra hands only take from fifteen to sixteen each, but even this would give 3,000 in one day. During the succeeding four months these fish are still taken, but in smaller quantities, and the common sorts are also captured, none of which have been computed in the foregoing estimate. The fish are sold in the same state as captured, a few hours afterwards they appear to be salted for local consumption. The roes are also occasionally dried, or salted, for separate use.

Fishermen improvident; effect of remissions to increase number of days when no work is done.

35. The Contractor and fishermen are said not to be well off, but it appears to be impossible to ascertain the value of the Pagoda receipts. In my recent enquiries it has seemed to me questionable whether fishermen, as a class, are not the most improvident, working only for a few days to obtain money which they dissipate in liquor. The more they obtain the less work they appear to do. Remissions of rent seem to be of little real value, simply enabling the people to be drunk one or two days more frequently than before, according to the amount of the remission. I think the foregoing shews the great value of this fishery in an economic point of view. The Tahsildar does not appear to think that other Hindus will bid against the present Pagoda people, and as they are the only good fishermen in the district, it is likely to remain in their hands.

Tradition asserts that this race of men were originally brought by some Hindu Rajah as bearers from Conjeveram.

Proviso in agreements to turn one in ten fish back into the river; this is not attended to.

36. On instituting enquiries it appeared, according to the Tahsildar, that in the Agreement signed by every Contractor is a proviso that one fish in every ten is to be released and turned to the west, evidently to perpetuate the breed. This clause appears to have existed from very ancient times, but is now quite a dead letter. It looks as if at some former period the fishes of the Cauvery and Coleroon had been in danger of being destroyed, and preventive means adopted.

The Lower Anicut.

37. The Lower Anicut, 1836, fifteen and a half miles from Combaco-num, crosses the Coleroon from a south south-east to a north north-west direction, it is separated into two portions by a large island. The southern branch, 1,230 feet wide, consists of thirty arches of thirty-four feet span, and four sluices. The dam differs from that of the Upper Anicut, in being made in two steps. The apron is twenty-four feet by twenty-four feet of stones. The northern branch is also 1,230 feet wide, whilst the intermediate island is 520 yards in width; its lowest step is five feet, its highest 3.3 or a total of 8.3, each step being four feet wide gives a total of eight feet. The main road crosses this anicut, and though the construction of the whole differs from that of the Upper Anicut, it is not sufficient to call for a more detailed description, as its bearings on the ascent and descent of fish must be the same, differing only in its greater height and width.

Fish cannot pass over the Anicut wall.

38. I arrived the day a fresh was coming down, it continued through the night until two feet three inches of water was going over the wall, then it began to subside. But I saw sufficient to be certain that no fish of any description could go over the wall, and on questioning the English Writer and the Monegar, they were of the same opinion, asserting positively that no fish ever did get over; but the head fishermen did not agree in this, and maintained that in very high freshes, when the river on both sides of the anicut is nearly level, there only being a slight ripple to mark the existence of the wall, fish went over: but this state of things had not occurred, they admitted, for the last eighteen months, and no one could be found who would assert that he had ever actually seen a fish ascend over the wall or go through the sluices. During my stay at the anicut several freshes came down, and although I saw the fish leaping up against the wall, I never saw one of them go over it, or even reach the summit.

Account of mode of fishing for Sable fish, which is only carried on once a day. Female fish the more numerous.

39. The first day that the water was sufficiently low, I went down to inspect the fishing at the stakes. On reaching the north branch of the Coleroon at 10 A. M., I found the water still deep, and the fish jumping against the anicut wall and falling down again on the lower step, from whence they were washed back into the river. About 400 yards down the stream was a row of stakes at right angles to the shore, extending half across the bed of the river. The head man, suddenly shouted, and waved a cloth, and in an instant the quiet scene was endued with life. Two men rushed into the centre

from the south side, and waded or swam off to the sand-bank existing in the centre of the river; whilst on the north side, from amongst the grass, and from under the trees, about fifty men came forth with nets, and, simultaneously, about twenty more manned the fishing stakes. The men with nets commenced about 100 yards below the anicut, forming a line across the northern half of the stream. Each net was about thirty yards long, and as it was unfolded was attached to the next. A second row of nets followed, the first at an oblique angle. As the river widened more nets were attached, until at last the stakes were reached. The fish which were trying to ascend were taken by the upper net, and those which were frightened and rushed downwards were caught by the stake nets. None attempted to jump over, as they appeared to be too heavy in roe. When the two sets of nets had met, the removal of the fish commenced. Men with green rattans threaded them as they were taken out, and 113 Oolum and one Wahlah was the result of this one haul. The circumference of the mesh was four inches, floated above by hollow reeds, and weighted below by leads, but these last are not sufficient to prevent the nets being carried gently downwards by the river. These nets are the property of the fishermen who, as I have observed, receive one-third of the spoil as their share. The first day the males of the Sable were in the proportion of one to every ten females. These fisheries are only drawn once daily, and other fishing is prohibited for fear of scaring away the Sable. It is only when these fish are not present that other species are captured.

Remarks on breeding Sable fish, and how none exist in the river above the Lower Anicut.

40. The females are the largest, and were full of roe; in one of moderate size I found 2187.5 grains of ova, and on

counting those contained in one grain, and calculating from this number, it appeared that there were 1,023,645. These eggs were sufficiently ripe to be deposited, whilst the melt in the males was in the same forward condition. No fish were taken below twelve inches in length, and all of them were breeding. As the proportion of males was only one to ten females, the number of the last taken was about 102, which would give the destruction of ova in round numbers at 104½ millions. On my suggesting their trying the nets above the anicuts, the fishermen declined, stating that it was of no use, as there were no fish there, rather a damaging statement as regards the effect of that construction on the ascent of the fish.

A *Sciæna* prevented breeding the same as the Sable fish.

41. But it is not only the Sable fish which is thus prevented from depositing its eggs in the river, as I found the *Sciæna coitor*, H. B., there, taken full of ripe ova below the anicut. It is never found above it. I observe that Hamilton Buchanan remarks, that in the Ganges they ascend as far as Agra. Therefore, as these specimens were just ready to breed, and were evidently trying fruitlessly to pass the anicut for that purpose, I conclude that they frequently, if not usually, deposit their ova in fresh water. This then is another species good for food, and extensively eaten by the Natives, whose destruction will probably follow in the Coleroon from the anicuts barring their upward progress.

Remarks on the breeding of the Mulletts.

42. *Mugilidae*, Mulletts.—Some of these species ascend the fresh water to

breed, as is well known, and are captured in numbers at the anicut, full of ripe ova, but are absent above that barrier. This is a very curious circumstance, from the fact that Mulletts exist in the backwater at Madras and in brackish ponds for years without going to the sea, and without apparently suffering from not doing so, although it is probable that they do not breed: but from their not being found above the anicut, it appears that if they are kept entirely in fresh water they die, and the genus disappears from the locality. Three years since they must have ascended in quantities when the breach of the anicut took place, now old and young have entirely disappeared above the Lower Anicut.

Myaveram. Return of the rents for the fisheries, and how the fish are decreasing.

43. *Myaveram*.—My enquiries here only extended to that portion of the talook which the Myaveram Contractor rents,

time not permitting me to enter into the Tranquebar division. The Contractor asserts that Sable and large sea fish do not now, and never did ascend the Cauvery, owing to the small size of its mouth, therefore their great supply of fish for food is derived from those species which are exclusively fresh water, and mostly come down the river with the freshes, but of late years these have much decreased, and the value of the fisheries have consequently dwindled down. The Myaveram district is about twenty-six by twelve miles in extent, and this is rented by one man, excepting Tranquebar. The following are the sums he has paid:—

	RS.	A.	P.
1862-63	1,435	0	0
1863-64	800	0	0
1864-65	1,026	0	0
1865-66	1,000	0	0
1866-67	962	0	0
1867-68	765	0	0
1868-69	865	0	0

Portion of Myaveram fisheries sub-let.

44. This great decrease in the rent is remarkable, but of course in my hurried visit I had not time to institute very detailed enquiries, whilst the Contractor had evidently much to conceal, and it was with the greatest difficulty any information could be obtained from him. He admitted that he sub-lets some portion, for which he obtains Rupees 200 a year, also that after paying every expense, including his living, he cleared 60 Rupees last year. He is said to be poor. He employs twenty fishermen, who have one-third of the captures as their share. The Tahsildar informed me that fifteen years since the rent of the fishing was collected with that of the land, and the Mirasdars of the villages paid it, but ten years ago the village tanks were made over to the village authorities. It would be interesting to ascertain whether this course has decreased the supply of fish. Last year only two men bid for the fishing, which appears to have been in the same family for a long period. The Tahsildar said that once when the fishing did not let, it was fished for Government, and he obtained the same amount as if it had been put up to auction. There were complaints that the people were of so high a caste that only eleven families bought fish, and that, therefore, it was obliged to be sold very cheaply, but this was the only place in which a difficulty of sale was even mentioned. It was also stated that in

Tranquebar fish were employed for manuring vines, but I could obtain no information as to whether this affected the price.

Tranquebar fishery.

45. The Tranquebar fishing lets as follows:—

	RS.	A.	P.
1865-66	114	0	0
1866-67	114	0	0
1867-68	114	0	0

Sheally fish do not appear to be decreasing.

46. At Sheally the river fisheries are not so valuable as at Myaveram, and

and Oolum do not ascend the river for the same reason, viz., that the water at the mouth is too shallow to admit of their doing so. There are complaints as to the decrease of fish, both as to size and number, but this is accounted for by the fact that nets with a very small mesh are employed. A few sea fish ascend, and I obtained some equula, &c. The fact of the decrease was hardly borne out by the receipts for rents. The fisheries are let yearly; for the whole of the forty-five places only six or seven persons bid, although fifteen or sixteen others are generally present. There are no tanks let out for fishing.

Rents received, and reason why they have decreased.

47. Statement of fisheries in the Perar river:—

Years.	Pelicha Caudoo Porawakal.	Thetty Oppanah.	Thenoor Palava	Coravaloor Mannody.	Total.
	RS. A. P.	RS. A. P.	RS. A. R.	RS. A. P.	RS. A. P.
For 1862-63	7 0 0	152 0 0	73 0 0	63 0 0	295 0 0
1863-64	8 2 0	140 0 0	74 0 0	136 0 0	358 2 0
1864-65	8 2 0	131 0 0	64 0 0	110 0 0	313 4 0
1865-66	8 4 0	141 0 0	68 0 0	75 0 0	292 4 0
1866-67	14 0 0	152 0 0	50 0 0	130 0 0	346 4 0
1867-68	14 0 0	152 0 0	53 0 0	130 0 0	349 8 0
1868-69	14 8 0	153 0 0	43 0 0	130 0 0	340 10 0

At Thenoor Palava, the Tahsildar observes that the value has decreased, owing to the exceedingly necessary order which has been issued, not to net the fish close to the sluices, or rather not to fish near the masonry work of the anicut. This shews most conclusively the destruction which must have been going on there.

Chellumbrum. A Sable fishery in the Coleroon, value estimated too highly by the fishermen.

48. Near Chellumbrum, on the north branch of the Coleroon, a few miles from the town of Chellumbrum, there is an

Oolum fishery, where, according to the fishermen, from four to six lacs of fish are yearly captured, in the same manner and at the same time as described at the Lower Anicut. During the Oolum months other fish are not taken for fear of frightening the Sable. But during the rest of the year the smallest fry are captured, in fact the Natives consider that the smaller the fish used for their curry the sweeter it is. Several fishermen were examined, and they all agreed that they get from four to eight annas worth of fish a day during the Oolum fishery, their pay being half the fish captured, the value as given at Combaconum; that 100 fishermen are constantly so employed, and when the fish are very numerous 100 villagers are allowed to help on much the same terms. Here I did not personally see the Contractor, and the fishermen had no

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object to gain by reporting the captures as below the average, and I question whether they did not even place them at too high a figure. For a few days at a time, if 200 men obtain eight annas each, that would be 100 Rupees for them and Rupees 100 for the Contractor, or a total of Rupees 200. Compute the fish at $1\frac{1}{2}$ Annas each, we obtain nearly 2,500 fish in one day; but I do not believe this could be done. Ten days in the season would give 25,000, and if we take the other fifty-one days in June and July at one-third, we obtain $833 \text{ fish daily} \times 51 = 42,483 \times 2,466 = 44,949$. Now, this must be three-fourths of the amount captured, so add one-third or $14,933 = 69,932$ fish, or less than a lac yearly. This is of course exclusive of the common fish, and as never less than two annas daily are obtained, we have the value of the fishery as follows: six months at two annas, or 200 annas daily = Rupees, $2,281 + 3,278 = 5,559$, deduct Rupees 892 and we have Rupees 4,667 as profits.

Sable fishery commenced after erection of the Lower Anicut; when the breach occurred the number of fish taken greatly decreased, whereas it is larger now than they ever recollect it to have been.

49. One old man recollected the fishing perfectly for forty years, and can well remember that after the Anicut was built the Oolum fishery commenced; whilst the year before last when a breach

occurred, they did not take one-half of the usual amount. Last year was good, but this is the best he recollects, and in this portion of his statement the younger men coincided. Probably in consequence of the break more fish deposited their ova above, and a greater number consequently the result. When very large captures are made, the roes and the fish are salted, and the Lubbays appear to trade in them. These fish are so much esteemed by Natives generally, that there is a proverb in these parts, "so long as you have funds purchase a Sable fish, being the most healthy and sweetest to the palate."

Rents received for the fisheries near Chellumbrum.

50. The fisheries are let as in the Tanjore district, mostly yearly. It appears that the Contractor of the Veeram

nam tank petitioned respecting the losses he incurred last year, and therefore, as a compensation, he is allowed to have the tank this year without paying any rent. I regret that time did not permit me to inspect it personally. It has been let as follows:—

	RS.	A.	P.
1862-63	121	0	0
1863-64	183	0	0
1864-65	0	0	0
1865-66	103	8	0
1866-67	201	0	0
1867-68	368	2	0
1868-69	0	0	0

Chellumbrum.—The following are the total amounts received or bid for the fisheries in this talook:—

	RS.	A.	P.
1862-63	543	0	0
1863-64	608	8	0
1864-65	1,156	0	0
1865-66	1,001	12	0
1866-67	1,533	13	0
1867-68	1,357	2	0
1868-69	961	0	0

Proceedings of the Madras Government, Revenue Department,
4th February 1869.

Cuddalore. Rents for fisheries steadily decreasing.
Remarks on not letting fishing.

51. Cuddalore remissions have of late been allowed on account of the great deficiency of rain during the last two

years. There are eighty-five tanks in the Cuddalore District, which are separately rented, and the rents appear to be steadily decreasing. This must be due either to remissions or to deficiency of fish. Now if due to remissions, I conclude it must be allowed that fish are decreasing, or else that Government is giving up that source of revenue. The price of food is increasing, so the fisheries also ought to be more valuable. If every one is permitted to indiscriminately fish village tanks without paying rent, on the philanthropic principle that it is hard on the people to make them pay, and thereby throw impediments on their obtaining food, I must observe that this course is quite opposed to true philanthropic economy; because it increases the numbers of those who catch fish, and though the supply is temporarily augmented, it is permanently decreased or even destroyed. Indiscriminate slaughter, by every possible method, appears to me most wasteful, for although no one would object to the use of rods and lines, this constant netting with small meshed nets, and letting off the water of tanks for the purpose of destroying its piscine inhabitants, should certainly be prohibited. This last procedure is said to be employed in some places, occasionally; it may be objected that the water is too valuable to be thus wasted, and I should have thought so myself, and could not have believed that any sane person would adopt such a suicidal policy; still I am assured by those who have been present that this is sometimes done, and if so it must certainly be efficacious in destroying the fish. The following is a summary of the returns given me by the Tahsildar:—

	RS.	A.	P.
1861-62	337	1	0
1862-63	337	1	0
1863-64	337	1	0
1864-65	282	6	0
1865-66	161	9	0
1866-67	335	5	0
1867-68	258	12	0

Tindavanum Talook. For seven years no alteration in the rents, and no remissions, as observed existing in neighbouring talook, on the ground of insufficiency of rain.

52. Tindavanum.—The Tahsildar does not appear well acquainted with the fishes, and the tanks are some distance away, those in the vicinity being either

dried up or destitute of fish. Fishermen were sent to try and procure specimens, but those they brought were mostly Koravas.

The following is the return of the fisheries in this talook, when all the tanks are let:—

Total tanks.	1861-62,	1862-63, 1863-64, 1864-65, 1865-66, 1866-67, 1867-68.
425	Rs. 1,569-4-10.	No alteration.

As the same amount of rain must have fallen in this talook and those in the neighbourhood, it is worthy of remark that no remissions were allowed here, and it is also remarkable that the fisheries have yearly obtained the same rent.

Arcot Talook. No use placing fish-nets in the anicut, as due to the scarcity of water very few fish exist in the river.

at the anicut I found the channel nearly dry, and this appears to be so constantly the case that valuable fish, such as the Sable, do not ascend it; the fish are, therefore, all strictly fresh water ones, and those most generally taken are the Wollah, *Wallago attu*, and the walking fish, *Ophicephalus*. It would therefore be a useless expense to attempt fish-nets here for these species. The rent of the fisheries has been as follows:—

	RS.	A.	P.
1862-63	1,426	9	6
1863-64	1,470	1	6
1864-65	1,442	14	0
1865-66	1,550	14	0
1866-67	2,348	12	0
1867-68	2,785	3	9

Revenue in Arcot Talook. Some tanks appear to be let in perpetuity, some are unlet for deficiency of rain, others have been unlet from too much water existing in them.

of the tanks are said to be let in perpetuity, others for long terms. The most valuable is the Chavank tank, which has been let as follows:—

	RS.	A.	P.
1862-63	245	0	0
1863-64	0	0	0
1864-65	0	0	0
1865-66	0	0	0
1866-67	820	0	0
1867-68	1,000	0	0

In those years in which it was not let, the water is said to have been too high to allow fishing: here, therefore, the return of the register of the height of the water throughout the year in this tank should be given with the returns of the revenue. It seems that a catamaran was rigged up and tried unsuccessfully in fishing. I observe that since 1842-43 the rent of the Vangoor, Polipankun, Partipootoor, Kavanoor, and several other tanks has remained unaltered, whilst many others are unlet in consequence of insufficiency of water. The price of fish as an article of diet is said to have risen owing to a decreased supply, which is not now equal to the demand. In fact the Tahsildar considers that almost any amount would find a ready sale whether fresh or salted.

Observations upon Colonel Italy's paper on the fisheries of India in the Journal of the East Indian Association.

which I have received, I think his statement, as regards the fresh water fisheries, that young fish are captured for immediate consumption without even a thought for the future, is correct, wherever a native may indiscriminately fish, as for instance

53. In the Arcot Talook the sum derived from the fisheries is principally obtained from the tanks. In the river

54. In this talook unfortunately the revenue cannot be taken as a direct and decisive proof of either the increase or decrease of the fisheries, because many

55. With reference to Colonel Italy's observations in the second number of the Journal of the East Indian Association,

when the fishing is unlet. But in large rivers, and most of the tanks where the fisheries are let, and this destruction goes on, it is due to the fact that no restrictions exist in the agreement for letting them, and the tenants, therefore, endeavour to obtain all they can for their money. This might easily be obviated by some conservancy laws. As regards the indiscriminate slaughter of fish, "at which not only the surrounding population by the thousands assisted, but dogs, jackals, birds, &c., lend their aid," it could not have taken place to the south of Madras, where a ready market exists for the sale of fish, and the Contractor would allow no such waste. I enquired most particularly into this subject, but no one had ever heard of such an occurrence.

Classes who consume fish; and good market which exists inland for salt fish.

56. As regards the classes who feed upon fish they are chiefly East Indians, Native Christians, Mussalmen, and the lower castes of Hindus; but I find at Chellumbrum and a few other places, that some of the more respectable of the Hindus commonly eat fish. All wholesome fish meet with a ready sale, and the importance of fish as an article of food must of course vary with the quantity obtainable. I have reasons for believing, as I intend showing in my final report, that the inland market for salt fish in this Presidency is inexhaustible, and that it is only the very inferior quality of the article supplied which prevents the trade increasing to an enormous amount. No one who has once passed a railway carriage containing salt fish, as at present cured, would wish to do so a second time. The following is the return kindly furnished me last February by the Traffic Manager of the Madras Railway, showing the tonnage of salted fish carried inland from the Western Coast.

1865	1,641 tons.
1866	1,465 "
1867	2,069 "

Disease due to a salt fish diet.

57. As regards dysentery being produced by salted fish, as Colonel Italy asserts, I some years since remarked that it is due to the poorer classes on the Western Coast salting their fish badly, and keeping it for the monsoon months, when they consume it in a semi-putrid state. The genera are the *Equula*, and the scabbard fish, *Trichiurus*, they are very thin, and are only dipped into the sea, and dried in the sun. That some diseases are due to a fish diet, and that persons living on such a diet are more subject to certain diseases is evident.

Unadvisability of placing brushwood in fresh waters, as proposed, for fish to deposit their ova upon.

58. The cultivation of fish in India by means of their ova, as suggested by Colonel Italy, would not succeed, for fish as a rule do not deposit their spawn in brushwood, but on sandy banks where the water is low, and in the grass by the side of the rivers and tanks. He also observes, speaking of the pearl oyster, that "the success of oyster beds would amount to a certainty," because frost is their greatest enemy; here also I would remark (although I did not go to Tuticorin) that the pearl oyster lives in salt water, and freshes coming down on its abode are said to destroy it, as also severe thunder-storms when in shallows, whilst it dies or does not breed in deep water. Its cultivation though it might succeed is a service of no little difficulty.

Fence months not advisable in the south of Madras, as fish breed at different seasons, whilst it is only at the breeding periods the Sable can be taken; but a law necessary to restrict the size of the mesh of the nets employed.

such as the Sable, are only taken when full of roe, and it is at that time that they are most valuable for the table, the same as with the Mackerel and some other species at home. I however believe that unless some means of conservancy are adopted, there is a likelihood of the fresh water fish supply being greatly impoverished in Southern India, especially in those rivers where there are irrigation works. But this may be obviated by the construction of fish-passes, which I will enter into fully in my final report. A general law also appears necessary respecting the size of the mesh employed in fishing. I do not believe this should ever be allowed of a smaller circumference than six inches. If this course were adopted, it would unquestionably decrease the revenue for a time, but subsequently augment it, provided the Tahsildars at different places were directed to pay a little more attention to the revenue derivable from fisheries.

Letting of fresh water fisheries in the Madras Presidency, as given by the Madras Revenue Department.

ment. In the Madras Presidency no tax is levied on nets for catching fish, but large tanks and rivers are annually rented out, and the amounts realized carried to the credit of the district road fund, subordinate to local funds. The amounts so collected in the year 1866-67 are shewn as follows:—

	RS.
Ganjam	1,533
Kistna	6,699
Nellore	67
Bellary	14
Madras	1,578
North Arcot	7,239
South Arcot	5,099
Tanjore	18,495
Trichinopoly	587
Madura	14,228
Tinnevely	11,076
Coimbatore	722
Salem	2,312

Total 69,684

Return does not correspond with that given by the Collector of Trichinopoly. Statements from other Collectors not received. Revenue returns should be a guide to the increase or the reverse of the fisheries.

applied to some other Collectors for returns, but have not received them as

59. As the generality of fish breed at different months in the southern parts of this Presidency in accordance with the monsoon months, I cannot advocate fence months, especially as some species,

60. As regards the letting of fisheries, the following return was furnished me from the Madras Revenue Department.

61. This return may be correct, but the Collector of Trichinopoly (see paragraph 22) gives the amount for that year as more than double that given above from the Revenue Department. I have

yet. My belief is that the revenue returns ought to be an excellent guide as to the increase or decrease of the fisheries, if they are being let out at their value, and I would suggest the advisability of calling for the following information, which should be collated when received. A return from each Tahsildar, shewing the yearly rent for the last ten years of every piece of fresh water in his talook, and including in that return all those still unlet. A second return shewing the yearly amount received for five years at some previous date, say before 1830. As talooks have altered in size, the rent of separate pieces of water should be shewn, and also as I see in some places the rent never alters, as in many pieces of water in Arcot, remarks should be made when it is fixed and permanent. Also a yearly return from every Collectorate since 1825. In valuable pieces of water, which are unlet owing to the excess or deficiency of water, a return of the height at which it stood on the 1st and 15th of every month should be given. It appears to me that when fresh water fisheries are let for a term, Government is much more likely to lose than when they are yearly put up to auction. If let by the year, the rent appears to be obtained; if for a term, every excuse is made for remissions, either there is no water, as at Chellumbrum, or too much, as at Arcot. The yearly rent appears very small, but I do not believe Government would gain by having the fresh water fisheries carried on under their own servants. Take the Lower Anicut for instance, here all the fishermen belong as it were to the present Contractor, and would probably not work for any one else; whilst it would be very expensive to introduce others, and new hands are not likely to be so efficient. At the same time I believe its value is not received. The fisheries in small places get into the hands of certain families, and thus at the auctions there is combination, not competition, this is not so much the case at large towns or stations. Fish-passes will assuredly increase the value of the fisheries above the anicut, and probably repay for their erection in twelve or eighteen months. It has been urged by some parties that Natives capture the little fish as food, and that as Government only obtains such a small revenue from the fisheries, they might remit the rents entirely. Such a course as this would cause the certain annihilation of the fisheries such as they are, and the consequence would be, as is said to be now the case in village tanks, that every one who liked would fish, no laws being in existence to restrain or control their proceedings. Thus this course, instead of being philanthropic to the people, would be entirely the reverse, as it would undoubtedly end in their having no fish at all at a future period.

(Signed) FRANCIS DAY.

No. 88. From Surgeon FRANCIS DAY, F.L.S., & F.Z.S., on Special Duty, to the Secretary to Government, Revenue Department, Fort Saint George, dated 17th November 1868.

I. I have the honor to forward my second report on the present state of some of the fisheries in this Presidency; this continuation having reference to those north of Madras, whilst the former was devoted to those existing in the south. In this report I have not included Nellore, as the time which would necessarily have been occupied in that inspection would have precluded my visiting the important anicuts on the Kistna, Godavery, and Mahanuddée prior to the dry season. For the same reason I had not time to remain longer in the Kistna and Godavery Districts, but I believe the information will be sufficient for practical purposes.

Masulipatam fisheries only partially farmed out.

2. At Masulipatam I was detained a few days completing the report of my Southern tour, which I despatched from thence, and I took the opportunity of inquiring into the fisheries. I there ascertained that some of the most eligible fishing-grounds have not been farmed out for some years, and I was thus enabled to see an excellent practical illustration of the effects of non-preservation. The same practice of not renting out the fisheries I may mention exists in the Godavery Collectorate.

Board of Revenue's Circular Orders respecting the letting of fisheries.

3. It may be as well to give some extracts here, from the Circular Orders of the Board of Revenue, to prevent repetition in reference to each locality, as well as in my final report. On November 27th, 1848, Collectors were requested "to take measures to introduce, in future, the system of disposing of the village, tank, and channel fisheries on rent, should such a course not have been hitherto adopted." But to the Collector of North Arcot, on receiving his letters of December 8th, and January 29th, 1849, the Board observed, they "will not press the extension of the renting system in respect to the fisheries of North Arcot, but will leave it to the discretion of the Acting Collector to continue the management of that branch of revenue in the manner which appears to him best suited to the circumstances of his district;" whilst, in reply to a letter from the Collector of Guntur of January 29th, 1849, the Board did "not consider it advisable to revive the practice of renting the tank and channel fisheries in Guntur." The Agent in Kurnool was directed "not to take any measures for renting the fisheries in his district," and the Collector of Bellary was "not to make any demand on this head upon fisheries which have not heretofore been subject to tax."

Board of Revenue's Orders respecting the letting of the Kistna fisheries.

4. In 1862, the Collector of the Kistna District reported to the Board of Revenue that he had been offered Rupees 942 as rent for fisheries which had never heretofore been given in rent but where the fishermen used to pay moturpha, the applicants intending to sub-rent them to the fishermen. He received the following answer:—"The Board are decidedly opposed to any extension of the fishery rents, and more especially so where involving in any form the reimposition of the burden from which the abolition of the moturpha tax relieved the poorer classes. The Collector will unhesitatingly reject the tenders." A copy of this was sent to all Collectors, and was immediately followed by the remission of the rents for the fisheries on the Kistna River, at Bezvada, and elsewhere. I propose leaving my remarks upon this subject until the next report, but have placed these extracts here to show the reason why these fisheries have not been let.

Returns of rents of fisheries in the Kistna District.

5. The Acting Collector of the Kistna District has furnished me with a return showing the rents received from the fisheries for the last ten years, from which I take the following in Fuslies:—

Fusly 1271.	Fusly 1272.	Fusly 1273.	Fusly 1274.	Fusly 1275.	Fusly 1276.	Fusly 1277.
RS. A. P. 1,244 5 2	RS. A. P. 4,611 7 4	RS. A. P. 5,357 11 4	RS. A. P. 3,525 0 0	RS. A. P. 4,927 7 10	RS. A. P. 6,698 13 4	RS. A. P. 6,864 12 0

This, however, does not coincide with the following return, dated October 12th; neither does this second agree with the return from the Bunder or Bezvada Tahsildars, or that from the office of the Department Public Works, (see paragraphs 7 and 8.) In fact the accounts of the fresh-water fisheries appear to be complicated, possibly by their being included in other returns; but as I only received the following at Cuttack, I have been unable to retransmit it for further information:—

Statement showing the Fish Rents in the undermentioned Talooks of the Kistna District.

GUDIVADA TALOOK.										BUNDER TALOOK.				BEZWADA TALOOK.				Total.
Fuslies.		Tahsildar.		Collair Lake.		Department of Public Works.		Rivers.		Tanks, Salt Creeks, and Swamps.		Department of Public Works.		Tahsildar.		Department of Public Works.		
		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.		Rs. A. P.		
1271...	...	...	3,934 15 0	...	...	...	...	...	...	685 8 3	...	...	...	...	...	...	...	...
1272...	...	...	4,185 3 4	...	...	...	...	...	...	381 4 0	...	...	...	...	...	...	...	...
1273...	...	...	4,968 0 0	...	...	...	...	...	...	389 11 4	...	...	...	...	...	...	...	...
1274...	...	...	2,303 8 0	...	...	...	...	...	...	305 7 0	...	...	...	...	...	...	...	...
1275...	...	...	4,920 0 0	...	...	...	...	...	...	340 8 7	...	...	...	...	...	...	...	...
1276...	...	...	4,920 0 0	...	...	...	...	...	...	365 7 4	...	...	...	...	...	...	...	...
1277...	...	...	4,920 0 0	...	...	...	...	...	...	934 12 0	...	...	...	...	...	...	...	...

(Signed) W. McQUHAE,
Acting Collector.

Fisheries of Masulipatam.

6. At Masulipatam there are three castes who are principally employed in capturing fish, or are in the fish trade, the Pulla, the Besta, and the Uddee. The salt-fish trade appears to be insignificant, and the article produced very inferior. Its value in the local market is, however, rather high, being about 4 Annas per pound. The Mullet, *May shappah* (Telugu), the Lates calcarifer, *Pundu kopah* (Telugu), and the Polynemus, *Maga* (Telugu), appear to be held in the greatest esteem. In the fresh-waters around this station I found the *Botchee* (Telugu), *Catla buchamani*, C. and V., very abundant; but owing to the indiscriminate slaughter which obtains there I could not procure one of more than quarter pound in weight, (see paragraph 26.)

Fisheries of Bunder Talook, and Tahsildar's estimate of the extent they could be increased.

7. In the Bunder Talook there are, according to the Tahsildar, ten places let, of which two are portions of the river, six tanks, and two salt-water swamps. The Tahsildar estimates that, if permitted to do so, he could at once double the revenue by letting all those portions now unlet, especially branches of rivers, only one-third of which are at present rented out. Those fisheries which are let are annually put up to auction. As, during the late cyclone, all the old records were destroyed or injured, the Tahsildar could give no information prior to that period. The following are the rents he stated to have been received in this Talook since 1863:—

	1863-64.	1864-65.	1865-66.	1866-67.	1867-68.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Rent	379 11 4	300 1 5	322 0 0	414 8 0	383 0 0

Rent of Bezwada fisheries.

8. At Bezwada (to which place I next proceeded up the canal) I requested and obtained returns from the Tahsildar, and from the Department Public Works, of the rents received, as the latter lets out the anicut and some of the sluices. As they do not correspond with the Collector's accounts I give them in full, as I am unable now to ascertain with whom the error lies.

The Tahsildar's return shows he received the following:—

1861. Rupees 100 for a portion of the Kistna river.

1862. " 150 " " " "

1863. Rents given up under Proceedings of the Board of Revenue already quoted in paragraph 4, conveyed in the Head Assistant's order, dated January 8th, 1863.

The Department Public Works collected as follows:—

Years.	Anicut.	Sluices, &c.	Total
	RS. A. P.	RS. A. P.	RS. A. P.
1866...	136 0 0	...	136 0 0
1867...	100 0 0	105 0 0	205 0 0
1868...	110 0 0	258 14 0	368 14 0

The portion of the river, given under the head of Anicut, consists of about 200 yards of the river below that structure.

Kistna Anicut. Fish unable to pass it.

9. At Bezwada the Kistna is about 1,370 yards broad, and crossed by the anicut. This differs entirely in its construction from those on the Cauvery, as the amount of stone obtainable here is unlimited. It consists of a broad wall upwards of fifteen feet high, having a short apron in front of it, and one two hundred feet long of rough stone at the back, or between it and the sea; these rough stones are kept in their places by retaining walls, &c., &c. On either side of this anicut are the sluices, whilst a long lock on the Bezwada side leads to the irrigation canal, which divides into two branches, one going to the Godavery at Rajahmundry, the other to Masulipatam. The velocity of the stream in the Kistna is great; the freshes commence in June, and continue to the end of October, after which the river subsides, but it is not fordable until the middle or end of January. About the end of September the sluices are closed, and a wall of rough stone, about three feet high, is raised on the summit of the anicut wall, so as to preserve as much water as possible for the November and December crops. Through this rough wall the water trickles, but it rarely flows over it. About March these stones are employed for strengthening the apron of the anicut, repairing the waste caused by friction, &c. Even if the anicut itself were not an insuperable obstacle to the passage of fish at this part of the river this additional three feet wall would most certainly be so.

Fishermen's account of the effect of the anicut upon the fisheries.

10. At Bezwada, amongst the fish which ascend from the sea, the most valuable economic species is the *Palasah* (Telugu), or Sable fish, *Clupea palasah* C. and V., which come up the Kistna during the months of October, November, and December to deposit their ova, and entirely disappear about April. The fishermen informed me that, for two years after the erection of the anicut, these fish were taken in great numbers being unable to continue their ascent past the weir; whilst their efforts to do so were so frantic as even to attract the attention of the Natives who renamed them *Yekkudi chakka*, from *Yekku* "to climb." In the Kistna one mode of taking them is by hanging baskets over the anicut, so that the fish jumping against the sluices fall down into them and are thus captured, as at the Coleroon anicut. Owing to the construction of the anicut over the Kistna the numbers of fish, which had previously extended their range for at least fifty miles of the river, became arrested at Bezwada where they were taken with little difficulty. So large were the captures that not only were the whole of the fish-eating population amply supplied, but many were salted and sent elsewhere for sale. As the freshes subsided in December and January, those fish which still continued trying to ascend to their spawning beds became entangled amongst the rough belt of stones at the rear of the anicut, (see paragraph 9,) and at night, and in the early morning, when the fishermen were not employed in catching them, the wild animals, such as jackals and the like, took their share, assisted by the pariah dogs who came down and destroyed numbers. It is universally denied that they were ever "left to rot, or to be destroyed on the banks," as those remaining unsold were salted by the inhabitants of the bazaar, and sent to distant markets. Since these first two years there has been a gradual diminution of this

species, as well as of all other kinds of fishes, whether strictly fresh-water or partially marine, and the fishermen complain that they cannot now half supply the local demand. They universally asserted the impossibility of any fish going over the anicut, or ascending up the under-sluices.

Obtaining specimens of Sable fish.

11. Judging from the habits of the Sable fish it appeared to me very improbable that none of them were in the river, (which was in full fresh,) although the fishermen asserted that this was the case. I accordingly offered a Rupee for the first fish brought me, and half that sum for the second. This had the desired effect, and in forty-eight hours I obtained a pair of them, and subsequently more. The ova was not quite ready for depositing, but it evidently would soon have been so, and they had ascended the Kistna to reach their spawning beds.

Effects of non-letting of fisheries, and their value in the Kistna.

12. Owing to there being no contractor, (for the fisheries are not let,) they are most imperfectly, although constantly, worked. Every one appears to act on his own account, and morning, noon, and night nets are employed in every available spot. Thus the fish are scared away, and the captures are far inferior to what they would be were there some organized system adopted, as in the Coleroon. Admitting, as we must, the great decrease of fish in this locality, it appears that, irrespective of the small size of the mesh of the nets employed, two causes have induced this result, viz., the presence of the anicut without a fish pass, and the indiscriminate fishing, greatly the result of non-letting the fisheries. Now even little boys are sent out to capture whatever they can for the use of their family; the size is no object, and thus the fry are destroyed, leaving future years to take care of themselves; this would not be the case were there a contractor, (at all events to such an extent,) as in self-defence he would prevent this indiscriminate fishing for some months in the year, whilst the Sable was in the river. Seeing two lads fishing on one occasion, I questioned them when each showed a moderate sized chatty, which they said they must half fill before they went home, or, as they expressed it, their mothers would beat them. I found hundreds of the fry of the Catlas, Barbel, Labeos, Siluroids, and other fish, which might attain a good size if allowed to grow. In the bed of the river, irrespective of the destruction going on along the banks, were the regular fishermen who use cast nets. About November or December, the local fishermen are supplemented by as many as forty more from Dowlaishweram and its neighbourhood, who come over to assist in catching the Sable, and earn about eight Annas a day each, remaining for from one month to six weeks, (see paragraph 23). I think Mr. Stuart's

* Proceedings of Madras Government, May 27th, 1868.

estimate, (in his letter, dated Bezvada, October 21st, 1867,*) that 3,300 cavady loads of fish, weighing 14,600 maunds, of the value of Rupees 7,800, are annually taken below the anicut, is too high; but as he has resided some time on the spot as Acting Head Assistant Collector, his opportunities of correctly ascertaining the amounts captured were superior to mine. Mr. Stuart, apparently from personal observation, states that the Dowlaishweram fishermen, who come in November and December, a period I was unable to be present, (see paragraph 1,) bring nets of from 300 to 400 yards long, and from 12 to 14 deep;

that "the greatest quantities of fish are caught in the deep pools below the anicut, the net being first fastened at one end then taken round a wide sweep, and gradually drawn in. At one haul these large nets will bring to land five cavady loads, and five or six hauls appear to be the usual day's work. In each haul (say thirty-six cavady loads) there will be some dozen or two of other kinds, but almost the whole haul consists of "Yekkudi chakka," "Sable fish." As the usual computation appears to be that Government should receive one-fourth of the value of the fish taken, this would give a yearly loss on this one spot (according to the Head Assistant Collector's calculations) of Rupees 1,950, to Government, and as this has gone on for six years the rents which could have been raised would have been amply sufficient to defray the cost of a permanent fish pass. The small white fish, alluded to by Mr. Stuart as taken in the canals, appear to me to be a *Chela*, which abounds, and is somewhat similar in appearance to the Sable fish. The difficulties for fish to obtain an entrance from the Kistna river into the canal are great, whilst the latter is too dirty for this species (the Sable) to reside in.

Reasons why fish cannot ascend over the anicut.

13. As regards the anicut itself, although the height of the wall above the bed of the river is considerable, the rough stones forming the apron on its sea-face have a gradual slope in their descent of 200 yards, and up this incline it might have been imagined the fish could easily pass, but such is not the case; the velocity of the current is great, and in passing over these rough stones the fish apparently become so bruised and otherwise injured that none cross the anicut. As I have already observed, amongst these rough stones numbers were taken soon after the construction of the anicut. On either flank are the sluices where this rough apron does not exist, but even over this they cannot pass, although the water is sometimes several feet above its summit. The reason appears to be that fish pass along the beds of rivers towards torrents, and if those beds are rough they cannot ascend. At the sluices they evidently go against the base, and will not rise sufficiently to pass over the wall; for as they rise the current takes them down the stream, and they do not find the obstruction overcome. It appears unquestionable that no Sable or other sea fish are ever taken above Bezvada now, although they used to be prior to the construction of the anicut.

Necessity of a fish pass.

14. The anicut for want of a fish pass is thus preventing fish from ascending the river for the purpose of breeding, and doubtless, unless some remedial measures are adopted, the fisheries, which are now very inferior, will be entirely ruined, requiring at least two years of rest for even partial recovery. As regards the anicut, it seems questionable whether a permanent or temporary fish pass would be least expensive; for the officer in charge considers it 'unadvisable that, for the sake of the stability of the works, any permanent structure should be erected up the face of the apron. These, however, are all subjects for the Department of Public Works, and therefore I shall only subsequently allude to the form required, leaving the method of construction to the consideration of the Engineering Department. Colonel Winscom suggested a temporary pass, which he considered could be erected for about Rupees 50. On this subject I addressed him a letter the day I left Bezvada, in which I offered personally to defray the cost on that amount, as the Sable fish were just arriving, and thus one season would have been saved; but his

answer has apparently miscarried, as I have not yet received it. I doubt if it will succeed, but considered it worth the trial, especially as the Engineer Officer proposed it.

Some of the remedies proposed. 15. The fisheries here are only partly let, and afford a good illustration of the effects of indiscriminate fishing, which I maintain must be as destructive to the fisheries in India as it has been to those in Europe, rendering it more economical and beneficial to the community to let out all fisheries, at the same time restricting the size of the mesh of the nets. If Government would consent to let out all these fisheries, in addition to the service it would be to the fish, I believe an increased revenue would result, and even if the fish passes prove expensive the rents would, I expect, amply reimburse the outlay. The value of the river fisheries above the anicut would be increased, the fish would multiply, and subsequently the fisheries below the anicut would improve. I trust it will be conceded that, when I use the term "increased revenue," I allude not so much to the money which would be received as to the increased value of the fisheries. The non-letting of the fisheries, or indiscriminate fishing, has been tried for six years, and I would now suggest the adoption of the renting system, with rules respecting the size of the mesh; the prohibition of fishing, excepting with rods and lines within 100 yards of all anicuts, dams, locks, or masonry works extending across streams or canals of fresh-water; and the construction of a fish pass over the anicut.

Examples of the destruction of the fry of fishes. 16. It will be as well to give some instances here to show that the fry of fish are destroyed in numbers, not wantonly for the sake of destruction, but because larger fish are unobtainable. I have already alluded, in paragraph 12, to two lads fishing, whose only directions were to bring home a sufficient supply, irrespective of size or condition. I examined the baskets of several of the fishermen, and still saw the same predominance of small fish taken, and fry in quantities destroyed without compunction either for food or for sale. Now this constant netting, if the fisheries were let, would be prohibited by the contractors, not for the sake of the fish, as they do not seem ever to look beyond the present day, but because they would be taking his fish and disturbing his fishing. Thus the non-letting is one of the causes of the destruction of the fry, and the consequent decrease of the mature fish. Miles upon miles of the river are thus left to chance, or rather not to chance but to the certainty of depopulation. One day some sun-dried fish were brought me, and on purchasing nine Pie worth I found I had upwards of 200 small fish for my money. Several persons, I was informed, in this and the neighbouring Talook live upon capturing the small fry, drying them in the sun, and disposing of them!

17. On leaving Bezwada I went by Ellore and Collair Lake.—Value of fish in the local market, the canal to Ellore, in the Gudivada Talook. Here, as I have already shown, (paragraph 5,) the Collair lake brings in a fair revenue to Government. Except in the rainy season this lake or tank was formerly salt-water, but owing to the bund erected of late years it is now kept fresh. It is computed to cover 100 square miles, and the Burdwan river flows into it. For the last three years it has been farmed out to a Mahomedan and a Brahmin in partnership, and they sub-let most of it in portions to various individuals. In the town of Ellore the fish sold realize about

Rupees 1,700 yearly, according to the Tahsildar. The persons who dispose of it purchase it at the Collair lake, or at Bezwada from the fishermen, charging one-third more for the risk and expense incurred in bringing it. Fish, in common with other provisions, is now much dearer than formerly. A *Botchee*, Catla buchani, of about 5 lbs. in weight, is worth three Dubs, or about one Anna at the present rates. I could not obtain many species from this lake, but the *Wahlah*, the *Ophiocephalidæ*, and the *Barbels* appear to abound.

18. From Ellore I proceeded by Rajahmundry.—Former taxes on fishermen. How fish have decreased since the construction of the anicut at Dowlaishweram. canal to Rajahmundry on the Godavery, some few miles above the Dowlaishweram anicut. The fisheries are not farmed out nor let, but the following is an account of what was received for ten years, to Fusly 1271:—

	Fusly 1262.	Fusly 1263.	Fusly 1264.	Fusly 1265.	Fusly 1266.	Fusly 1267.	Fusly 1268.	Fusly 1269.	Fusly 1270.	Fusly 1271.
Rent	RS. 137	RS. 137	RS. 139	RS. 24	RS. 24	RS. 24	RS. 24	RS. 24	RS. 24	RS. 24

It appears to be a common scramble who can take the fish, irrespective of their age or condition. At present there is a tax of one Rupee on every house inhabited by fishermen, and about twenty in number; this they appear to consider gives them a right to the fisheries. I applied to the Tahsildar for further information respecting this, and he explained that, since Fusly 1271, "the tax on them was inflicted, and is being collected by the Municipal Department." About thirty persons fish with cast nets, and it appears to be a tacit agreement that the fishermen from Rajahmundry do not go to Dowlaishweram, and *vice versa*. Before the construction of the anicut, sea fish were by no means uncommon opposite the town, but now they have become comparatively rare, and it is quite futile to expect to obtain large fish above the anicut. The anglers appear to have but little sport, they sit hours and hours on the stone wall or elsewhere baiting their hooks from time to time with coagulated blood, but they as frequently return home without, as with anything worth catching. This great diminution in the number and size of fish taken by angling is said to be only of very recent years. I obtained a few Sable fish, *Clupea palasah*, C. and V., which had evidently deposited their roe, and about 100 fry of the same species, apparently about a month old, and also the *Sciæna coitor*, H. B., thus distinctly proving that sea fish may either ascend the river over the anicut, or come up the irrigation channels. There appears to be a large demand for fish, and the Sable and other species ascend during the south-west monsoon when the freshes come down.

The Reverend Dr. Murphy's account of the fisheries in the Godavery, from 1861 till the present time. 19. I applied to the Reverend Dr. Murphy at Rajahmundry for any information respecting the fishes of this magnificent river, which he would be good enough to afford me, as he has been residing either at Rajahmundry or at Dowlaishweram since 1861, the year before the Revenue Board ceased accepting rent for these fisheries. The following is a synopsis of his reply:—That he considers the fish have decidedly decreased, which decrease

has been more apparent during the last three years; that this has been due to excessive destruction of fish below the anicut, and also to the universal and unrestricted capture of the fry in the river and irrigation channels; that the price of fish has more than doubled. With regard to the anicut he observes, that it facilitates the destruction of fish by causing them to collect in large numbers whilst awaiting a fresh, to enable them to pass over it on their way to the spawning grounds. Since it was raised two feet higher (that is, within the last four years) it prevents the return of the later fry to the sea, and causes them to pass down the irrigation channels where they are mostly captured by nets, or being carried out into the small channels they become lost in the paddy-fields. The early fry began to pass down to the sea in November or December, but after the latter month they cannot cross the anicut. Dr. Murphy also agreed with me on the advisability of compelling the fishermen to enlarge the mesh of their nets. All the Natives, and most of the Europeans whom I questioned on the subject, considered that the fish had greatly decreased both in number and in size; some assigned one cause for this, others another. It appears to me, however, as I propose showing in my final report, that it is produced by several circumstances, all acting deleteriously, which, if left unchecked, will probably end by totally destroying the fresh-water fisheries.

Dowlaishweram anicut, over which it is asserted the Sable fish ascend when the freshes are high.

20. At Dowlaishweram there is a magnificent anicut across the Godavery river. It was constructed in 1847, and in its formation differs considerably from those on the Coleroon or the Kistna. It is four miles in width, but has three islands or lunkals in its course as "points d'appui." Rising fifteen feet from the bed of the river its wall is 14-6 broad at its summit. From its rear, or sea face, it forms a smooth curve technically called an "ogee curve," this is twenty-nine feet in length, having a descent of 8-6 feet; whilst beyond this portion are large racked stones, terminating in a retaining wall, the whole of this latter being thirty-five feet in length, having a descent of three feet; whilst still further from the anicut is a rough stone apron 114 feet in length, with a perpendicular descent of 6-9 feet. It will, consequently, be seen that for the last twenty-nine feet, prior to reaching the anicut wall, the ascent is a curved and perfectly smooth wall. It is asserted that up this the Sable ascend when the freshes are so high that there is no perceptible ripple over the top of the anicut, and this, although theoretical, is probable. As to their ascending up the under-sluices it is simply impossible. Since the construction of the anicut the fishing for the Sable at Dowlaishweram has greatly increased, for they are now detained and captured in large quantities below that structure, whilst waiting for a fresh to enable them to ascend.

Abolition of the Moturpha Tax, &c.

21. The fishermen stated that, prior to the abolition of the moturpha, they paid 15 Rupees yearly, which tax included the whole of those of their caste who resided in Dowlaishweram, and that from the period of its abolition they have paid 30 Rupees to the Moonsiff at a feast which takes place in February, ostensibly that they may have a good fishing season, and to prevent any complaints being made as to their interfering with the stones of the anicut. This money, the Moonsiff asserts, he spends in oil, lights, &c., and that this sum has been given yearly since the

construction of the anicut as a voluntary gift, but at the same time he complained of having only received 10 Rupees out of the 30 Rupees for this year; the fishermen not having yet paid him the difference. They, on the other hand, deny this and say they have never had any account of the money spent. It is a pity that on these occasions the ignorance of the people prevents their applying for redress to the proper authorities, in which case, if this is an extortion, it would be immediately inquired into and stopped. I allude to it here, because it is very rarely that Natives ever say anything of these petty exactions, or if they admit them in an incautious moment do not deny having ever said so, if questioned again on the subject.

Mode of capturing fish and best market for their disposal. How the young Sable fish go down the irrigation canals, but are not present below the anicut in the river.

22. The Dowlaishweram fishermen work in gangs of from nine to twenty in each under one head man. The fish are disposed of by sale, and the proceeds divided into shares.

The usual plan appears to be for each gang to possess two boats, with one long net, which is fastened at either end of the stern of each boat; these boats are then paddled round a large circuit of water, and thus taken down stream, and gradually bringing the outer end of the net round they tow it on shore. About four hauls are made daily by each gang. I saw forty-five Sable fish captured at the first haul by three gangs of eight men each; this was considered only a moderate take. Ten of the fish were out of season from having deposited their ova; they looked dull about the eyes and head, and had a flabby unwholesome feet, these had no doubt dropped their ova below the anicut; for it is very improbable that, having once passed over it to spawn, they could return the same season, unless down the irrigation channels. Not a single one of the fry was taken below the anicut on this or on any subsequent occasion. Each adult fish is worth about six Pie. The Sable is said to be taken in the greatest number in the freshes of July, August, and September, whilst about the middle of October it commences to disappear from the river, which is getting clear. Owing to the comparative sluggishness of the Godavery it can be netted through much of the freshes. Some of the fry leave as late as March, and go down the irrigation canals to the sea. Besides being captured by long seine nets the Sable are taken by means of cast nets, and when the sluices are open even by baskets which are hung over the river close to the anicut wall, so that as they jump they fall into them in the same manner as previously described at the Bezvada and Coleroon anicuts. The best paying market for these fish appears to be at Samulcottah, where a Native Regiment is stationed. It is forty-five miles distant down the canal, and I am informed that by the time the fish arrive there they must be almost unfit for human food. Certainly the stench arising from the boats carrying fish is almost insufferable. If taken of an evening the fish are, as a rule, fifteen hours before they reach Samulcottah. They are not cleaned, and no salt is employed, the fishermen not having sufficient energy, apparently, to cure them; much of it is thus spoilt from arriving in a semi-putrid state. Individual fishermen, such as those from Dowlaishweram, cannot personally undertake this with much prospect of success, unless on a large scale, and the sub-divided manner of fishing renders it unlikely that, if the present mode is continued, any improvement can be expected. Here it may fairly be asked whether fish in this state has any

effect upon the health of the Native population of this station, or whether the Police seize it as unfit for human food, which I am assured they do not do.

Means of disposal of captured fish. Decrease of value of fisheries. The Dowlaishweram fishermen go to Bezwada yearly.

23. The fishermen state that there is no waste of fish taken from this locality; that all captured are sold without any trouble, and none of them ever remember fish left to the dogs and wild animals to devour. One year they mention, when cholera was very prevalent at Dowlaishweram, the Chief Engineer had their fish taken from them and buried, as he believed it to be either productive of that disease, or to assist in its dissemination. Sometimes they are losers by the fish becoming putrid en-route to distant markets, but they maintain that they could sell three times the amount now taken without the least difficulty. They universally agree that the number captured is much less than it used to be, and that the fisheries have been decreasing since the erection of the anicut, whilst above that structure large fish have almost entirely disappeared for the last few years. In the month of October many of the Dowlaishweram fishermen go to Bezwada with their nets, because it is only when the rapidity with which the Kistna flows during the freshes begins to subside that the Sable can be captured in that river. This appears to be the reason why the fishermen assert that these fish only arrive at Bezwada when the water in the Kistna becomes clear.

24. I will now detail the various species of fish which I personally obtained in the Kistna and Godavery. Possibly the communication formed by the canal between these two rivers may account for the similarity of the fishes, as lochs of sufficient size, although they impede, do not entirely prevent the ascent and descent of fresh-water fish.

List of sea Fishes personally obtained in the Kistna and Godavery rivers.

Scientific and Telugu Names.	KISTNA RIVER.			GODAVERY RIVER.			Size attained.	Remarks.
	Above anicut.	Below anicut.	In Irrigation canals.	Above anicut.	Below anicut.	In Irrigation canals.		
<i>Sciaenops coitor</i> , C.V. Goraka, Tel.	No.	Yes.	No.	Yes.	Yes.	?	7 in.	Breeding.
<i>Clupea palasah</i> , C.V. Palasu, Tel.	No.	Yes.	No.	Yes.	Yes.	Yes.	18 "	Do.
<i>Pristis semisagittatus</i> , Shas	No.	?	No.	No.	Yes.	No.	Large.	

There are other species of sea fish which also ascend, but these I have omitted, as they come up more for the purpose of preying upon the smaller kinds than anything else; and the anicut does not interfere with their breeding, but only assists them in procuring food. The fresh-water fishes I obtained were as follow:—

ACANTHOPTERYGU.

1. Ambassis, *Akkurati* and *Balimkaku*, Tel.
2. Goby, *Gobius giurus*, (H. B.), *Tsikidundu*, Tel.
3. *Nandus marmoratus*, (C. and V.), *Septi* and *Isoppitay*, Tel.
4. Common walking fish, *Ophiocephalus striatus*, (Bloch.), *Sowarah* and *Muttageddusa*, Tel.

5. Fresh-water sand eel, *Rhynchobdella aculeata*, (Bloch.), *Bommiday*, Tel.
6. Spined eel, *Mastacemblus armatus*, (Lacep.), *Mudibommiday*, Tel.
7. Small spined eel, *Mastacemblus pancalus*, (H. B.), *Pahparaul*, Tel.

SILURIDÆ.

8. Scorpion fish, *Saccobranchus singio*, (H. B.), *Marpu*, Tel.
9. Wallago attu, (Bloch.), *Valaga*, Tel.
11. *Eutropius taakree*, (Sykes), *Salava jella*, Tel.
12. *Pseudotropius atherinoides*, (Bloch.), *Ahku jella*, Tel.
13. *Pangasius buchani*, (C. and V.), *Banka jella*, Tel.
14. *Silondia gangetica*, (C. and V.), *Wanjou*, Tel.
15. *Macrones cavasius*, (H. B.), *Nahra jella*, Tel.
16. *Macrones aor*, (H. B.), *Muti jella*, Tel.
17. *Macrones tengara*, (H. B.), *Saku jella*, Tel.
18. *Rita crucigera*, (Owen), *Gudla jella*, Tel.
19. *Bagarius yarrelli*, (Sykes), *Rahti jella*, Tel.

CYPRINIDÆ.

20. Catla buchani, (C. and V.), *Botchee*, Tel.
21. *Cirrhina leschenaultii*, (C. and V.), *Aruzu*, Tel.
22. *Labeo fimbriatus*, (Bloch.), *Ruchu* and *gandumenu*, Tel.
23. *Labeo gonius*, (H. B.), *Mosul*, Tel.
24. *Labeo calbasu*, (H. B.), *Nullagandumenu*, Tel.
25. *Barbus*? *Vagamma*, Tel.
26. *Barbus guentheri*, (Day), *Nilusu*, Tel.
27. *Barbus sophore*, (H. B.), *Chadu perigi*, Tel., or "Bitter carp."
28. *Barbus ambassis*, (Day), *Kalay*, Tel.
29. *Crossochilus reba*, (H. B.), *Pullarazu*, Tel.
30. *Thynnichthys*? *Kala tala* and *Ahku chappah*, Tel.
31. *Nuria danrica*, (H. B.), *Konissi*, Tel.
32. *Amblypharyngodon mola*, (H. B.), *Tallamaya*, Tel.
33. *Aspidoparia morar*, (H. B.), *Ulsa*, Tel.
34. *Rohtee vigorsii*, (Sykes), *Kunninga*, Tel.
35. *Rohtee microlepis*, (Blyth), *Kilay*, Tel.
36. *Rohtee ogilbyi*, (Sykes), *Kunninga*, Tel.
37. *Chela bacaila*, (H. B.), *Badishaya*, Tel.
38. *Perilampus atpar*, (H. B.), *Arku konissi*, Tel.

Irrigation Canal to Cocanada. Presence of Sable fish. Suggest that destruction of fry should be prevented, but a fish pass at Dowlaishweram of no immediate necessity.

25. From Dowlaishweram I proceeded to Cocanada down the canal, and took the opportunity of examining whether the Sable fish make use of that

communication with the sea as a means of ascent and descent. At its mouth I was able to obtain several specimens of the mature fish, which is exceedingly common at that spot, but above the lochs they were absent; still it is my belief that these may have been the mature of young fry, which had come down this means of exit from the Godavery to the sea. Above the first loch from the sea there were a considerable number of the young, of the same size as those taken in the Godavery at Rajahmundry, thus conclusively showing that the fry are able to make use of

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this communication with the sea to descend from the river; for, as already observed, the young fish cannot pass over the anicut after the freshes are over, the water being too low. The only exit they find at Dowlaishweram is by the canal. The lochs are opened several times a day for the purpose of admitting boats passing to and fro; young fry have a natural tendency to go down stream, and thus wait close to the obstruction until it is opened, when they will have little difficulty in descending, provided their capture at these spots is prohibited. I do not think, therefore, that at present it is necessary to incur any expense in building a fish pass at Dowlaishweram, as I found sea fish above that structure, and also traced the young down the canal towards the sea. The destruction of the fry in these canals is, however, on all hands admitted to be most disastrous. They are captured close to the lochs, and wherever any impediment exists; whilst when the water is cut off in the canals, and they are closed for repairs, the lower end becomes dry, and the fish must either die there or pass into the paddy-fields and be destroyed. As these fish pass down from October to January or February, this destruction should be entirely prevented, and this alone would probably be one means of restoring the Sable to the river.

How fish are salted at Cocanada. Decrease of fresh-water fisheries. Great amount in a preserved tank.

26. At Cocanada there are about forty fishermen who formerly resided within the limits of the municipality, but as their absence was considered desirable they were presented with a suitable piece of land on which to erect their village; this having the additional recommendation of being beyond the municipal taxing limits appears to suit them exactly. They consider the best season for sea fishing commences about December, and although they salt fish it is not of a good quality. They collect the saline effervescence from the marshes, whatever it may consist of, and into this they put small fish, which are allowed to remain in it for twenty-four hours, and subsequently one day's drying in the sun is deemed quite sufficient. The smell of this preserved fish is abominable. It is their impression that good salt is too expensive for it to be profitable to them to use it in curing fish. They have a yearly ceremony about December, when they boil milk and rice together on the banks of the Godavery, which they then worship, and subsequently have a feast off some goats which are killed for the occasion. In the fresh-waters, and tanks fed by the irrigation canals, it is asserted there has of late years been a considerable falling off in the quantity of fish taken, and consequently the price has risen. This falling off of fish, however, can hardly be due to anything but the destruction of the fry, as I was fortunate enough to be able to ascertain. The Collector, Mr. Fraser, kindly allowed me to have one haul of a seine net in a tank at Cocanada, fed by the irrigation channel; for the last two years the water has been used for drinking purposes, and all netting consequently prohibited. In this haul twenty-seven large *Botchees* were taken, weighing from 5 lbs. to 9 lbs. each, besides an enormous number of small fish, consisting of the young of this species, and other inhabitants of fresh-water. This was most interesting, showing the effects of preservation; such fine *Botchees* it would be simply impossible to obtain from any irrigation channels or tanks which are constantly netted.

Fish castes at Gopaulpore, and salting fish. 27. From Cocanada I proceeded by Steamer to Gopaulpore. Here the very heavy surf which prevails during the south-west monsoon, and even at other times

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of the year, renders the risk of fishing in the sea somewhat greater than in most other seaport places. There are two castes of fishermen, the *Wahdas*, who ply their occupation in the ocean and deep waters, and also act as boatmen, but never salt the fish they capture; and the *Cundras*, who fish in the rivers, back-waters, and along the shore; they also purchase sea fish from the *Wahdas*, which they carry to Berhampore and elsewhere for sale, and even salt what remain, but this is not much, as the supply rarely equals the demand. From June to September, inclusive, are considered the best months for river fishing, when Mullet, Whiting, and several other species of fish ascend for the purpose of depositing their ova. I observed that women are sent down to the sea to collect the water from which they obtain the salt for preserving those small species of fish which are useless for sending away fresh for sale.

Weir at Gopaulpore.

28. There is a small estuary or brackish river of about three miles in extent at this place, which extends from the Munsoorcotta Fort to the sea. This is farmed out, and I closely examined the whole of it with reference to the fry of sea fishes. On it there are two weirs erected for the purpose of capturing fish and crustacea. They are about four feet in height, and consists of labyrinths open on the land side or upstream; the walls of these labyrinths are formed of cages, about four feet long and two feet wide at the base; they are flat below, joining above where there is a hole at one end to remove the captures; along the face, upstream, each of these cages has three openings low down in the rattan, like the entrance into a wire rat-trap, so that whatever enters cannot escape. These cages are taken up at low tide, and replaced before the next high tide. A keeper lives alongside and sends off whatever is taken to Berhampore, immediately it is removed from the weir. On the sea face of this weir are also nets which are hauled up at every low tide. Mostly crustacea are captured, but also Mullet, Eels, and Whiting. On crossing this river above the weirs a number of Mullet commenced jumping out of the water, and making off in every direction. My bearers then became very excited, bunched the tonjon on shore and rushed as fast as they could go into the water, where they forthwith set to work vigorously, clawing up the mud from the bed of the river with both hands. In this manner they secured a number of Mullet; in fact, each man on an average caught ten a minute, whilst the fish were of moderate size. The only fish which appear to breed above the weirs is a small species of Mullet.

Sea fish at Gopaulpore, and possible existence of the oil Sardine. 29. The sea on my first arrival was too rough to allow the fishermen to use their nets, so I remained a few days until the surf subsided. Here I found the young of the Mackerel, *Scomber kanagurta*, C. and V., in abundance, but I was unfortunately unable to obtain any information as to whether they arrive in droves as in Malabar, where they are extensively salted for the Ceylon and other markets. I was also informed that, during the last few years, shoals of small fish, about the size of Sardines, have appeared about November. I could not ascertain whether they previously arrived about the same time, or at all. They are not made any use of, as oil is not manufactured in this place. Captain Waters has promised to be good enough to send me some specimens to Cuttack that I may ascertain whether it is the true oil Sardine, which for several years have been so unaccountably absent from the Western Coast.

Berhampore. Tank fishing. Tank of putrid water contained fish.

30. From Gopaulpore I went to Berhampore and inspected a large tank, a few miles from that station. It was covered with the lotus plant, and its deep waters were so full of weeds that it could scarcely be imagined that it was of much utility for fishing purposes. The fishermen I took with me could not use a net, and after two hours' work we were obliged to give it up, having only taken two Walking fishes and a Loach by means of tickling. But just as we were leaving, the fishermen who farm it came down and showed us the means by which they contrive to make a good livelihood. They use shallow boats, which they pole about amongst the weeds, and every here and there they hauled up baskets like the traps described in paragraph 27, which had been placed in the best positions the previous night. In these traps not only Eels and Crabs are caught, but also the Walking fish, and Climbing perch, which, when on their travels, walk or crawl through the entrances into the rattan cages. They also spear fish, and thus obtain very large ones. The spear differs from that in use at Cuddalore, being flat, with four prongs on a single line, the two outer being the longest. Large quantities of fish are also taken by rods and lines from the boats, a large bivalve mollusk, which is very common here, being used as a bait. The fish when captured are taken into Berhampore for sale, where they meet with a ready market. There is said to be no apparent decrease in the number of fish, but the amount taken depends greatly upon the rain-fall, and consequent filling of the tanks. I may here mention that in one small tank we came to the water was perfectly putrid, and the Natives informed me that it had been so for months, and was consequently unfit for anything but fish. I was curious to ascertain whether fish really could exist in water so foul, so after much persuasion prevailed upon the fishermen to use their nets, and it was found as full of fish as any of the other tanks, the only difference being that they were of a darker colour. The water I should mention was nearly black, and the bottom of the tank deep in black slimy mud; yet Natives not only eat these fish themselves, but sell them as good for food in the market.

Chetterpore.—The returns for fisheries in the Ganjam Collectorate.

31. I next proceeded to Chetterpore, where I did not obtain much, as the tanks were nearly dry, and the curious long fresh-water lake running ten feet above the high-water level, parallel with the sea, from which it is merely divided by a bank of sand, was full of weeds. The Brinjarees, who yearly come down the ghauts with pack bullocks and donkeys, exchange turmeric and other articles with the people in this Collectorate for salt-fish. After the abolition of the moturpha tax in this Collectorate the fisheries were farmed out, and have been annually let since that period. The Munsicotta river, however, where the farmer has had the expense of making weirs, is let on a lease of five years. The following is a synopsis of the return furnished me by the Collector of the rents of the fisheries:—

Return of Rents for the Fisheries in the Ganjam Collectorate.

Fusly.	BERHAMPORE TALOOK.		GUMSUR TALOOK.		CHICACOLE TALOOK.		Total.
	Fresh-water swamps and rivers.	Salt-water swamps and rivers.	Fresh-water swamps, tanks, nullahs, and rivers.	Rivers.	Fresh-water swamps and rivers.	Salt-water swamps and rivers.	
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
1275 ...	1,161 2 8	550 0 0			393 4 0	327 12 0	2,432 2 8
1276 ...	1,595 8 0	766 0 0	199 0 0	36 14 0	1,074 0 0	625 0 0	1,296 6 0
1277 ...	1,600 8 0	921 0 0	238 8 0	39 8 0	953 12 0	626 0 0	1,381 4 0

From the foregoing it will be seen that there is a steady but rapidly increasing revenue derived from the fisheries of this Collectorate, whilst the fishermen do not complain of a decrease of fish to any extent. Doubtless the character of the tanks, and the great prevalence of the screw pine, the *Pandanus odoratissimus*, the roots of which have spread into most of the tanks, combined with the large quantities of the lotus and other weeds, renders constant netting almost impracticable, thus giving the fish a chance of breeding; for it is not worthwhile to take much trouble in catching the fry when large fish are obtainable. Indiscriminate fishing is also prevented, the farmers in the places I visited having watchers to protect their property.

Ganjam.—Salt-fish. Value of fish. One mode of fishing.

32. The largest fisheries at Ganjam are marine and back-water. The fishermen are the same castes as at

Gopaulpore. Salt appears to be more easily obtained from the salt pans being within a mile of the town, and it is surmised that much of the rejected salt is used in curing fish. Salt-fish is exchanged with the Brinjarees as at Gopaulpore. A Mullet of about 3 lbs. in weight, in full roe, is valued at 1 Anna when plentiful, and 1 Anna 3 Pies when scarce, whilst other sea fish are sold at proportionate rates. The Sable ascends the river for some distance, but the people are so poor that the pecuniary value of the fishing cannot be very great. If some impetus were given to the capture of fish, the contiguity of the salt pans should make salt-fish cheap and abundant, but the inhabitants are wanting in energy, and apathetic in the extreme.

An official informed me that he went out one night to see how the Murrul or Walking fish, *Ophiocephalus striatus*, (Bloch,) was captured. The fisherman had provided himself with a long flexible bamboo as a fishing rod; a line was attached to the end, having a hook baited with a bull frog. Hardly had the frog been splashed into the water when a moderate sized Walking fish made a dart at and swallowed it. Desirous of ascertaining what would next ensue, the Murrul was left as a bait with the swallowed frog; before long a large water-snake was seen swimming towards it, and soon had the fish in its capacious jaws, and was thus pulled out of the water and despatched.

Rumbah and the Chilka lake. Value of fish.

33. The next station, or rather deserted house, I went to was Rumbah, on the banks of the Chilka lake, a portion of which is in the Madras territory and the remainder in Bengal. It is a large collection of salt-water, about thirty-five miles in length from north-east to south-west, and eighteen from east by north to west by south. It is divided from the ocean by a narrow strip of sand, seldom upwards of 300 yards in breadth, and discharges its waters by an opening into the sea. The general depth is about five feet, and rarely above six. Several rivers empty themselves into it, bringing down a large amount of alluvial deposit. The bed consists of thick blue mud. As it is navigable for large cargo boats the fishing is unlet, but a considerable amount of marine fish appear to be taken in it, some of which are dried and others salted. Numerous labyrinthiform weir, much like those described at Gopaulpore, are employed along the shores of this lake for taking crustacea, which are most abundant. A Begti, *Lates calcarifer*, weighing about 30 lbs., was brought me, and the fishermen were very well pleased to accept six Annas, which shows either how very cheap fish is there or the poverty of the population.

(Signed) FRANCIS DAY,
On Special Duty.

*Proceedings of the Madras Government, Revenue Department,
4th February 1869.*

APPENDIX No. I.

From Surgeon FRANCIS DAY, to the Superintending Engineer of Bezvada, dated Bezvada, 25th September 1868.

1. I have the honor to request you will be so good as to favor me, at your convenience, with your opinion on the following subjects to append to my report to Government on the state of the fisheries of this Presidency, suggesting such remedies as may appear to be expedient.
2. Assuming the necessity of erecting a fish pass to enable the passage of fish over the anicut during this period of the year, or from October to January inclusive, the question arises whether you would advocate a permanent or temporary structure as regards its effects on the anicut? Could you suggest any inexpensive temporary pass which would not act injuriously on any portion of the anicut?
3. The pass I allude to would have to be eighteen feet wide, with a series of steps, each one foot high, with basins thirteen feet long between each, except the last three feet of perpendicular height furthest from the anicut, which might be merged into a slope nine feet long, and having a one foot step at the top of it. The whole of the floor of the fish pass should be made as smooth as practicable, and have side walls to maintain it as full of water as possible. The walls for each step should be one foot lower than the one above it, but one-third of the length of each of these walls must be two feet high so as to bring that part on a level with the summit of the one above it. This portion should be on alternate sides of the pass at each step. The basins should hold three feet of water in depth below the walls forming the steps above each.
4. The best place for a permanent fish pass would, doubtless, be up the apron opposite the deepest water, or if such would be dangerous there is a place about eighteen feet wide between the under-sluices and the lateral walls of the apron.
5. A temporary fish pass of rough stones covered with mats, and yearly renewed, such as we conversed upon, might answer, and if you would assist the experiment this year, I shall be happy to advance as far as Rupees 50 for mats to keep the water in the temporary pass and flowing over the wall. The mats employed for covering the steps and sides will, I fully understand, be liable to be washed away, but without them I do not think the construction will answer.
6. As I find that breeding Sable fish are now coming up the river, I should very much wish this experiment to be tried this season, and if you will oblige me by giving me your opinion on the result obtained I shall esteem it an additional favour.

APPENDIX No. II.

Observations on the state of the Fisheries in the Godavery river since 1861.

Questions.

Answers.

1. Do you consider that the fish in the Godavery have increased or decreased since you came here in 1861?
2. Have larger fish been lately captured in the river, or has their comparative size remained unchanged or decreased?

1. I think that the fish have decidedly decreased since my arrival here in 1861. This decrease has been most apparent during the past three years. The causes of the decrease are—1st, the excessive destruction of the fish below the anicut; and, 2ndly, the universal and unrestricted capture of the fry in the river and irrigation channels.

2. I think that the average size of the fish now captured is less than in former years.

*Proceedings of the Madras Government, Revenue Department,
4th February 1869.*

3. Are the fry captured to any great extent in the Godavery, the irrigation channels, and the paddy-fields?
4. Are the fishermen better or worse off now than formerly?
5. Where are the fish sold which are taken at the anicut?
6. Are any salted and sold?
7. In what months are there most fish?
8. What has been the effects of the anicut?
9. Have you heard of the fish being left to decay on the banks of the rivers, if not sold?
10. Can you tell me if any rent, subsidy, or bribe in any form, is paid by the fishermen to be allowed to capture fish in Rajahmundry; if so, the amount, and to whom?
11. In what months do the fry of the sea species try and go to the sea. Can they cross the anicut; and if not, what becomes of them in your opinion?

3. Yes, the destruction is excessive, and some means for their preservation should be adopted. I would suggest that the Superintendents of the irrigation should be empowered to act as "Water bailiffs."

4. The position of the fishermen is unchanged, because (though the amount of fish now captured is less than in former years) the price of the fish has more than doubled.

5. The fish are sold in the local market, and the portion in excess of local demand is sent to Cocanada, Samulcottah, and Peddapoor.

6. A small portion is salted, but a considerable portion is preserved by drying in the sun.

7. The "Pullasa" is abundant in August, September, and October, and sometimes till the middle of November. Other kinds of fish abound in the river above the anicut, and are captured by drag and hand-nets, till the freshes come down in June.

8. The anicut facilitates the capture of fish below it by causing them to collect in large numbers when awaiting a fresh, to enable them to pass over it on their way to the spawning grounds. Since it was raised two feet higher (that is, within the last four years) it prevents the return of the later fry to the sea, and causes them to pass down the irrigation channels where ninety-nine per cent. of them perish either by capture with nets, or by being carried out in the small channels which run into the paddy-fields.

9. I have heard that, before my arrival here in 1861, the fish were sometimes allowed to rot, namely, when the supply was in excess of local demand. This does not now occur, as there are great facilities for conveying it by transit boats to Cocanada and Samulcottah. Further, the enhanced value of the fish now causes it to be dried, if in excess of present requirements.

10. I have heard that fees are paid, but it is very difficult to obtain reliable information.

11. The early fry of the sea species begin to pass down to the sea in November and December. There is then some water passing over the anicut, and they can cross it. I believe that after December they cannot cross the anicut, and thus the later fry are compelled to pass down the irrigation channels where they are captured, or pass into the paddy-fields.

*Proceedings of the Madras Government, Revenue Department,
4th February 1869.*

12. If the destruction of fish is excessive, what measures do you consider necessary to be taken to stop it, without interfering more than is absolutely necessary with the fishermen?

12. The fishermen should be compelled to enlarge the meshes of their nets, and small fish should not be captured while the fry are passing down to the sea. Fish passes should be made in every anicut, and all fishing should be discontinued on one day in each week, this would give the fish one quiet day in seven to approach the foot of the pass.

13. Do you imagine any alteration is called for in the size of the mesh of the nets?

13. Decidedly the meshes are too small.

RAJAHMUNDY, (Signed) FRANCIS DAY,
7th October 1868.

RAJAHMUNDY, (Signed) J. MURPHY,
8th October 1868.

To the Reverend Dr. Murphy.

No. 89.

ORDER THEREON, 4th February 1869, No. 306.

Miscellaneous.

1. Ordered that the foregoing reports do lie over until Dr. Day's concluding report is brought under the consideration of Government.

2. Paragraph 62 of the first report, and paragraph 34 of the second report, with the Memoranda of expenses attached, will however, be expunged, and Dr. Day will be requested to address to Government a separate communication on the subjects therein under reference.

(True Extract.)

(Signed) R. A. DALYELL,

Acting Secretary to Government.

To Surgeon F. Day, M.D.

Exd. G. A. Turton.

To the Superintending Engineer
Beywada

Sir
I have the honor to request you will be so good as to pass over, at your convenience, with your opinion on the following subjects to append to my report to Government on the State of the fisheries of this Presidency, suggesting such remedies as may appear to be expedient.

2. Assuming the necessity of erecting a fish pass to enable the passage of fish over the ancient during this period of the year, or from October to January inclusive, the question arises whether you would advocate a permanent or temporary structure, as regards its effects on the ancient? Could you suggest any inexpensive temporary pass which would not act injuriously on any portion of the ancient?

3. The pass I allude to would have to be 18 feet wide, with a series of steps each one foot high, with basins 13 feet long between each except the last three feet of perpendicular height furthest from the ancient which would be merged into a slope 9 feet long, and have a one foot step at the top of it. The whole of the floor of the fish pass should be made as smooth as practicable, and have side walls to maintain it as full of water as possible. The walls for each step should be one foot lower than the one above it, but one third of the length of each of these walls must be two feet high so as to bring that part on a level with the summit of the one above it. This portion should be on alternate sides of the pass at each step. The basins should hold 3 feet of water in depth. The walls forming the steps above each

4. The best place for a permanent fish pass would doubtless be up the approach to the deep water, or if such a

Govt. of 1869; Madras.

REVENUE.

To

SURGEON F. DAY.

Dated February, 4th.

Recd.

Encl.

G. O., 4th February 1869, No. 306.

FEBRUARY.
Nos. 87-89.

Fisheries in Madras Presidency.—Dr. Day's reports ordered to lie over until his concluding report is brought under consideration.

dangerous there is a place about 18 feet wide between the understones, and the lateral rolls of the apron.

5 A temporary fish pass of rough stones covered with weats, and yearly renewed, such as we conversed upon, might answer, and if you would assist the experiment this year, I shall be happy to advance as far as the 50 for mats to keep the water in the temporary pass, and flowing over the wall. The weats employed for covering the steps and sides will I fully understand be liable to be washed away, but without them I do not think the construction will answer.

6 As I find that breeding sable fish are now coming up the river, I should be very much with this experiment to be tried this season, and if you will oblige me by giving me your opinion on the result obtained I shall esteem it an additional favour.

I have the honour to be
Sir

Myrabad
Sep 25th 1868

Wm. L. Day

Appendix No II

25

Observations on the state of the fisheries in the Godavery river since 1861.

Questions Answers

1 Do you consider that the fish in the Godavery have increased or decreased since your arrival here in 1861? I think that the fish have decidedly decreased since my arrival here in 1861. This decrease has been most apparent during the past 3 years. The causes of the decrease are 1st the excessive destruction of the fish below the ancient, and 2nd the universal, and unrestricted capture of the fry in the river, and irrigation channels.

2 Have larger fish been lately captured in the river, or has their comparative size remained unchanged, or decreased? I think that the average size of the fish now captured is less than in former years.

3 Are the fry captured to any great extent in the Godavery, the irrigation channels and the Paddy fields? I see the destruction is excessive, and some means for their preservation should be adopted. I should suggest that the Superintendants of the Irrigation should be empowered, to act as water bailiffs.

4 Are the fishermen better or worse off now than formerly? The position of the fishermen is unchanged because though the amount of fish now captured is less than in former years, the price of the fish has more than doubled.

5 Where are the fish sold which are taken at the ancient? The fish are sold in the local market, and the portion in excess of local demand is sent to Cocanada, Samudcottah, and Poddapoor.

6 Are any salted and sold? A small portion is salted but a considerable portion is preserved by drying in the sun.

7 In what months are there most fish?

7 The Mullasa is abundant in August, September and October, and sometimes till the middle of November. Other kinds of fish abound in the river above the ancient, and are captured by drag, and hand nets till the freshes come down in June.

8 What has been the effect of the Ancient?

8 The Ancient facilitates the capture of fish below it by causing them to collect in large numbers when awaiting a fresh to enable them to pass over it on their way to the spawning grounds. Since it was raised 2 feet higher (that is within the last four years) it prevents the return of the later fry to the sea, and causes them to pass down the irrigation channels, where 99 per cent. of them perish either by capture with nets or by being carried out in the small channels which run into the paddy fields.

9 Have you heard of the fish being left to decay on the banks of the rivers if not sold?

9 I have heard that before my arrival here in 1861 the fish were sometimes allowed to rot namely when the supply was in excess of local demand. This does not now occur as there are great facilities for conveying it by transit boats to Cocanada and Samud-Cottah. Further the enhanced value of the fish now causes it to be dried if in excess of present requirements.

10 Can you tell me if any rent, subsidy or bribe in any form is paid by the fishermen to be allowed to capture fish in Rajahmundry if so the amount, and to whom?

10 I have heard that fees are paid but it is very difficult to obtain reliable information.

11 In what months do the fry of the sea species try and go down to the sea in ancient, and if not what becomes of them in your opinion?

11 The early fry of the sea species begin to pass down to the sea in November and December. There is then some water passing over the ancient and they can crop it. I believe that after December they cannot crop the ancient, and then the later fry are compelled to pass down the irrigation channels where they are captured or pass into the paddy fields.

12 If the destruction of fish is excessive what measures do you consider necessary to be taken to stop it, without interfering more than is absolutely necessary with the fishermen?

12 The fishermen should be compelled to ^{enlarge} ~~exchange~~ the meshes of their nets, and evade fish should not be captured while the fry are passing down to the sea. Fish passes should be made in every ancient and all fishing should be discontinued on one day in each week. This would give the fish one quiet day in season to approach the foot of the pass.

13 Do you imagine any alteration is called for in the size of the mesh of the nets?

13 Decidedly the meshes are too small.

J. Murphy

Francis Day

Rajahmundry
Oct 8th 1868.

Rajahmundry.
Oct 7th 1868.

To the Rev. J. Murphy

Memo of Expenses incurred from Madras to Cuttack inclusive

No. 2. P.

Sep 2nd Goods to steamer:
Embarking at Madras.
Disembarking at Manipalain
& telegraph } — 24 . 8 . 0

Height & charges — 21 . 9 . 0

Oct 3rd 2 first class tickets by steamer 120 . 0 . 0

4 third class 40 . 0 . 0

" 5th 9th Fishermen & bearers 4 . 0 . 0

Conveyance to fishing grounds 3 . 8 . 0

" 10th Expenses to boat & on to Kezha 17 . 5 . 0

" 12th 16th Fishermen, bearers &c 5 . 13 . 0

" 15th 28th " " " " 10 . 3 . 0

" 29th Boat & expense from Kezha to Uda 13 . 6 . 0

" 30th " " " " " " " " 21 . 12 . 0

Oct 1st 8th Fishermen & bearers 9 . 0 . 0

" 8th Boat to Coconada 21 . 0 . 0

" 9th 13th Fishermen & bearers 7 . 0 . 0

" 13th 17th 2 first class tickets, 4 third class
& freight by steamer to Gopalpore
& landing charges } 226 . 8 . 6

" 19th 23rd Fishermen & bearers 8 . 9 . 0

" 23rd Bearers & cart to Berhampur 3 . 12 . 8

" 26th Fishermen & bearers 2 . 0 . 0

" 26th Bearers &c to Chatterpore 14 . 15 . 0

" 27th 29th Fishermen &c 2 . 0 . 0

" 29th Bearers &c to Ganyam & fishermen there 6 . 0 . 0

" 31st " " " " " " " " 5 . 10 . 0

Nov 2nd 2 boats to Ganghy 13 . 2 . 0

" 4th Handies to Cuttack 12 . 0 . 0

{ Bearers & hire of palkees to
Cuttack } 24 . 0 . 0

Total 647 . 9 . 20

Report No. 2

On the products of the
the north of the river

from
the river to the sea

to the sea from the river

the river from
the river

the river from
the river

306.
 S. Aug 1st & 2nd Reports

Ordered that the
 foregoing reports do
 lie over ~~until~~ until
 S. Aug's concluding
 report is brought under
 the consideration of
 Genl.

Para 62 of the first
 report, ^{para 34 of the second report} and the memo
 of expenses attached,
~~to the second report~~ will
 however, be expunged,
 and S. Aug. will be
 requested to add thereto
 a separate com-
 munication in the next
 report.

List
 M.D.

1 Copy To Surgeon To Day M.D.
 Despatch

250

Perme 1868. M.D.

W. 3697-

Shannon

Surgeon To Day
 M.D.

on Special Duty

Attended 17th 3
 Received 25th 3 hours/68

W. 306-2. 28th/69

Forwarding his second
 report on the state of the
 force of the prisoners in
 this Presidency.

1868

1868

1/2 of the land
was sold by me
to the State of
California for the
purpose of settling
the same

- J. B.