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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

Immigration Branch.

G.O. No.	429 J	Press Mis.
Dated	6th May	1885.

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper :—

No. 86 I.

Note by the Chief Engineer for Irrigation.

For many years past the improvement of water communication on the West Coast has been under consideration. So long ago as 1858, the Chief Engineer, in a letter printed with G.O., No. 8270, dated 20th March 1858, says: "The inland navigation between Cochin and Beypore has been so often reported on, that I consider it unnecessary to make any fresh reference to local officers." The length of this portion of the communication is 92 miles and the navigation was then said to be most imperfect and at one point completely interrupted.

2. An estimate was in that year submitted, which provided for improving the canal and making it fit for country boats, width 12 yards, depth 3 feet below low water, amount three and-a-half lakhs; and it was stated that the cost of making the navigation fit for steamers would be six lakhs.

3. In Financial Railway Consultation G.O., No. 125, dated 3rd March 1859, Government sent to England, for sanction, a portion of the above estimate, amounting to one and-a-half lakhs, for canal from Cochin to Ponáni, saying that the portion between Ponáni and Beypore would not benefit the railway, but would compete with it, and suggested that the work should be handed over to the Madras Irrigation Company. There was at that time water communication from Cochin northward only as far as Chetwye.

This estimate was sanctioned by the Secretary of State in despatch, No. 31, dated 14th April 1860.

The Irrigation Company declined to take up the work.

4. In November 1860 an estimate for canal between Beypore and Ponáni, amounting to Rs. 2,30,600, was submitted, but Government declined to sanction it.

It appears that Government could not find funds for the canal between Ponáni and Cochin (sanctioned by Secretary of State), but in 1860 provided Rs. 4,600 for improving canal between Cochin and Chetwye, and then had an estimate made for a road instead of the canal.

5. In 1862 Mr. Kennedy was sent down to report on the canals and the best means of establishing a communication between Cochin and the railway, and also to report to the Resident his opinion on Travancore backwater and canal communication. He said that a canal between Beypore and Ponáni was unnecessary as there was a good backwater between Ponáni and Tirúr railway station. The worst part of the line from Ponáni to Chetwye was immediately south of the former place. He estimated cost of making a first-class canal from Tirúr to Cochin at Rs. 50,000.

6. In December 1863 the Agent and Chief Engineer, Madras Railway, examined the canal from Tirúr to Cochin. They considered it would require about Rs. 50,000 to make it a good navigation; and stated that the canal in parts requires widening, the bridges raising, and the locks enlarging.

7. In April 1864 an estimate for improving the canal between the Ponáni and Velliangode rivers was ordered to lie over until it was decided whether the Indian Tramway Company were to undertake the connection of Cochin with the railway by the construction of a tramway from Shoranur station to Kaningpatam. The Government agreed with the Collector in considering that cultivators must be allowed to put up cross bunds to keep out salt-water, and that they should help boats over these bunds and levy no tolls.

8. In November 1865 the Government approved of the Superintending Engineer's recommendation that a sum of Rs. 6,600, for the maintenance of the water communication between Ponáni and Cochin, at the rate of Rs. 100 a mile, should be entered in the budget; that the artificial canal only should be gradually improved; that no locks, &c., should be built at present, and that the land belonging to the canal should be defined.

9. In April 1870 the Superintending Engineer reports that the maintenance allowance of Rs. 6,600, first granted in 1866-67, has been made good use of, all the bridges over the canal having been improved, &c.; he had no objection to two cross bunds between Ponáni and Chávákád from September to January, yearly, but they should be removed in January as the water then becomes low. He considered that, had the canal banks been maintained and demarcated originally, no bunds would have been wanted; as it is, the banks have been encroached on and obliterated for considerable distances. He altogether objected to the renewal of permanent dams and boat locks, remains of which are to be seen on both sides of the Velliangode river, as they are not wanted.

10. G.O. No. 289, dated 26th July 1872, mentions that the yearly maintenance of Rs. 6,600, formerly given by Government, is now given by the Local Fund Board, Calicut.

11. G.O. No. 2585, dated 4th November 1872, on letter from the Superintending Engineer, submitting rough estimates for Rs. 26,82,000 for canal from Mangalore to Cochin, directs the officer in charge of the West Coast canal to concentrate his attention on the third section between Chetwye and Ponáni, and to prepare complete surveys, plans, and estimates for opening that section to a depth of 3 feet below low-water, and minimum bottom width of 7 yards, with embankments to keep salt-water out of the cultivation.

12. G.O. No. 413, dated 17th October 1873, accepts proposal of Cochin Sirkar, that Cochin Government shall defray half of the cost of improvements and maintenance of the canal the whole way to Yenamakal inland, opposite Chetwye, sharing equally in the proceeds of the ferries, provided the British authorities undertake to contribute half the amount required for the repair and maintenance of that portion of it which lies between Munnagam, on the north, and the point where the new canal to Chávákád turns off on the south, about a mile in length.

13. In April 1874 the Government of India were informed that existing water communication between Cochin and Calicut can be put into an efficient state for the following sums:—

	rs.
Tirúr ^{rail} station to Cochin, 77 miles	84,000
Kutai lock, near Tirúr, north to Calicut	37,676
Total	1,21,676

14. In May 1876 the District Engineer, Malabar, submitted an estimate, amounting to rupees six and-a-quarter lakhs, for improving the canal from Velliangode to Chetwye (18 miles). This allowed for locks, bridges, &c., and for cutting out the canal to a depth of $4\frac{3}{4}$ feet below M.S.L., or 3 feet below L.W., with bottom width of 27 feet.

15. In September 1882 the Superintending Engineer reported on the state of the navigation. No action having been taken on the estimate of 1876, he proposed a canal of not less than 12 feet bottom width and with 2 feet of water at low tide, which he considered quite sufficient for the present traffic, and said that for

Rs. 8,75,000 a first-class water communication could be opened from Ponáni to Cochin, about 105 miles. The letter was communicated to the President, Local Fund Board, Malabar, and, in October 1884, the Collector forwarded an estimate, amounting to Rs. 8,665, for repairs to the "Conolly canal," in the Calicut taluk, and suggested its being carried out from Imperial funds, on which the Superintending Engineer asked for orders. Meanwhile, His Excellency the Governor had visited the West Coast and received petitions regarding the state of the West Coast canal, on which, when the West Coast was separated from the Coimbatore division, the Executive Engineer was directed to investigate the circumstances of the canal.

16. In March 1885, the undersigned visited the West Coast, and the following are notes of inspection written at the time.

From Tirúr to Cochin.—At Tirúr railway station the Railway are about to commence a wharf for boats alongside the railway platform, and a short cut connecting the canal with the wharf. The creek here is a very fair one with, in very few places, less than 2 feet of water at low tide, and its course is not very tortuous; the margins are lined with reeds and ferns, and well protected from the action of the water; at first the width is not considerable, probably about 30 yards, but further on the creek widens out till near the Ponáni river it becomes a fine backwater, in places more than a quarter of a mile wide, the shore lined with cocoanut gardens. From all that can be learned, the depth of water in this creek is not less than it has been for a long time past, and is sufficient for the ordinary traffic; to deepen it would be a costly undertaking as any channel dredged out would very quickly fill in again, unless a bank were raised outside the deepening for the whole length, which would be very expensive to maintain; while to remove the canal entirely from the backwater, as we are doing in the case of the Buckingham canal, would entail vast expenditure, as it would run the whole distance through cocoanut gardens in which are dotted about the homesteads which are characteristic of the West Coast. These backwaters are well suited for navigation by the boats in use here, and which are likely to be the only boats in use on them for some time to come; and it seems that the first thing to be done is to make the navigation for these boats easy throughout, leaving the question of the necessity for providing a navigation fit for a larger and improved class of vessel to be considered when the traffic seems to require it.

The whole of the creek from Tirúr to Ponáni has now been surveyed and levelled, and the Superintending Engineer has been instructed to prepare an estimate for deepening, where required, to $4\frac{1}{2}$ feet below M.S.L., which will give quite 2 feet at the lowest tide occurring once or twice in the year; the bottom width of the canal to be nowhere less than 20 feet, side slopes 4 to 1, which is the section to which the Buckingham canal is being cut. The sections were examined, and it is evident that very little will be wanted here.

From Ponáni backwater an artificial canal runs to the Velliangode river, a distance of about $3\frac{1}{2}$ miles; for the first part of its length it runs through the town of Ponáni, and is a pestilential ditch very much silted up, its bottom being only a few inches below hot weather low-water level; there are numerous foot bridges over it, and these have been repaired and improved from the maintenance allowance granted by the Local Fund Board.

The Velliangode river is about half a mile wide, and is navigable at all times. On leaving the river the canal is still shallow and requires deepening; about 4 miles from the river the canal enters a low strip of ground lying between sand ridges, through which it runs for about 10 miles; this strip, in some places narrow, is in others about quarter of a mile wide, and all of it is cultivated with wet crops. When the flood water subsides after the monsoon, a bank is thrown across the canal about $7\frac{1}{2}$ miles below Ponáni, and another near Chetwye, about 12 miles further on, and thus fresh-water is retained for the crops; as this subsides in the dry weather the crops are supplied by baling from spring channels taken into pits on the edge of the sand ridges. It is represented that it is essential to this cultivation that salt-water should be kept out of the canal, and the people were much opposed to a proposal made some years ago to remove these dams and embank the canal with proper outfall sluices to run off flood water. The Revenue authorities consider that the objections are well founded and

still exist, and it is a difficult matter to decide what is best to be done. The sand ridge towards the sea was examined, and it is not so high but that a canal could be excavated through it; but a deep excavation through the sand would, no doubt, tap the springs which supply the irrigation, and injure, if not destroy, the cultivation; and as the whole line runs through enclosed gardens with houses and cocoanut trees it would be very expensive. To buy up the irrigation, it was estimated some years ago that upwards of Rs. 1,10,000 would be required; probably it would cost much more now, and taking it up would entail great hardship on the cultivators. After the bunds are put up, boats are passed over by the cultivators who construct them, it being one of the conditions attached to the permission to erect bunds, that they should pass boats without demanding any payment; but it is very doubtful if the bunds are not made is, however, not much difficulty in passing boats, and not so much delay as there would be in passing a lock, which would not answer here, as when the fresh-water was lower than the salt, salt-water would be admitted with every boat passed. There were formerly many such cross bunds, but the others have been removed, and it is thought we must accept two bunds as necessary in future; ultimately, they may be superseded by low double gates, and a double inclined plane over which boats could be passed; but for the present it is proposed to allow the bunds to remain (they are only necessary for a few months) and only deepen the canal between to proper depth. The Revenue authorities should be applied to for information regarding the land which belongs to the canal, as this has evidently been encroached upon and there is no space on which to place spoil. Gauges should be fixed above and below each dam and carefully recorded daily, and the man employed to keep the registers should keep a record of all boats passing the lock, so that any complaint of detention or of a demand for black-mail could be investigated.

Below Chetwye to 35 miles from Ponáni, the navigation is by backwater, and only a little deepening is required in parts. At 35 miles we enter a cut called the Eddiriturti canal, about 3 miles in length, which is considerably silted and requires deepening; the backwater below this is narrow and silted in places; but about 40 miles from Ponáni it opens out and becomes a very wide sheet of water in which there is always a fairly deep channel, and so continues to Cochin.

The Local Fund Board has lately done a great deal of clearing in places all along the shallow parts, but the sections show that the maintenance allotment cannot do all that is necessary.

A little below the cross bund near Chetwye, an arm of the backwater runs inland to the Yenamakal dam which retains the fresh-water and keeps out the salt and is 360 feet in length; the upper portion and the wings are of masonry; after the fresh-water subsides the crest is raised by means of wooden boxes filled with clay, and to prevent leakage a ring bund of clay between piles is constructed above the dam. The work is in charge of this department, and half the cost of maintenance is paid by the Cochin Government; the clay banks are maintained by a contractor. The bank on either side of the dam needs attention, the front slope being eroded in places; for some distance from the dam it requires revetment. Gauges should be fixed above and below the dam and carefully recorded. Care should be taken that no trees are allowed to get a footing in the masonry.

It is through this fresh-water lake that we passed going from Cochin to Trichúr, on our way to the railway station of Shoranur; on leaving the backwater the boats have to be pulled over a cross bank and then pass through a cutting in a laterite ridge into the lake. The passage through the lake is very difficult when water is low, and the reclamation of the lake bed, which is going on on all sides, must soon lead to the lake being impassable during the dry months of the year. The lake is entirely in Cochin and probably it would not be considered necessary to keep open navigation through it at all seasons if the canal from Cochin to Tirúr railway station were put in good order.

Tirúr to Beypore.—There is water communication here by means of creeks, but it was not inspected; and it is said that it is unnecessary to do anything to this portion of the line as the direction is generally parallel to the railway.

Beypore to Calicut.—When His Excellency the Governor was at Calicut, certain petitions were presented representing the necessity for good water communication between Beypore and Calicut; and there is reason to believe that the representation was made mainly in consequence of an individual being desirous of running steamers from the railway station to Calicut, which he believed would bring him in very considerable profits. The subject was discussed with this individual, who stated that, as the railway was to be extended to Calicut, there was now no necessity for improving the water communication. The Superintending Engineer has examined this portion of the line and states that, though the course of the creek between the Kallai river, near Calicut, and Beypore is tortuous, there is generally a depth of 2 feet of water at low tide, and he considers it only necessary to deepen in a few places. This can be done at slight cost.

The Kallai river itself is a great timber depôt, a large quantity of timber being floated down this river from the jungles, and also down the Ellatur river, north of Calicut, from which it is brought to the Kallai by creeks and by a canal made, it is said, by Mr. Conolly, when Collector, with the aid of convict labor. From the Kallai river the water communication was inspected to north of Calicut. The canal must have been a troublesome work as it passes through two ridges of laterite rock where it is cut with vertical sides and a bottom width of apparently about 18 feet. The Local Fund Board does some clearing here, but it is evident that in the cuttings deepening is required, as even small canoes, when laden, stick at low water. An estimate for the necessary deepening to $4\frac{1}{2}$ feet below M.S.L. should be prepared, but it is a question whether the necessities of trade require that the canal should be widened. The Collector is of opinion that eventually it should be widened, but that clearing will meet immediate wants. There are several bridges on this canal and masonry inlets, most of the latter have been much damaged and need extensive repairs. North of this the water communication was not inspected.

17. The navigation of the West Coast backwaters must always have been of considerable importance and at one time received attention, as the artificial cuts connecting the backwaters, which are apparently attributed to Mr. Conolly and are called Conolly's canal, were carefully laid out; the drainage into the canal provided for by masonry inlets, and a large number of accommodation bridges built. But, as will be seen from the history of what has been done of late years, the canal has been allowed to deteriorate until ordinary boats can only pass at about half tide. What has apparently prevented the improvement of the canal has been the scale on which these improvements have been designed. A steamboat canal has been talked of, and the works proposed were intended to make a first-class line of navigation with locks to get over any difference in flood and tide levels, and iron bridges at frequent intervals. The magnitude of the work and the expenditure entailed have prevented any action being taken, and the Local Fund Board is apparently unable to devote sufficient funds on the great length of navigation even to prevent deterioration, and it is considered that they cannot be expected to give the funds necessary to restore the canal to efficiency.

18. In order that a commencement may be made in the work of restoration, it is now proposed to take up the work in sections, commencing with the portion from Tirúr railway station to Cochin, and clear out a channel with a minimum width of 20 feet, side slopes 4 to 1 (as in the Buckingham canal) and sill at $4\frac{1}{2}$ feet below mean sea level, which will give a depth of at least 2 feet in even the lowest spring tides. The estimate will provide for repairing the bridges and inlets, and constructing new ones if required; but no locks are considered necessary; and, as stated in the notes of inspection, two bunds will be allowed for the present, the existing arrangements for passing boats being maintained. It is roughly estimated that the cost of thus improving this portion of the canal will amount to Rs. 60,000, and the work could be carried out in one year if funds are forthcoming.

19. It is understood that the Cochin Government are very desirous of having a really good water communication from Cochin to Tirúr, and would be prepared to contribute a considerable sum towards the execution of the work. It will be seen from what has been said above, that there are considerable difficulties in opening and keeping open a deep channel throughout the backwaters, and the difference in

cost of making a canal with a minimum depth of 2 feet and one with 3 feet depth is very great. The extensive reclamations made and now being made in the Cochin backwaters are also tending to damage the water communication; but it is still possible to provide a depth of 3 feet with a width sufficient to enable small steamers to pass boats at any point, and, if the Government think it desirable, an estimate of the cost of the work will be prepared from the surveys and levels now being made; but lest the difficulty in finding funds should again delay the execution of a work which is very desirable, it is urged that the minor project should, in the first instance, be carried out, which will provide for all the requirements of the existing traffic.

20. When the improvement of the canal from Cochin to Tirúr has been carried out, efficient maintenance must be provided for; and it is thought that the best arrangement would be to keep the canal in charge of this department, receiving from the Local Fund Board and the Cochin Government such contributions as they may agree to make. There would be no objection to the maintenance being handed over to the Local Fund Board entirely, but if we have once placed an establishment on the work and there is a probability of further improvements being undertaken, it seems desirable to have the work in the charge of this department.

21. As soon as the establishment now employed in making surveys and levels of the portion between Tirúr and Cochin have completed their work, another section of the canal north from Tirúr will be taken up, and estimates for restoration prepared in the same way; and when the first estimate is sanctioned it will be necessary to make a Canal sub-division, which should be placed under a competent officer.

OOTACAMUND,
15th April 1885.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 6th May 1885, No. 429 I., Public Works.

The Government approve of the suggestions of the Chief Engineer for Irrigation, and direct the submission of the minor project for the improvement of the West Coast navigation from Tirúr railway station to Cochin without delay.

2. This paper will be communicated to the Political and Financial departments in order that the views of the Cochin Government on the suggestions of the Chief Engineer for Irrigation may be obtained as soon as possible, and the amount of contributions which may be expected towards the maintenance of the navigation may be ascertained.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Superintending Engineer, IV Circle.

„ Chief Engineer for Irrigation.
„ Financial Department.
„ Political „
„ Revenue „
„ Consulting Engineer for Railways.

Exd. E. Fernandez.
Spare Copies

IRRIGATION.

Govt. of 1885 Madras.

PUBLIC WORKS.

Dated May 6th.

Recd.

Encl.

G.O., 6th May 1885, No. 429 I.

MAY.

**Water Communication on the
West Coast**

Orders on note by the Chief Engineer for
Irrigation on the subject of the improve-
ment of —.



1
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86 L.

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1858 says 'The inland navigation between Cochin and
Beyflore has been so often reported on, that I consider it
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The length of this portion of the communication is 9.2 miles
and the navigation was then said to be 'most imperfect
and at one point completely interrupted'.

2 An estimate was in that year submitted
which provided for improving the Canal and making it
fit for country boats, width 12 yards, depth 3' below
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6 In December 1863 the Agent and Chief Engineer, Madras Railway, examined the Canal from Tiroor to Cochin. They considered it would require about 50,000 Rs to make it a good navigation; and stated that the Canal in parts requires widening, the bridges raising, and the locks enlarging.

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the water; at first the width is not considerable, probably about 30 yards, but further on the creek widens out till near the Ponany river it becomes a fine back water in places more than a quarter of a mile wide, the shore lined with cocoanut gardens.

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is the section to which the Buckingham Canal is being cut. The sections were examined, and it is evident that very little will be wanted here.

From Ponany backwater an artificial Canal runs to the Velliengode river, a distance of about $3\frac{1}{2}$ miles. For the first part of its length it runs through the town of Ponani, and is a festitious ditch very much silted up, its bottom being only a few inches below low water level; there are numerous foot bridges over it, and these have been repaired and improved from the maintenance allowance granted by the Local Fund Board.

The Velliengode river is about $\frac{1}{2}$ a mile wide, and is navigable at all times. On leaving the river the Canal is still shallow and requires deepening; about 4 miles from the river the Canal enters a low strip of ground lying between sand ridges, through which it runs for about 10 miles; this strip, in some places narrow, is in others about $\frac{1}{4}$ of a mile wide and all of it is cultivated with wet crops. When the flood water subsides after the monsoon, a bank is thrown across the Canal about $7\frac{1}{2}$ miles below Ponany, and another near Chetage about 12 miles further on, and thus fresh water is retained for the crops; as this subsides in the dry weather, the crops are supplied by baling from Spring channels taken into pits on the edge of the sand ridges. It is represented that it is essential to this cultivation that salt water should be kept out of the Canal, and the people were much opposed to a proposal made some years ago to remove these dams and embank the Canal with proper outfall sluices to run off flood water; the Revenue Authorities consider that the objections are well founded and still exist, and it is a difficult

matter

matter to decide what is best to be done. The sand ridge towards the sea was examined, and it is not so high but that a canal could be excavated through it, but a deep excavation through the sand would no doubt tap the springs which supply the irrigation and insure, if not destroy, the cultivation, and as the whole line runs through enclosed gardens with houses and Cocoanut trees it would be very expensive. To buy up the irrigation it was estimated some years ago that upwards of Rs 1,10,000 would be required, probably it would cost much more now, and taking it up would entail great hardship on the cultivators. After the bunds are put up, boats are passed over them by the cultivators who construct them, it being one of the conditions attached to the permission to erect bunds, that they should pass boats without demanding any payment, but it is very doubtful if the bunds are not made use of for extortion, and even when we passed the men asked for a present. There is however not much difficulty in passing boats, and not so much delay as there would be in passing a lock which would not answer here, as when the fresh water was lower than the salt. Salt water would be admitted with every boat passed. There were formerly many such cross bunds, but the others have been removed, and it is thought we must accept 2 bunds as necessary in future, ultimately they may be superseded by low double gates, and a double inclined plane over which boats could be passed, but for the present it is proposed to allow the bunds to remain, (they are only necessary for a few months,) and only deepen the Canal between to proper depth. The

Revenue

Revenue Authorities should be applied to for information regarding the land which belongs to the canal, as this has evidently been encroached upon and there is no space on which to place spirit-gauges should be fixed above and below each dam, and carefully recorded daily; and the man employed to keep the registers should keep a record of all boats passing the lock, so that any complaint of detention or of a demand for black mail could be investigated.

Below Chetwye, to 35 miles from Ponany, the navigation is by backwater and only a little deepening is required in parts. At 35 miles, we enter a cut called the Eddiritwiti Canal about 3 miles in length, which is considerably silted and requires deepening, the back water below this is narrow and silted in places, but about 40 miles from Ponany it opens out and becomes a very wide sheet of water in which there is always a fairly deep channel, and so continues to Cochin.

The Local Fund Board has lately done a great deal of clearing in places all along the shallow parts, but the sections show that the maintenance allotment cannot do all that is necessary.

A little below the cross bund near Chetwye, an arm of the back water runs inland to the Yenamakhal Dam which retains the fresh water and keeps out the salt from the large Lake east of Trichoor. The dam is apparently founded on rough stone and is 60 feet in length, the upper portion and the wings are of masonry; after the fresh water subsides the crest is raised by means of wooden boxes filled with clay, and to prevent leakage a ring bund of clay between piles is constructed above the dam.

The

The work is in charge of this Department; and half cost of maintenance is paid by the Cochim Govt. the clay banks are maintained by a Contractor. The bank on either side of the dam needs attention, the front slope being eroded in places; for some distance from the dam it requires revetment. Gauges should be fixed above and below the dam and carefully recorded. Care should be taken that no trees are allowed to get a footing in the masonry.

It is through this fresh water Lake that we passed going from Cochim to Trichoor, on our way to the railway station of Thovannur. On leaving the back water the boats have to be pulled over a cross bank and then pass through a cutting in a laterite ridge into the Lake. The passage through the lake is very difficult when water is low, and the reclamation of the Lake bed which is going on on all sides must soon lead to the lake being impassable during the dry months of the year. The Lake is entirely in Cochim and probably it would not be considered necessary to keep open navigation through it at all seasons if the Canal from Cochim to Trichoor railway station were put in good order.

Trichoor to Beyoor - There is water communication here by means of creeks, but it was not inspected, and it is said that it is unnecessary to do anything to this portion of the line as the direction is generally parallel to the Railway.

Beyoor to Calicut - When His Excellency the Governor was at Calicut, certain petitions were presented representing the necessity for

for good water communication between Beyoor and Calicut; and there is reason to believe that the representation was made mainly in consequence of an individual being desirous of running steam from the Railway Station to Calicut, which he believed would bring him in very considerable profit. The subject was discussed with this individual, who stated that, as the railway was to be extended to Calicut, there was now no necessity for improving the water communication. The Supg. Engineer has examined this portion of the line and states that, though the course of the creek between the Kallai river near Calicut and Beyoor is tortuous, there is generally a depth of 2 feet of water at Low Tide and he considers it only necessary to deepen in a few places. This can be done at slight cost.

The Kallai river itself is a great timber depot, a large quantity of timber being floated down the river from the jungles, and also down the Ellatur river north of Calicut from which it is brought to the Kallai by creeks and by a canal made it is said by Mr. Conolly, when called for, with the aid of convict labor. From the Kallai river the water communication was inspected to north of Calicut. The Canal must have been a troublesome work as it passes through 2 ridges of laterite rock where it is cut with vertical sides and a bottom width of apparently about 18 feet. The Local Fund Board does some clearing here, but it is evident that in the cuttings deepening is required, as even small canoes when laden stick at low water. An estimate for the necessary deepening to $4\frac{1}{2}$ feet below M.S.L. should be prepared, but it

it is a question whether the necessities of trade require that the Canal should be widened. The Collector is of opinion that eventually it should be widened, but that clearing will meet immediate wants. There are several bridges on this Canal, and masonry inlets, most of the latter have been much damaged and need extensive repairs. North of this the water communication was not inspected.

17. The navigation of the West Coast back waters must always have been of considerable importance, and at one time received attention, as the artificial cuts connecting the backwaters which are apparently attributed to Mr. Canolly and are called Canolly's Canal were carefully laid out, the drainage into the Canal provided for by masonry inlets and a large number of accommodation bridges built. But as will be seen from the history of what has been done of late years, the Canal has been allowed to deteriorate until ordinary boats can only pass at about $\frac{1}{2}$ tide. What has apparently prevented the improvement of the Canal, has been the scale on which these improvements have been designed - a steam boat Canal has been talked of, and the works proposed were intended to make a first class line of navigation with locks to get over any difference in flood and tide levels, and iron bridges at frequent intervals. The magnitude of the work and the expenditure entailed ^{have} prevented any action being taken, and the Local Board is apparently unable to devote sufficient funds on the great length of navigation even to prevent deterioration, and it is considered that they cannot be

be expected to give the funds necessary to restore the Canal to efficiency.

18. In order that a commencement ¹³ may be made in the work of restoration, it is now proposed to take up the work in sections, commencing with the portion from Siroor Railway Station to Cochin and clear out a channel with a minimum ^{width} depth of 20 feet side slopes 4 to 1 (as in the Buckingham Canal) and sill at $4\frac{1}{2}$ feet below mean sea level, which will give a depth of at least 2 feet in even the Lowest Spring tides. The estimate will provide for repairing the bridges and inlets, and constructing new ones if required, but no locks are considered necessary; and as stated in the Notes of Inspection 2 bunds will be allowed for the present, the existing arrangements for passing boats being maintained. It is roughly estimated that the cost of these improving this portion of the Canal will amount to Rs 60,000, and the work could be carried out in one year if funds are forthcoming.

19. It is understood that the Cochin Govt are very desirous of having a really good water communication from Cochin to Siroor, and would be prepared to contribute a considerable sum towards the execution of the work. It will be seen, from what has been said above, that there are considerable difficulties in opening and keeping open a deep channel throughout the back waters, and the difference in cost of making a canal with a minimum depth of 2 feet and one with 3 feet depth is very great. The extensive reclamations made and now being made in the Cochin back waters are also tending to damage the water

water communication, but it is still possible to provide a depth of 3 feet with a width sufficient to enable small steamers to pass boats at any point, and if the Govt think it desirable, an estimate of the cost of the work will be prepared from the surveys and levels now being made, but lest the difficulty in finding funds should again delay the execution of a work which is very desirable, it is urged that the minor project should in the first instance be carried out, which will provide for all the requirements of the existing traffic.

20 When the improvement of the Canal from Lochin to Tirosor has been carried out, efficient maintenance must be provided for, and it is thought that the best arrangement would be to keep the Canal in charge of this Department, receiving from the Local Fund Board and the Lochin Government such contributions as they may agree to make. There would be no objection to the maintenance being handed over to the Local Fund Board entirely, but if we have once placed an establishment on the work and there is a probability of further improvements being undertaken, it seems desirable to have the work in the charge of this Department.

21 As soon as the establishment now employed in making surveys and levels of the portion between Tirosor and Lochin have completed their work, another section of the Canal north from Tirosor will be taken up, and estimates for restoration prepared in the same way; and when the first estimate is sanctioned it will be necessary to make a Canal sub-division which should be placed under a competent officer.

Cotacamund
15 April 1885

W. H. R. Colb Rb.
Chief Engineer for Irrigation

To The Joint Secretary to Govt. P. W. & Engrs Branch

15
Memo no. 113 D of 17-1-84.

" " 80 of 20-1-75

" " 168 of 11-2-75

G.O Public Dept no 185 of 24-3-82

G.O A no 550 W of 6-8-77

G.O Rev Dept no 2371 of 24-7-77

G.O A no 2585 of 4-11-72

" " 2 of 3-1-61

Military Dept G.O no 492 of 25-11-59

G.O A no 2966 of 21-12-59

" " 238 of 30-1-60

" " 14 of 7-1-58

" " 2426 of 16-11-58

" " 1618 of 1-7-59

Pros of the B. of Rev. 1162 of 1-7-72

Memo no. 794 E of 22-9-82

G.O. no 568 W of 6-3-82

Despatch to

Legy of state } no 28 of 9-4-61
for India }

G.O A no 2455 of 28-1-60

" " 1189 of 7-6-60

Despatch no 5 of 10-2-60

" " 53 of 27-9-59

G.O A no 1699 of 10-9-59

" " 255 of 9-5-59

" " 125 of 3-3-59

G.O Marine Dept no 482 of 12-2-59

Despatch no 3 of 1-3-59

G.O A no 57 of 7-1-59

" " 2125 of 12-10-58

Despatch no 18 of 15-10-58

G.O. No. 3795 a/22-12-63
 G.O. No. 258 a/29-1-63
 G.O. No. 257 a/29-1-63
 G.O. No. 403 a/20-7-58
 " " 1072 a/5-6-58
 " " 574 a/30-3-58
 " " 410 a/9-3-58
 " " 50 a/27-1-58
 " " 629 a/20-9-81
 " " 628 a/30-9-81
 G.O. Political Dept a/340 a/4-6-75
 G.O. No. 1764 a/23-6-75
 Rev. Dept. 417 a/15-3-75
 G.O. No. 3565 w a/13-12-83
 Public Dept 2179 a/16-11-83
 G.O. No. 2721 a/25-9-74
 " " 1792 a/4-7-74
 " " 941 a/11-4-74
 " " 792 a/23-3-74
 " " 2669 a/20-10-73
 " " 874 a/13-1-74
 " " 42 a/7-11-72
 " " 2630 a/28-10-72
 Political a/306 a/18-7-73
 G.O. No. 429 a/8-2-73
 " " 168 a/18-1-73
 " " 2637 a/9-11-72
 " " 2639 a/9-11-72
 " " 2585 a/6-11-72
 Political a/287 a/26-7-72
 G.O. No. 1449 a/12-6-72
 " " 956 a/6-4-70
 " " 3630 a/11-11-69
 Pol. No. 218 a/29-10-69
 G.O. No. 1917 a/17-6-69
 " " 1704 a/7-6-67
 " " 2979 a/17-9-66
 " " 892 a/20-3-66
 " " 3374 a/10-11-65
 " " 2894 a/7-10-64
 " " 2222 a/3-8-64
 " " 1054 a/13-4-64 +
 Pol. No. 96 a/8-11-64

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G.O. No. 2801 a/21-11-62
 " " 2408 a/9-10-62
 " " 2463 a/31-12-61
 " " 1597 a/22-8-61
 " " 1385 a/25-7-61
 " " 562 w a/20-2-83

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PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 6th May/85.

Read the following

Note by the Chief Engineer for Irrigation H.E. No 86 I dated 15 April 1885

W 10

The Government approve of the suggestions of the Chief Engineer for Irrigation, and direct the submission of the minor project for the improvement of the West Coast navigation from Tiruvor railway station to Cochin without delay.

This paper will be communicated to the Political & Financial Departments in order that the views of the Cochin Government on the suggestions of the Chief Engineer for Irrigation may be obtained, and the amount of contributions which may be expected towards the maintenance of the navigation may be ascertained.

Good

as soon as possible

Approved by Circle
for Irrig
Financial Dept
Political Dept
and Dept
Cons. Eng for Irrig.

24/4/85.

27.4.86

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17-3-33 BIII
30-11-38 BII

Govt. of Madras.

PUBLIC WORKS.

8/7/85

Dated

Encl.

G.O. of May 1885, No. 429

to Communication
on the West Coast
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in the State of Mysore
for Emigration
to the Malay Peninsula
by the Government of

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