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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT

1-7-57

G.O. No. 1664 Press Mis.

22 SS

Dated 1 — 7 18 57

Not to be folded or roughly handled

Fort Saint George, Public Works Consultation of 1*st September* 1857.

No. 52. Read the following letter from Lieutenant A. D. TAYLOR, I. N. Commanding H. C. S. Vessel Pownah ; to HENRY FORBES, Esq., Acting Secretary to Government, dated 27th July 1857.

SIR,

In forwarding the following report on the harbours and rivers of Canara, called for by Government in Extract No. 1279 of Minutes of Consultation dated 1st July 1857, I have the honor to state that since the monsoon of 1855, I have by order of the Commander in Chief of the Indian Navy been engaged on the Survey of the Canara, and Malabar Coasts, which duty owing to my almost constant ill health from March to November 1856, was only completed in April last.

2. I need not repeat my former report on Sedashigur bay and the harbour of Beitkul, but I would mention that the plan for a harbour proposed by me was considered by Colonel Arthur Cotton to be of too limited a nature to meet the growing wants of the country. It was therefore proposed to take the whole bay between Coormagur Island and Carwar Head for a large harbour.

Sedashigur Harbour.

3. This was to be effected by a Sea breakwater of loose stone, from Carwar Head towards the Islands, about 1,000 yards long, with an opening 400 feet wide at a distance of 400 yards from the Head. Another breakwater from the point of Deoghur Island and about 500 yards long would protect the harbour against any swell from the north west, whilst the Oyster rocks would nullify the effect of any westerly swell. There cannot be a doubt that this more comprehensive scheme would be of greater ultimate benefit. Beitkul Cove now offers shelter for small vessels, and the construction of the above works extending over several years, the harbour would get gradually better year by year, as the produce from the interior increased.

The present wants of Bombay Harbour.

4. But I am reminded that harbours can be too large as well as too small by the late discussion regarding that of Bombay, where in November 1854 so many vessels were wrecked by a gale from the eastward. A similar warning occurred in 1837, that was neglected, but now the attention of Government and the Merchants is steadily directed to the grand object of giving more shelter to vessels whilst loading or unloading cargo. Wet docks were proposed by Government Engineers, but such works are so liable to silt up, especially in the muddy harbour of Bombay, that it seems to me, that scheme will never be adopted. Wharf walls (running parallel I suppose to the ebb and flow of tide) are proposed by a Civil Engineer to cost the enormous sum of 89¾ lacs. Some modification of the latter project will, I think, be accepted, but will doubtless be undertaken by a Joint Stock Company and not by the Indian Government. Bombay harbour is entirely open on its south side. The ocean swell from S. S. W. rolls almost unimpeded over the space in which the Merchant shipping lie. To the S. S. E. there is an expanse of water 8 miles in length, a gale blowing over this causes a heavy swell.

Advantages of Beitkul Harbour.

5. Now the main desideratum of a harbour of refuge on the West Coast is, that its *South* side should be a natural defence against the south west swell of our rainy season gales, and periodical hurricanes, Carwar Head is pre-eminently such. Our north west winds from March to May are but trifles to a large ship, and when the wind in a cyclone has got round to north west, the only point on which our bay is open, the centre of the revolving storm will have passed to the northward ; nor s the storm wave likely to recoil upon our works from the north west.

6. I mention these things merely to point out that there is as much chance of our falling into error in forming a harbour of too great an extent, as there is of our limiting one to too

small an area. I have reconsidered the subject in all its bearings, and am now of opinion that my former views were too circumscribed, and that any works to be undertaken at Beitkul should be on a large scale.

Tuddree a fine season harbour.

7. We have a harbour in Tuddree (as I shall presently explain) upon which three ghauts converge and though making it a south west monsoon port is out of the question, yet there needs very little to make it the centre of the Export Trade of North Canara temporarily, whilst the grander port and harbour of refuge of Beitkul is being prepared.

Objections to many small Ports on one Coast.

8. There is this to be said with regard to the advisableness of establishing small ports in anticipation of the development of one great harbour—viz., where once a beginning has been made, when shall we cease to add improvement to improvement upon the little ports, and when cease to cherish a rising place. Take Madras itself as an instance in point, had the Fort been built abreast of the Armogom or Pulicat shoals, we should not now be clamouring for works to nullify the effect of the surf, and to render landing easy; for at both those places we should have so fine a nucleus for a Sea breakwater, that three fourths of the labor and expense now required to render Madras a safe port would have been saved, and the project would come within the easy means of either Government or a private Company. Now that so much has been expended by Merchants on Warehouses and other buildings, and Madras is become a great Commercial port, it is clear that a harbour some few miles distant will never answer, but that one will have to be made here at whatever cost.

Lighthouse of first class for Carwar Head and not on the Oyster rocks.

9. With these preliminary remarks on the first essentials for a good refuge harbour, I shall proceed to state what is needed at Sedashigur. The Marine Board in their report upon my project for making Beitkul a harbour of refuge, objected to the light being placed on Carwar Head, their preference being given to the Oyster rocks as the site. In a letter to the Collector of Canara, dated November 26th 1855 in continuation of my first report, I stated my reasons for selecting the Head as the place where the light should be. The Collector's reply was to the effect that the advantages of the proposed harbour had been so clearly pointed out by me he thought nothing more need be said on the subject, at that time I was ordered by Sir Henry Leeke to continue the coast survey, and until the arrival of the Right Honorable the Governor on the Western Coast, I had been incapacitated by sickness from giving such attention to the subject as I could have wished.

10. The following remarks are for the most part what I wrote in the letter above alluded to; as I can at this distance of time improve upon and add to them, I propose doing so.

Arguments in favor of taking Carwar Head as the site for a Lighthouse.

11. In selecting Carwar Head as the site for a Lighthouse, I took into consideration its commanding height above the Sea. It is a known fact which probably the Captains of the P. and O. Co's. Steamers have noticed while passing along this coast, that during the south west monsoon a vapoury salt spray rising to a height of some 100 feet veils the Seaboard of Western India, rendering a recognition of the features of the low land no easy task. The Oyster rocks, which I at first thought of as the place for a Lighthouse, come in a measure under the influence of this mist, that is to say the rocks which project from them on their southern and western sides, cause the spray to rise high into the air, and I contend that a light of so little height as these Islands would afford, will be less distinguishable at 5½ miles distance than the lofty Carwar light at 8 miles; the greater height of the latter 650 feet, placing it above the limits of this ocean mist.

Arguments against Oyster rocks.

12. The Oyster rocks afford no landing place during south west gales, their margin is rock bound possessing no patch of sand on which a boat might be beached. Some and no little expense and trouble would connect the two high Islands which are about 50 yards apart, the interval filled by impassable rocks above and below water this barrier must be some 30 feet broad and raised at least 10 feet above the water to give any shelter to leeward, but even then we may expect the ocean swell to roll round to the landing place, the cost of such a barrier would be great.

13. Fresh water is to be found on them during and after the rains, but the scouring of the jungle would not be conducive to health; the transit of supplies would be difficult, and in the event of injury to the lantern or house, no native Artificer could be found to brave the passage by sea. It would not suffice that the communication with the main-land should be confined only to intervals of fine weather; sickness or accidents to the people in charge would render it imperative that a large boat should be always at hand.

14. These are some and the most weighty of my reasons for giving the preference to Carwar Head as the site for a first class light, whose brilliancy would enable it to be seen 30 miles off from a vessels' deck.

Beitkul is the nearest Fort to Dharwar cotton country.

15. Our harbour is the nearest sea port to the great Dharwar cotton fields, that town itself is but 75 miles, as the crow flies, from Sedashigur when in my former report I wrote of developing the trade during the ensuing year (1856) I was under the impression that the road to Malapore from the Dharwar Districts was finished. Mr. Brice a Merchant resident at the latter place has since undeceived me; the Kyga ghaut line is opened merely to a bridle path and the nullahs are unbridged; he pointed out the immense advantages a Rail to Beitkul would ensure in keeping the goods *dry* in transit, a point which he looks upon as an essential, as so much loss is now suffered from deterioration of goods by the rain; but surely provision against damp could be managed in the boats we would build expressly for the purpose, the Rail would cost an enormous sum, and could not possibly compete with water carriage.

16. The ordinary traffic roads are now nearly impassable during four and a half months of the year, June to middle of October, and with any increase to that traffic, such as we may expect on the opening of our port, the wretched state of these roads during the rains will be a serious drawback. There are no works commenced at Sedashigur that would render it of importance in a pecuniary point of view, to prevent their supercession by others, however more feasible on the contrary the harbour and its approaches are as nature formed them, there is nothing to alter; before us lies an entirely new field of greatest promise, all that is requisite is to look before we leap, to see that the most advantageous scheme be selected. If the trade of the interior is to be brought to the sea, a harbour on this coast, of easy access, sheltered from all winds, capable of receiving very large vessels, and at one tithe of the distance from the internal resources of the country that the Madras or East Coast is where there are no safe harbours, would surely be preferred.

The great advantage of a high light.

17. The above is what I wrote before to show that I had not overlooked the Oyster Rocks, when considering where to place my principal light. It is a grevious mistake to place a first class light on a low hill, when not far off, there is one four times the height. Besides there is this to be said in favor of high lights, that they are visible so much further from the *deck of a ship*, by aid of a telescope, which is a difficult instrument to handle at the *Mast head*, where the motion is of course so much more violent, and footing insecure.

Small light and a Signal Gun on Oyster Rocks.

18. I agree so far with the Marine Board that the Oyster Rocks should have some landmark on them, and I would recommend that a small white house, (to serve also as a column for a small light) be built on them, where a few fishermen could live in the south west monsoon, keeping provisions enough for their maintenance; breaks in the weather afford occasional though not frequent opportunities of communicating with Beitkul Cove. It should be the duty of these men to burn blue lights either at stated times, (as at the outer Light vessels in Bombay) on observing lights at sea, or hearing guns. A signal gun should be placed there. The Oyster Rocks though 160 feet high, have loose granite boulders on their summit; levelling these, and marking a place for signal guns would reduce the height considerably, so that a column of 40 feet would give the light a height of 160 feet still.

Light on Carwar visible 30 miles. Oyster light only 18 miles.

19. The small light on those Islets would not interfere with that on Carwar Head, which is so lofty as to be visible from the deck of any vessel at 30 miles distance; whereas the light on the Oyster's if 160 feet above the sea would be only seen in fine weather 18 miles, the distance between the two is 2¼ miles, so that the greater light would be visible for some time before the other, and when

both are visible, that on the Head would appear so much more exalted and brilliant. I would wish to explain more fully what I said about the Salt spray of the ocean; it hangs like vapour above the sea, and so dims distant objects that land 200 feet high which can be seen in clear weather 15 miles off, is scarcely discernible during the south west monsoon on the West Coast (even when rain is not falling) at half that distance.

20. I need say no more regarding the Light House on Carwar Head, but that breadth is what is wanted, not height in the building. We have the necessary altitude in the Hill itself.

Proposed works for Beitkul Harbour.

21. Adverting to my former report, I would now reject the two piers at the mouth of the Cove, but would increase that proposed at the point T (vide Plans Nos. 3, and 2) to a length of 400 yards in a line due north leaving an opening of 400 feet wide at the water's edge. I would continue the breakwater in a line N. N. E. as shewn on the Plans No. 2 and 3. The stone for these works could easily be quarried from the Hill and they would give at once great security to Beitkul by increasing the anchoring ground for large vessels; and with the Canal from the Kalee Nuddy which I would have as shewn by the blue line in No. 2 Chart; (and not as formerly suggested by the Sinkerry Creek) the produce of the country above the ghauts could be brought from the present head of navigation, about 2 miles above Malapore to the shipping in Beitkul by the same boat.

Canal to join the River to the Harbour.

22. A subsequent examination of the Sinkerry Creek and of the shoals in its neighbourhood led me to alter the proposed line of Canal, my new line commences from the deep water of the south bank nearly opposite Sedashigut old fort, and marked blue on Plan No. 2, pursuing a nearly due south course to the fishing village near Beitkul, this is 4,400 yards or 2½ statute miles long, with a rough stone breakwater running along the rocky cliff by the fishing village and turning down to the South West so as to protect the Canal mouth, the water communication all the way from above Malapore to Beitkul will be perfected.

Present roads bad in rainy season.

23. With the present means of communication between the coast and the interior, and until by covered boats on the rivers, and by covered carriages (on perhaps lines of light rail) above and below ghaut, the goods can be carried *dry* to any part, it is needless to expect Merchants to avail themselves of any but the five months, viz. October to May, for shipping goods at any port. The rain is now our greatest drawback on the Western Coast. With a Canal system it will facilitate progress.

Lines of Canal wanted for North Canara.

Canals and not roads suited to the wants of Canara.

24. The proximate lines of Canal to connect all our present roads from the ghauts with our harbour are shewn on the accompanying Plan No. 1 in blue tint; these are all that are required to connect all the rivers north of Honore with Beitkul, that there is comparatively but little work in this undertaking will be evident at a glance. In such a tract of country as that between the west ghauts and the sea, where for 2 or 3 months of the year the freshes come down with great violence, overflowing the banks in many places for hundred of yards, and some time bearing on the surface of the water enormous trees which threaten destruction to any bridge of boats; where stone or strong wood bridges requiring great span would be most costly; in such a country canals are clearly the proper highways. A journey from north to south of Canara is now a tedious business, a constant shifting from palankeen or horse to boat and back again, canals with suitable boats will remedy all this, and enable passengers and goods to travel at one tithe of the present cost and certainly as quick. I cannot resist the temptation to state the fact that horses do not thrive in Canara during the season of the cutting land winds, neither do Bullocks thrive, there being great difficulty in getting grass for one fourth of the year.

How far Kalee Nuddy is or may be open.

25. My survey of Sedashigur River or the Kalee Nuddy is herewith forwarded. It shews the river to be navigable twenty or twenty-two miles up, or to about 2 miles above Malapore, at which place my survey ended, but will be resumed when the rainy season is over, if it can be made navigable for 15 miles more (as is most likely, from all accounts) a great advantage will be gained, the importance of which I shall not overlook.

Effects of a groin at the Kalee Nuddy entrance.

Another object gained by the groin.

26. The entrance of the river has improved since my first examination in January 1855, having moved northward until stopped by the black rock which forming a natural groin deflects the stream, and will doubtless keep it in one channel henceforth: already has this groin operated to advantage, the entrance channel has now 15 feet at low water, and 21 feet at high water, and this will admit vessels of 500 tons in the fine season, they will be able to lie off the steep south bank, near the entrance of my proposed canal, where a pier 100 yards long would give 20 feet water at its head. Another advantage is gained by the entrance of the Kalee Nuddy being kept so far north, which is that the alluvium brought down by the river freshes is, on its exit to the ocean, encountered by the south west swell and deposited to the eastward of those rocks situated about a mile to the northwest of the groin rock (vide Plan No. 2) which rocks are now joined to the mainland by a sand spit dry at low water, thus is the deposit prevented from entering the southern portion of Sedashigur bay where our harbour is to be.

Roads that come down upon the Kalee Nuddy.

27. There are no impediments to boat navigation up to Malapore nearly opposite that place the Singaway ghaut comes down to the river on the right or north bank, on the south bank is the Kyga ghaut these two roads when completed should bring the whole of the South Mahratta country cotton and other produce to Beitkul. The rains which commence in April by the Western ghauts make the roads very heavy, and do much damage to the cotton, so that *very little* arrives on the coast, from the interior before the south west monsoon sets in; the greater part being kept above ghaut until the rains are over, until then a harbour be obtained, it is of little use having the roads kept in good repair during the rainy season when there is no traffic.

Devamunny Ghaut.

Arbyle Ghaut line of road.

How it may be improved.

28. At present the cotton goes down by principally the Devamunny ghaut to Cutgal, on the north bank of the Tuddree river, thence instead of going by boat to Tuddree, it is carried in carts up a hill again and then down to the Munky Ferry about 2½ miles from Coomta town; the carts, bullocks, and cotton are then carried across the stream, a breadth of 300 yards, when the carts being reloaded proceed onwards to Coomta. Some carts come down the Arbyle ghaut, but the ferry on the Gungavelly river between Sooksaul and Goondabaly, which is fordable for only 6 or 7 months of the year, is a great drawback. The Gungavelly river from this ferry to its mouth, is navigable all the year round, clearly then it should be used, and connected to the Tuddree by a Canal as represented in the Coast Chart No. 1 the details of this arrangement will be found under the head of Tuddree. An estimate was made by the late Civil Engineer of Canara, for bridging the river by the above mentioned ferry; this bridge was to cost half or three fourths of a lac of Rupees; now I am certain the small piece of Canal which I recommend cannot cost more than a quarter of a lac.

Tuddree a fine Season Port.

Arbyle Ghaut.

Devamunny Ghaut.

Neelcoond Ghaut.

29. But we have a fine season port in Tuddree, which is far superior to Coomta, from which most of the up country produce is now exported with a small Canal of less than 1½ miles length (vide letter A. on No. 1, Canal Chart) the Gungavelly river can be connected with the Tuddree, and so the Arbyle Ghaut be made of use during the whole year instead of only being an indifferent road for two thirds of the year as it is at present, then again the produce that is brought down the Devamunny ghaut should go no further by land than Cutgal, where it could be put on boats and sent to Tuddree at far less cost than by the present system, which carries it up a hill 200 feet high, along its top and down again to Munky Ferry, a distance of 6 miles; then over the ferry, which involves the operation of unloading on one side, and reloading on the other; and then a 3 mile drive to Coomta. The Neelcoond ghaut comes down upon the Tuddree river some miles above Oopenputnum the river could either be improved, or the road made along its right or north east bank to the highest point where it is now navigable above Oopenputnum, and thus the Neelcoond ghaut be brought down to Tuddree at but little expense.

Tuddree Harbour.

Vessels of 400 ton can enter.

The Bar may be deepened.

Export duty can be levied.

30. With these three ghauts (excellent during the fine season) coming down upon Tuddree, that port ought to be the most frequented, as it is the most excellent on the coast. It is sealed for 2½ months in the year or from middle of May to beginning of August, after which large vessels might be outside of the river, and others of less than 400 tons could run in and load, there is now 11 feet at low water and 18 at highest on the bar, and I have no doubt we could get upwards of 21 feet by preventing the first of the ebb-tide from running out over the sands on the west side of entrance this I propose doing by a groin of loose stone thrown down as marked in red on the Plan of Tuddree No. 5 accompanying this report. This work would cost some 10,000 Rupees which will be recovered by the additional duty that would be levied on grain and other produce embarked in square rigged vessels from Tuddree direct, at present all this goes to Bombay in native crafts, and there the duty is collected instead of in Canara. Before the harbour of Beitkul can possibly be ready to receive vessels, this work at Tuddree will have paid for itself over and over again.

Tuddree.

Present refuge harbour for the Native vessels.

Light at Tuddree instead of at Coomta.

At what times the light is wanted.

31. Tuddree is the haven for which many native vessels steer in our periodical cyclones, and southerly gales, it is the next port north of Cochin, and with a Light House would be a nice harbour of refuge for the native craft; it is 25 miles more to windward than Sedashigur in the above mentioned breezes, and a small port light here, could never be mistaken for the lofty one which it is proposed to place on Carwar Head, which as I have said before should be a first class light, like that of Madras. With the interests of Canara fully at heart, I deem it my duty here to record my opinion that a Light House and Flag staff on the highland west of Tuddree would be of far greater general advantage than the present column of Coomta, which is situated far back from the sea on a receding part of the coast, whereas Tuddree point is so prominent. My long experience of this coast, shews me that a light is not cared for except in bad weather on this particular part of a coast so mountainous. I have felt my way by night in fine weather as the tindals of Pattimars do by knowledge of the form and features of the land. Only in squally weather is a light an immediate necessity, and then Coomta is too far back to be of use, for in bad weather vessels must not keep in shore, but an offing must be maintained, whence the light would be scarcely visible.

Canara Teak for Bombay Dockyard.

Canal between Gungavelly and Tuddree.

32. The Gungavelly is the river down which most of the Teak Timber for Bombay dockyard is floated, it has a very poor entrance and consequently Pattimars have mostly to be loaded outside in the open sea, the Timber being rafted out; these rafts frequently break a drift, and away goes the timber, if the small piece of Canal to connect Gungavelly and Tuddree rivers be first executed, this timber could be taken on board in the quiet river of Tuddree, and much expense thus saved to the Government of Bombay; the Arbyle ghaut would then be brought down, as it were, to an excellent sea port, and it would then relieve the Devamunny of a great deal of that superfluous traffic which, now incessantly plying upon it during October, November, and December, so severely cuts it up.

Works of primary importance.

33. To my mind then, the works of primary importance for North Canara are:—

1stly. The Gungavelly and Tuddree Canal.
2ndly. A wharf wall and a few small improvements at Cutgal.
3rdly. Bringing the Neelcoond road on to the river above Oopenputnum, where also should be a wharf.
4thly. A wharf at the spot where the Arbyle ghaut comes down upon the Gungavelly.
5thly. A small light house on Tuddree hill.
6thly. Two buoys to mark Tuddree bar, and
7thly. The groin at the entrance of Tuddree river.

Tuddree *harbour*, better than the Coomta roadstead.

34. I have long been impressed with the utter inferiority of Coomta to Tuddree in every way, and have not failed to express my conviction of the same to the authorities of Canara.

The Natives say that the God or Goddess of riches (I forgot which) has taken up an abode at Coomta, but I think the first year's saving to them by adopting Tuddree would prove that their deity has also a country seat there, indeed the famous temples of Gokurn are within half an hour's walk of Tuddree, a little was done for Coomta at first, trade gradually increased, and the cry was ("what more shall we do for the place's benefit?") now people say, "it is getting on so well, we cannot neglect it even in favor of a better, something more must be done for Coomta" and thus is the original mistake perpetuated, instead of the inferior port being at an early stage of its existence superseded by the better one of Tuddree. I have not the least doubt that Tuddree bar may be much improved by the means I have above recommended in para. 30, and at a very small sacrifice of money, at indeed one tithe of what is intended to be spent on the Coomta Canal, which work, the very inhabitants of that place (for whose benefit the canal is said to be contemplated) deprecate as a waste of money without commensurate advantages.

Canal between Tuddree and Coomta not yet wanted.

Obstacle to Canal system south of Honore.

35. This Canal between Coomta and Tuddree has been, I understand, sanctioned, but it seems the general opinion of the natives that if any toll be levied on it, the old way of conveying goods to Coomta as explained in para. 29 will be maintained. That Coomta (a wretched little port from which the native craft fly, on the approach of a gale, to Tuddree) should ever have been allowed to supersede the latter fine port is greatly to be deprecated, a light house has been built at Coomta, but being not on the proper site is not of any use in making the port from the north. The Devamunny and Neelcoond ghauts both are interrupted by the Tuddree river, which seems to invite the traffic on to its stream to Tuddree, will then the native merchants, who are so knowing in money matters carry their merchandize to Coomta to ship it in an open road stead? When they can take it with less trouble, and no tolls to pay, to Tuddree; and there ship it from the pier that is about to be built at that place; the Canal must be free to boats passing otherwise it will not be used. For one fourth the sum it is estimated to cost, we could make a light house on Tuddree point and the Tuddree river accessible for 9 months of the year to vessels of 600 tons. Doubtless at some remoter period when the Gairsipa ghaut is opened, the Canal may, in connection with others connecting the Honore and Coomta rivers, be an adjacent to that ghaut and form a part of the canal system of north Canara. That the system of canals along this northern Canara sea board, cannot be extended lower than Honore without a great outlay is shewn by the fact that a range of hills 200 to 300 feet high, and in the lowest part not under 100 feet, projects into the sea, 3 miles south of Honore ferry. Byndoor head and several little Capes intervening between it and Honore, projecting into the sea throw obstacles also in the way.

Object of deepening Tuddree entrance is to admit larger vessels to load by a pier.

Valuable land will be gained from the sea by the groin.

36. The object of deepening Tuddree river entrance is to enable vessels to get inside to load by a pier, which process is a great saving to merchants, but is not an absolute necessity; for Bombay, that much vaunted harbour, has not yet that accommodation, although that they appreciate the advantage of a wharf is patent in the fact that Government have had estimates laid before them for the construction of wet docks, the least sum being 12¾ lacs whilst one Civil Engineer proposes wharf walls in preference to wet docks and states that 89¾ lacs of Rupees would be required, the deepening of Tuddree river then may be looked upon as a work of secondary importance, more demanded by the interests of merchants than by those of Government, although of course every incentive to trade cannot but benefit the Government. I must not however omit to mention that the groin proposed will prevent the ocean swell from cutting away the point outside of Mr. Brice's screw house as it now does at the first burst of the south west monsoon, which comes up well from the south but does not last many days, late in May or early in June. Thus will be gained that piece of ground (tinted yellow on No. 5 Plan) most valuable for a merchant's storehouse as it has deep water close to its east side where a pier can be made.

Advantages of Tuddree.

37. I have in my hand a list of 24 vessels which were in Bombay harbour between May and October of last year, any one of which when loaded could have left Tuddree river as it now is. There are besides many that could load inside to a draught of 16 feet and fill up with cargo outside. Any one of the vessels that frequent Cochin river could with greater ease enter and depart from Tuddree, where the bar is

Disadvantages of Coomta.

quite smooth during the fine season : the west point of land (on which I propose to place a light marked on the Charts No. 1 and 5) so completely breaks the swell of the north west winds, which are the only breezes that during the fine season last long enough to produce any swell that is troublesome to vessels on this coast. In these north west winds Coomta is an open and exposed roadstead, and I have heard many complaints of the cotton and other goods getting wet along side native crafts. I believe the merchants allow about 2 per cent. for the deterioration and loss of cotton in shipping and transit to Bombay from the coast.

Tuddree not open throughout the year, but made use of by Native vessels in gales of wind.

Saving in loading from a pier or jetty.

38. Tuddree is the port to which the attention of merchants is now turned. 2 or 3 screws are now ready to press the cotton bales, and vessels of 300 or 400 tons will be able to load from a pier and sail direct to England. Tuddree is however as I said before merely a fair season port ; it is sealed from the middle of May till the beginning of August, but for 9 months of the year can be made the centre of a great trade and is the next port north of Cochin wherein Native craft seek shelter during gales of wind. In the cyclone which committed such havoc in Bombay on November 1st 1854 and which was felt all along the Malabar and Canara Coasts nearly 30 Pattimars put into Tuddree for shelter, and at the early setting in of the monsoon of 1856 many took advantage of it likewise. It is well known that loading vessels from a wharf of jetty is far cheaper and more expeditious than the method pursued at Coomta of loading by means of many small boats. The jetty constructed by Mr Brice at Tuddree, had, I am assured, in half a year paid its cost by saving boat hire. In the face of this fact can it be expected that Coomta will continue to hold up its head before the rising importance of Tuddree ; an open roadstead from which vessels have to fly on the appearance of a gale before a safe and commodious harbour !! Cotton will have to be landed at Tuddree, as it has to be pressed, but linseed and other seeds can be packed and weighed at Cutgal, placed in a boat, and sent directly along side the merchant vessels, either in Tuddree river, or outside ; here then is another source of saving to the merchants.

Gain in shipping direct from the coast.

39. I am assured that the value of seeds exported from Coomta and Tuddree, in the official years 1855 and 1856 was 40,000 Rupees, whilst in 1856 to 1857 it was 80,000 and still increasing. I append a Memo given me by the Firm of Brice and Co., to shew what saving is effected by shipping cotton [illegible]nd seeds from Tuddree direct in English bottoms, instead of transporting it as is now the cus[illegible] to Bombay where it is shipped and the duty levied.

		Rs.	As.	P.
Cotton American value 100 Rupees per Bombay Candy of 7 cwt.	Freight to Bombay	1	8	0
	Marine Insurance	0	12	0
	Extra landing in Bombay	0	12	0
	Bombay Agents Commission	1	0	0
	Interest of money for 1 month @ ¾ ꝑ cwt.	0	12	0
(Nearly 5 per cent.) saving		4	12	0 ꝑ Candy.

Linseed at Rupees 4 per cwt.	Freight to Bombay	50 Reas.
	Insurance	4 ,,
	Landing and shipping in Bombay	50 ,,
	Interest 1 month	4 ,,
(About 6 per cent.) saving		108 Reas.

Charts of Tuddree wanted.

40. This is the saving to the merchants and it is independent of loss by deterioration and pilfering which cargo has to undergo on its passage to Bombay in native vessels and on being landed there, this is sufficient inducement indeed to attract many to these parts. In the latter end of last year, Messrs. Brice and Co., wanted to charter a vessel to load at Tuddree but the demand for tonnage which the Persian war created made freight too high, however, the principal objections to going there made by Masters or Merachant vessels were, that there was no Magistrate at Tuddree and that they had no correct charts of the coast. If as above suggested by me Tuddree be made the Head Quarters of the Timber Agency, the first of these difficulties would vanish ; the second one will soon be removed by the publication of the coast charts, copies of which, from Cape Ramas in the Goa territory to Mount Dilly in Malabar, I have now the honor to forward together with one of Tuddree river entrance.

Canals suited to the wants of Canara.

Gungavelly river to be made navigable.

The Kalee Nuddy to be made navigable higher up.

41. There is another argument so much in favor of water communication in Canara. It is this, the native Cart men are so loath to go a few miles beyond their own villages, that they look upon it as a great favor being discharged as soon as possible ; thus frequently have goods to be shifted from cart to cart during their progress. So at the Munky Ferry, each cart as to be unloaded, and a reloading takes place on the other side of the river. All this is avoided by the cheaper and quicker method of transport by boats. The Arbyle ghaut comes down upon the Gungavelly or Baidlee river about 2 miles below the village of Arbyle and if the river were navigable from this place to the Canal, which is proposed to join it with Tuddree, a great point would be gained, there would be so much less (some 20 miles) roadway to keep in repair. If the Kalee Nuddy were made navigable from Taree Malapore, or Barhull, 15 miles above Malapore to its mouth, there seems every probability that a line of road could be made from either of those places to Gurrus between Iddagoonjee and Yellapore. If so, there would be so many miles less of road (some 15) to make and keep in repair, these are important points, and I propose examining these two rivers so soon as the season permits me to resume work.

A better line than the Kyga ghaut may perhaps be found.

Kyga ghaut.

42. I have already surveyed the Kalee Nuddy as high up as Malapore as will be seen by the accompanying Chart No. 4 which demonstrates that the navigation so far is excellent ; there is said to be a small barrier some 2 or 3 miles above Malapore, but I fully expect it will fade into insignificance on a careful inspection. I shall endeavour to get through the survey of this river from Malapore, to Barhull as quickly as possible, for I understand that the Kyga ghaut is to be proceeded with at once, now if the river be navigable, or may without difficulty be made navigable higher up than Kyga, it will clearly be a mistake to carry that ghaut so low down the river. The hurrying on of the Kyga ghaut will not accelerate the development of Sedashigur, for until the harbour is formed we cannot expect ships to go there. They may at once go to Tuddree in the fine season indeed I fully expect several will load there before the close of this year.

Halfway house between ghauts and the coast.

Road from Neelcoond to Tuddree.

43. I learn from Messrs. Brice and Co., that it would be absolutely necessary, in case of half the transit of goods from above ghaut to the coast being by land and half by water that merchants should have an office and wareho[illegible] at the place of shipment, goods having to be weighed and taken care [illegible]n shipping from carts to boats. Here then is another point we must not neglect, viz. that the locality for such office be healthy. I shall bear this in mind during my examination of the rivers ; Cutgal, on the Tuddree river already adopted as a half way house by the above enterprizing firm, is decidedly weil chosen. I have visited the river above the last named place a little higher than Oopenputnum, and found no impediment to regular water communication so far. The maps of the Great Indian Atlas represent a road running along the right bank of this river to the Neelcoond road. It is evident then that we shall not need an *entirely new* line of road to connect that ghaut with Tuddree river as proposed in para. 29. but only a few *repairs to an old* road.

Charts of Canara.

44. I cannot think of any point that has been omitted in demonstrating the great value some years hence of a grand refuge harbour and commercial port at Sedashigur, and the present advantages possessed by the little port of Tuddree. As Charts of the whole Canara Coast may be useful to Government, I have the honor to forward them, they are in three sheets marked respectively Northern, Central, and Southern Canara.

Honore river.

45. Honore river is navigable by small boats for 20 miles from its mouth or up to the old town of Gairsipa, whence there is a good ghaut road passing by the falls of Gairsipa to the Mysore country. I cannot see that any improvement is needed on this river. The entrance is indifferent, but nothing need be done to that as Canal communication will subsequently connect the river with the great harbour to the north shewn in the Canal Chart No. 1. I have before stated in para. 35, that

Coast canal below Honore.

difficulties (not insuperable however, but to be overcome by Engineering skill,) exist in the way of continuing a coast canal southward. The space of seaboard from Honore to Byndoor abounds with little capes projecting into the sea, there may be low level ground at the back of these, but it has not been examined by me. Below Byndoor again and as far south as I have surveyed every facility for a continuous coast canal exists.

Coondapore.

A small port light for Coondapoor.

46. Coondapore, a place of very considerable trade is situated just to the south of all that rocky foul ground on the south of Hog and Pigeon Islands where rocks a few feet above water and in some places just under water lie so far as 3 to 3½ nautical miles from the mainland in 7 fathoms of water. I have not yet examined the Coondapore river inside, but it is said to be navigable for small boats for some distance from its entrance both towards the Coolloor and the Agoombee ghauts, where the 2 ghauts come down upon the river. Here again therefore we have water communication and no roads are needed entailing unnecessary expense upon the country. A small port light at Coondapore would be very useful to the native shipping; no part of the whole coast of Canara is so dangerous at night as that between Hog island and Moolky rocks on account of the many rocks at so great a distance from the shore.

Coast Canal already half made by nature.

47. Between Coondapore and Mangalore and to the south of the latter port to Malabar there is every facility for a coast Canal, the backwaters running in numerous instances parallel to the coast for several miles, few and short cuttings are all that are needed to perfect the system of water communication for hundreds of miles. The Charts of Canara will give a tolerably good general idea of what is wanted for the country.

Mangalore River entrance.

How the north point has been cut away since the year 1855.

48. I now proceed to lay before you a few remarks on Mangalore shewing what has been done and what suggested by others, and finally what is my own proposal for the improvement of that port at the least possible outlay; so that the river entrance may be permanently kept at one spot and consequently be rendered deeper and more accessible. My first examination of the river entrance took place in April 1855. Copy of this was furnished to the Civil Engineer of Canara, who during the monsoon of that year was engaged in operations contemplated to prevent the river mouth from moving up northward; these operations were unsuccessful. A second survey taken after that rainy season shewed that notwithstanding the impediment to the cutting action of the ocean swell and ebb tides when augmented by the freshets that the laterite battery on the north side of the entrance was expected to afford a strip of nearly 100 yards in breadth and 300 in length including about ⅔ of the battery itself was swept away. On the south side of the entrance what was in April of that year a projecting point always above water was after the rains a spit, which scarcely dried at low water the main body of the point was removed from 200 to 300 yards to the south west.

The river mouth is moving up Northward.

How to prevent that and to keep it in one spot.

49. My latest survey in November 1856 is represented on the Plan No. 7 in lake whilst in black is shewn the contour of the sand in January of the same year, much of the north point was cut away in the rainy season of 1856, and with it went the last remains of the battery. In November of last year I found a depth of 25 feet water over the site of that battery. A startling proof of what a scouring current we have to deal with. I feel confident that if left to itself the river will find its way out by the Goorpore mouth in ten (10) years much of the Buntwal stream goes out of the Goorpore mouth and this year my Officers report that this has occurred more than formerly. To prevent the river mouth from thus moving northwards year by year is an important consideration. It was my opinion that such a result could be attained, though not without a heavy outlay by a substantial revetment from the vicinity of the Custom House in a right line or in a gentle curve to the north sand, until where it bends round to the seashore; but a work of this sort would be very costly as it must of course have a deep foundation to withstand the scouring action of the current upon the stones which unless protected by a facing of piles and wales, would be picked out in detail and swept away by the stream.

50. The ocean swell is the most active agent in cutting away the north point; the sand is broken up by it, the trees shaken in their foundations, and the ebb tides carry them away; sheet piling of cocoanut trees deeply sunk, and backed up by stones would protect the seashore of this north point, and when the sand is no longer removed year by year from that locality, we may expect the southerly current to carry with it much of what is now deposited near the Bar. By such a revetment as above described we should gain a long wharf facing, where pattimars may load and discharge cargoes under cranes, an immense advantage for the native shipping. The whole space before the Custom House is fast filling up, and the groin if allowed to remain will accelerate that process, the little bank to the north west of the groin was formed in the rains of 1855 and is a type of what may be expected in a series of years. Close to the extremity of the groin the present survey shews 11 feet at low water, where prior to its construction were only six feet, this exemplifies the scouring power of the stream even on a small scale, and convinces me that had the attempt to open a mouth by means of that groin and by cutting away the sand succeeded, the groin itself would in process of time be undermined, and its materials swept away piece-meal by the ebb, when the river mouth would again move northward year after year.

Mischief done by the groins where it now is.

Argument against closing up the Goorpore mouth.

51. I would recommend that the Goorpore stream be kept as it is and that no attempt be made by stopping the present outlet, to bring it down as counterbalance to that of Buntwal, in anticipation of an increase of scouring power; for if so brought down it will inevitably bring with it all that mass of sand banks, which now dries at low tide in the backwater between the 2 streams; these banks have been deposited by the dead water where the 2 freshets meet. Unless a groin be built off the Custom House towards the west, some 200 yards, the greater force of the Buntwal stream will over power that of Goorpore and render it a difficult task to prevent the latter from taking to its old outlet the attempt to close which will of itself be difficult job. Abreast of this groin if one be built will be the river mouth, into which such a swell will roll that no boat could *round* the groin to pass from the Buntwal to the Goorpore stream, without risk of being swamped, or carried out by the freshets and wrecked on the north shore. A glance at the plan will shew how the sand off the river mouth is deposited in patches (thus forming so many blind channels) when only one stream has its outlet there. If that of Goorpore be led to the same mouth, I fear these banks will be even more spread about, and the result will be we shall have no single deep channel, but the bar will be extended over an immence area. One of the agents (and by no means an inactive one) in the formation of the bar must be the current that runs to the south along the coast in the south west monsoon, and much of the peculiar direction the sand banks take must depend upon *this*, whether its action, that of the ebb, and of the south west swell, be synchronous or not.

Rains in the latter part of monsoon scour the bar most, their effect witnessed on the bar of Sedashigur.

52. I had during the rains of 1855 an excellent opportunity of witnessing the effect of the monsoon swell at Sedashigur and convinced it is the latter rains only that we must depend on for scouring the bar; these happening in October when the sea is comparatively calm the freshets are met by no antagonistic forces. Before the middle of October the bar was one continuous breaker right across, and the fishermen said there was actually no deep water channel, but my soundings in the beginning of November shewed the channel was then better than in the season before.

Probable effect of closing the Goorpore outlet, and if works on a small scale be tried, the freshets will soon re-open it.

53. Shutting up Goorpore outlet will I fear cause the flooding of both the Buntwal and Goorpore lands, and I cannot agree in propriety of such a measure. I said in para. 51 that to close Goorpore mouth will be a difficult job, the late attempt in May 1856, failed; though it was said to have been, *very nearly* successful, I still hold to an opinion formed at that time, that even if it had succeeded then such success would only have been temporary, for early in June the freshets came down they would by impinging against the battery rocks, and by meeting with the opposing current of the Buntwal stream (as mentioned in para. 49) being at such periods higher by several feet than the usual high water level soon force themselves out at their original outlet. This is supposing that only works on a small scale be tried, for I by no means intend to say that if that outlet be *effectually* shut up, the stream will not in a measure, by counterbalancing that of Buntwal maintain the river mouth in one place (as is the case at Moolky for instance) but the combined freshes of the two rivers will bring out so much more sand, and I

fear we shall as I said before have no longer a good deep entrance, a result more to be deprecated than the mere shifting of the opening in the sand. When the Goorpore stream joined that of Buntwal (previous to an opening of its own being made to the north) the Buntwal entrance was some two miles south of where it now is, and then doubtless their co-operation tended to do good. Now that the Buntwal mouth has moved up so far north, the case is widely different, the one stream running exactly opposite to the other whereas formerly the one met the other at right angles.

Argument against shutting up the mouth of Goorpore river.

As it will cause an interruption in the communication between the two streams in the South West Monsoon.

54. Another disadvantage resulting from the closing of Goorpore is that boats wishing to communicate with large vessels which anchor so far off shore, during the prevalence of the heavy north west winds of March, April and May, will not as now, be able to avail themselves of the backwater and Goorpore mouth to get to windward and drop down up the vessel, and will be compelled to pull directly in the face of a heavy breeze. The water communication which now exists between Buntwal and Goorpore town by their two streams, will be stopped during the monsoon months if the latter mouth be closed, for the 2 streams will deposit their silt in the eddy water abreast their common mouth far out from the line of Custom House shore, and no small boat will be able to pass round the projecting point from one stream to the other without encountering the force of the monsoon swell and wind. This will be a serious impediment to Canal communication along the Coast, such boats as we require for Canals must not venture out near the sea; if they get into deep water, they will be carried out by the strong ebbs and swamped.

The little Fort by Goorpore entrance called Sultan's Battery forms a natural groin.

Proposal to allow Buntwal river to have its exit at the south side of Sultan's Battery.

55. A reference to my plan of Mangalore and Goorpore river entrances will shew what an extent of rock there is off Sultan's Battery. That little fort is built on a solid granite foundation which is some 10 feet above the level of high water, the parapet of the battery is 25 feet higher. I have colored the rocky parts a green tint to shew them more clearly and I would recommend to have the backwater south of the battery examined by boring to ascertain if more rock exist there. I think it would be best policy to let the mouth go on moving northwards year by year, until the rocks off Sultan's Battery prevent it; then will the two mouths be kept in their proper positions by a solid natural groin at no expense at all. The lands of Goorpore and Buntwal will not be flooded as to a certainty they will be if the former mouth be artificially closed. The sandy Islet now intervening between the 2 mouths is 2,600 yards or 1½ miles in length, and in places very narrow, there is but little cultivation upon it, and would not be much loss to Government whilst the removal of all trees from it would purify Mangalore town by allowing the sea breeze unimpeded to blow along the line of wharf.

Effect of a natural Groin at the Kalee Nuddy.

Similar effect expected at the Goorpore Battery.

56. Since my Survey of Sedashigur river in January 1855, its mouth has moved, as I stated before, northward to the Black Rock fronting Madhully stream, which rock forming a natural groin has prevented the entrance from moving further north, and has given a greater depth of water there, viz. 15 feet at low water, or 21 feet at high tide, we may expect the same advantageous operation at Mangalore if, as I suggest, the mouth be allowed to work itself up till it reaches Sultan's Battery rocks which acting as a groin will deflect the stream out to sea and the Goorpore river in the north side acting as a check upon it, we shall have the entrance kept permanently in one place. I do not recommend an attempt to keep the Mangalore river mouth from moving up north by any small works such as were tried in 1855, and again early in 1856, and only ended in total failure, the money (and no small sum either) being literally sunk in the stream if it be deemed essentially necessary to save that small piece of cultivated ground between the 2 mouths (and I cannot myself see what is to be gained by it) works on a large scale must be undertaken; nothing under half a lac of Rupees will do any good.

57. I am of opinion moreover that the addition of the little battery to the entrance of Mangalore will be a great point gained. It is built of very large blocks of granite fitted well into each other. The trade of Mangalore in common with that of all the West Coast ports is fast on the increase and if the river mouth be kept where it is by any works there will be no increase of anchorage room obtained; there is scarcely enough now for the few small vessels that come inside. But if, as I have above advised, the mouth be allowed to go up to Sultan's Battery, we shall gain the whole of that straight reach from the groin to the battery, a length of more than 2 miles, and the channel may be kept near either side, as most needed, by little groins on either bank, the present Light House is now too far north with respect to the river entrance. It is better situated as a land mark for an entrance near the battery. I think it may be objected that this project will cause the same impediment to continuous canal communication as that suggested in para. 54; but I am prepared with a remedy in this case which could not be so feasible in the other, because, off the present Custom House there is no so *much* (and in the event of bringing down the Goorpore stream there would be so *much more*) sand deposit. My remedy is to carry a small canal as is shewn in blue round the back of the battery rocks, a stream now exists for half the required distance which drains the town in the rainy season. The suggestion I have now made as to the best method of improving Mangalore river, and keeping its mouth permanently at one point did not occur to me whilst Colonel Arthur Cotton was with me on the West Coast, and I cannot but think it will meet with his approval.

Means of keeping up the Coast Canal communication.

Swiftness and great scouring power of Mangalore freshets.

Proposal to remove part of present Mangalore groin to opposite bank and thereby deepen the stream of the wharf.

58. There is such a vast quantity of water brought down in the rainy season by the Buntwal river, and so swift is its stream that in the month of June just passed, after heavy fall of rain, the velocity of the stream was measured by Massey's patent log from the Pownah, (moored in the river) and found to be in 24 hours no less than 77 knots or 88 statute miles. Here than is a scouring power for any works to stand against. Assuming the breadth of the stream of 88 miles at only 200 yards (and it is more) and its mean depth at 4 yards we find that 124 million cubic yards of water found there exit in one day, or upwards of 5 millions cubic yards per hour. Sand is fast accumulating in front of the Custom House, through the baneful influence of the elongated groin and landing is getting more and more inconvenient if the outer part of that groin (say a length of 500 feet) be removed and thrown down on the sand opposite it, on the spot marked G. in the Plan, so as to turn the stream over towards the Custom House wharf, we should gain deeper water there, and thus enable boats to come alongside the wharf wall at all times of tide, an advantage which was intended to be obtained when that piece of ground now constituting the Custom House wharf was gained from the river by building that wall.

59. If then the Government deem my proposal, to let the river mouth go up north to Sultan's Battery, to be worthy of consideration, I shall be happy to examine the locality of the battery to ascertain more thoroughly what amount of rock foundation there is, I anticipate that we shall find it much more extensive than what I have shewn on the Plan in green tint, and if so, so much the better, I shall not enter more into the details of this scheme, until a more thorough examination has taken place.

60. In conclusion I beg to state the number and titles of the different Charts and Plans sent with this Report.

No. 1. Canal Chart comprizing the Coast from Cape Ramas to Honore.
,, 2. Sedashigur Bay and Beitkul Cove shewing proposed harbour works.
,, 3. Beitkul Cove shewing the same on a larger scale.
,, 4. Sedashigur river or Kalee Nuddy including part of the Bay.
,, 5. Tuddree river entrance on a large scale to shew proposed works of improvements.
,, 6. Tuddree bay on a smaller scale (to be lithographed if required.)
,, 7. Mangalore river entrance, with that of Goorpore.
,, 8. North Canara, }
,, 9. Central Canara, } On a scale of about 4½ inches to 10 statute miles.
,, 10. South Canara, }

No. 11. Beypore river entrance (to be lithographed if required.)
,, 12. Ponany river entrance.

No. 53. ORDER THEREON, No. 1664; dated 1st September 1857.

Ordered that the foregoing report be forwarded to Colonel A. T. Cotton for any remarks that he may wish to offer.

(Signed) H. FORBES,
Acting Secretary to Government.

From
Lieutenant A. D. Taylor I. N.
Comg H. C. S. Vessel Pownah

To
Henry Forbes Esquire
Secretary to Government

Sir,

In forwarding the following report on the harbours and rivers of Canara, called for by Government in Extract No. 1279 of Minutes of Consultation dated 1st July 1857, I have the honor to state that since the monsoon of 1855 I have by order of the Commander in Chief of the Indian Navy been engaged on the Survey of the Canara and Malabar Coasts, which duty owing to my almost constant ill health from March to November 1856 was only completed in April last.

2. I need not repeat my former report on Sedashigur bay and the harbour of Beitkul, but I would mention that the plan for a harbour proposed by me was considered by Colonel Arthur Cotton to be of too limited a nature to meet the growing wants

of the Country. It was therefore proposed to take the whole bay between Coormagur Island and Carwar Head for a large harbour.

Sedashigur Harbour

3. This was to be effected by a Sea Breakwater of loose stone, from Carwar Head towards the Islands, about 1000 yards long, with an opening 400 feet wide at a distance of 400 yards from the Head. Another Breakwater from the point of Deoghur Island and about 500 yards long would protect the harbour against any swell from the North West, whilst the Oyster rocks would nullify the effect of any Westerly swell. There cannot be a doubt that this more comprehensive scheme would be of greater ultimate benefit. Bitkul Cove now offers shelter for small Vessels, and the construction of the above works extending over several years, the harbour would get gradually better year by year, as the produce from the interior increased.

4. But I am reminded that harbours can be too large as well as too small by the late discussion

regarding

regarding that of Bombay, where in November 1854 so many Vessels were wrecked by a gale from the Eastward. A similar warning occurred in 1837, that was neglected, but now the attention of Government and the Merchants is steadily directed to the grand object of giving more shelter to Vessels whilst loading or unloading cargo. Wet docks were proposed by Government Engineers, but such works are so liable to silt up, especially in the muddy harbour of Bombay, that it seems to me, that scheme will never be adopted. Wharf walls (running parallel I suppose to the ebb and flow of tide) are proposed by a Civil Engineer to cost the enormous sum of 89¾ lacs. Some modification of the latter project will, I think, be accepted, but will doubtless be undertaken by a joint Stock Company and not by the Indian Government. Bombay harbour is entirely open on its South side. The Ocean swell from S.S.W. rolls almost unimpeded over the space in which the Merchant Shipping lie. To the S.S.E there is

The present wants of Bombay harbour

an expanse of water 8 Miles in length, a gale blowing over this causes a heavy Swell.

Advantages of Beitkul harbour

5. Now the main desideratum of a harbour of refuge on the West coast is, that its South side should be a natural defence against the South west Swell of our Rainy season gales, and periodical hurricanes. Carwar Head is pre-eminently such. Our North west winds from March to May are but trifles to a large ship, and when the wind in a cyclone has got round to North west, the only point on which our bay is open, the centre of the Revolving Storm will have passed to the Northward; nor is the Storm wave likely to recoil upon our works from the North West.

6. I mention these things merely to point out that there is as much chance of our falling into error in forming a harbour of too great an extent, as there is of our limiting one to too small an area. I have reconsidered the subject in all its bearings, and

am

am now of opinion that my former views were too circumscribed, and that any works to be undertaken at Beitkul should be on a large Scale.

Tuddree a fine season harbour

7. We have a harbour in Tuddree (as I shall presently explain) upon which three ghauts converge and though making it a Southwest monsoon port is out of the question, yet there needs very little to make it the Centre of the Export Trade of North Canara temporarily, whilst the grander port and harbour of refuge of Beitkul is being prepared.

Objections to many small Ports on our Coast.

8. There is this to be said with regard to the advisableness of Establishing small ports in anticipation of the development of one great harbour - Viz, where once a beginning has been made, when shall we cease to add improvement to improvement upon the little ports, and when cease to cherish a rising place - Take Madras itself as an instance in point. had the Fort been built abreast of the Armegum or Pulicat shoals, we should not now be clamouring

for works to nullify the effect of the Surf, and to render landing easy; for at both those places we should have so fine a nucleus for a Sea Breakwater, that three fourths of the labor and expense now required to render Madras a safe port would have been saved, and the project would come within the easy means of either Government or a private Company - Now that so much has been expended by Merchants on warehouses and other buildings, and Madras is become a great Commercial port, it is clear that a harbour some few miles distant will never answer, but that one will have to be made here at whatever cost.

9. With these preliminary Remarks on the first essentials for a good refuge harbour, I shall proceed to state what is needed at Sedashigur. The Marine Board in their report upon my project for making Beithul a harbour of refuge, objected to the light being placed on Carwar Head, their preference being given to the Oyster rocks as the site - In a letter to the Collector of Canara dated November

26th

Lighthouse of first Class for Carwar Head and not on the Oyster Rocks

26th 1855 in continuation of my first report I stated my reasons for selecting the Head as the place where the light should be - The Collector's reply was to the effect that the advantages of the proposed harbour had been so clearly pointed out by me he thought nothing more need be said on the subject - at that time I was ordered by Sir Henry Leeke to continue the Coast Survey, and until the arrival of the Right Honorable the Governor on the Western Coast, I had been incapacitated by sickness from giving such attention to the subject as I could have wished. -

10. The following Remarks are for the most part what I wrote in the letter above alluded to; as I can at this distance of time improve upon and add to them, I propose doing so. -

11. In selecting Carwar Head as the site for a lighthouse, I took into consideration its commanding height above the Sea. It is a known fact which probably the Captains of the P. and O. Co's Steamers have noticed while passing along this coast, that during the South west

Arguments in favor of the Carwar Head as the site for a Lighthouse

West monsoon a vapoury salt spray rising to a height of some 100 feet veils the Seaboard of Western India, rendering a recognition of the features of the low land no easy task. The Oyster rocks, which I at first thought of as the place for a lighthouse, come in a measure under the influence of this mist, that is to say the rocks which project from them on their Southern and Western sides, cause the spray to rise high into the air, and I contend that a light of so little height as these Islands would afford, will be less distinguishable at 5½ Miles distance than the lofty Carwar light at 8 Miles; the greater height of the latter 650 feet, placing it above the limit of this ocean mist.

12. The Oyster rocks afford no landing place during South west gales, their margin is rock bound possessing no patch of sand on which a boat might be beached. Some and no little expense and trouble would connect the two high Islands which are about 50 yards apart, the interval filled by impassable rocks above and below water. this barrier must be some 30 feet broad and raised at least 10 feet above the water to give any shelter to leeward, but even then we may expect the ocean swell to roll round to the landing place, the cost of such a barrier would be great.

at h.w

Arguments against Oyster Rocks

13. Fresh water is to be found on them during and after the rains, but the scouring of the jungle would not be conducive to health; the transit of supplies would be difficult, and in the event of injury to the lantern or house, no native artificer could be found to brave the passage by Sea. It would not suffice that the communication with the main land should be confined only to intervals of fine weather; sickness or accidents to the people in charge would render it imperative that a large boat should be always at hand.

14. These are some and the most weighty of my reasons for giving the preference to Carwar Head as the site for a first Class

light, whose brilliancy would make it to be seen 30 Miles off from a Vessels deck.-

15. Our harbour is the nearest Sea port to the great Dharwar Cotton fields - that town itself is but 75 Miles, as the crow flies, from Sedashigur - when in my former report I wrote of developing the trade during the ensuing year (1856) I was under the impression that the road to Malapore from the Dharwar district was finished - Mr. Brice a merchant resident at the latter place has since undeceived me; the Hyga ghaut line is opened merely to a bridle path and the Nullahs are unbridged. he pointed out the immense advantage a Rail to Beithul would ensure in keeping the goods dry in transit, a point which he looks upon as an essential, as so much loss is now suffered from deterioration of goods by the rain: but surely provision against damp could be managed in the boats we would build expressly for the purpose - the Rail would cost an enormous Sum, and could not possibly complete with water Carriage -

Beithul is the nearest Port to Dharwar Cotton Country

16. The ordinary traffic roads are now nearly impassable during four, and a half months of the year, June to middle of October, and with any increase to that traffic, such as we may expect on the opening of our port, the wretched state of these roads during the rains will be a serious drawback. - There are no works commenced at Sedashigur that would render it of importance in a pecuniary point of view, to prevent their supercession by others, however more feasible - on the contrary the harbour and its approaches are as nature formed them, there is nothing to alter, before us lies an entirely new field of greatest promise - all that is requisite is to look before we leap, to see that the most advantageous scheme be selected. - If the trade of the interior is to be brought to the Sea a harbour on this coast, of easy access, sheltered from all winds, capable of receiving very large Vessels, and at one tithe of the distance from the internal resources of the Country that

the Madras or East Coast is where there are no safe harbours, would surely be preferred.—

The great advantage of a high light.

17 The above is what I wrote before to show that I had not overlooked the Oyster rocks, when considering where to place my principal light. It is a grievous mistake to place a first class light on a low hill, when not far off, there is one four times the height. Besides there is this to be said in favor of high lights, that they are visible so much further from the deck of a ship, by aid of a telescope, which is a difficult instrument to handle at the Mast head, where the motion is of course so much more violent, and footing insecure.—

Small light and a Signal Gun on Oyster Rocks.

18 I agree so far with the Marine Board that the Oyster rocks should have some land-mark on them, and I would recommend that a small white house, (to serve also as a Column for a small light) be built on them, where a few fishermen could live in the South west monsoon, keeping provisions enough for their maintenance; breaks in the weather afford occasional though not frequent opportunities of Communicating with Beithul Cove— It should be the duty of these men to burn blue lights either at stated times, (as at the Outer Light vessels in Bombay) on observing lights at sea, or hearing guns— A signal gun should be placed there— The Oyster rocks though 160 feet high, have loose granite boulders on their summit; levelling these, and making a place for signal guns would reduce the height considerably, so that a Column of 40 feet would give the light a height of 160 feet still.—

Light on Carwar visible 30 Miles. Oyster light only 18 Miles—

19 The small light on these Islets would not interfere with that on Carwar Head, which is so lofty as to be visible from the deck of any vessel at 30 Miles distance; whereas the light on the Oysters of 160 feet above the sea would be only seen in fine weather 18 miles the distance between the two is 2¼ Miles, so that the greater light would be visible for some time before

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the other, and when both are visible
that on the Head would appear
so much more exalted and brilliant.
I would wish to explain more fully
what I said — about the Last
spray of the ocean; it hangs like
vapour above the sea, and so
dims distant objects that land
200 feet high which can be seen in
clear weather 15 Miles off, is scarcely
discernible during the South west
monsoon on the West coast (even
when Rain is not falling) at half
that distance.

20. I need say no more regarding
the light house on Carwar Head, but
that breadth is what is wanted,
not height in the building — We have
the necessary altitude in the hill
itself.

21 Adverting to my former
report I would now reject the two
piers at the mouth of the Cove, but
would increase that proposed at
the point F (vide plans No 3, 2d) to a
length of 400 yards in a line due
North leaving an opening of 400 feet
wide at the water's edge — I would
Continue

Proposed Works for Bethul harbour

continue the breakwater in a line
N.N.E. as shewn on the plans No 2 & 3.
The Stone for these works could
easily be quarried from the hill and
they would give at once great security
to Beithul by increasing the anchoring
ground for large Vessels, and with
the Canal from the Kalee Nuddy
which I would have as shewn by
the blue line in No 2 Chart; (and
not as formerly suggested by the
Sinkerry Creek) the produce of the
Country above the ghauts could be
brought from the present head of
navigation, about 2 Miles above
Meilapore to the Shipping in Beithul
by the same boat.—

Canal to Join the River to the harbour

22 A Subsequent Examination
of the Sinkerry creek and of the Shoals
in its neighbourhood led me to alter the
proposed line of Canal — my new line
Commences from the deep water of
the South bank nearly opposite
Sedashegur old fort, and marked
blue on plan No 2, pursuing a nearly
due South Course to the fishing village
near Beathul — this 4400 yards or
2½ statute Miles long — with a rough
Stone

stone breakwater running along the rocky cliff by the fishing village and turning down to the South west so as to protect the Canal mouth, the water communication all the way from above Malapore to Beitkul will be perfected.-

Present roads bad in rainy season.

23 With the present means of communication between the Coast and the interior, and until by covered boats on the rivers, and by covered carriages (or perhaps lines of light rail) above and below ghaut, the goods can be carried dry to any port, it is needless to expect Merchants to avail themselves of any but the fine months, viz. October to May, for shipping goods at any port.- The rain is now our greatest drawback on the western coast.- With a Canal system it will facilitate progress.-

Lines of Canal wanted for North Canara.

24 The proximate lines of Canal to connect all our present roads from the ghaut with our harbours are shown on the accompanying plan No. 1 in blue tint; these are all that are required to connect all the rivers North of Honore with Beitkul- that there is comparatively

bat

Honore and Coomtee rivers, be an adjunct to that ghaut and form a part of the Canal system of North Canara. That the system of Canals along this Northern Canara sea-board, cannot be extended lower than Honore without a great outlay is shown by the fact that a range of hills 200 to 300 feet high, and in the lowest part not under 100 feet, projects into the sea, 3 miles South of Honore ferry.- Byndoor head and several little Capes intervening between it and Honore, projecting into the sea throw obstacles also in the way.-

Obstacle to Canal system south of Honore.

Object of deepening Tuddree entrance is to admit larger vessels to load by a pier-

36. The object of deepening Tuddree river entrance is to enable vessels to get inside to load by a pier, which process is a great saving to Merchants, but is not an absolute necessity; for Bombay, that much vaunted harbour, has not yet that accommodation, although that they appreciate the advantage of a wharf is patent in the fact that Government have had estimates laid before them for the construction of wet docks, the least sum being 12¾ lacs- whilst our Civil Engineer proposes wharf walls in preference to wet docks and states that 89¾ lacks of Rupees would be required- the deepening of Tuddree river

then

than may be looked upon as a work of Secondary importance, more demanded by the interests of Merchants than by those of Government, although of course every incentive to trade cannot but benefit the Government. I must not however omit to mention that the groin proposed will prevent the ocean swell from cutting away the point outside of Mr. Price's screw house as it now does at the first burst of the southwest monsoon, which comes up well from the south but does not last many days late in May or early in June. There will be gained that piece of ground (tinted yellow on No. 5 Plan) most valuable for a Merchant's storehouse as it has deep water close to its East side where a pier can be made.

Valuable land will be gained from the sea by the groin.

37 I have in my hand a list of 24 Vessels which were in Bombay harbour between May and October of each year, any one of which when laden could have left Taddree river as it now is. There are besides many that could load inside to a draught of 16 feet and fill up with Cargo outside. Any one of the vessels that frequent Cochin river could

Advantages of Taddree.

but little work in this undertaking will be evident at a glance. In such a tract of Country as that between the west ghauts and the sea, where for 2 or 3 months of the year the freshets come down with great violence, overflowing the banks in many places for hundreds of yards, and sometimes bearing on the surface of the water enormous trees which threaten destruction to any bridge of boats; where stone or strong wood bridges requiring great span would be most costly; in such a Country Canals are clearly the proper highways. A journey from North to South of Canara is now a tedious business, a constant shifting from palankeen or horse to Boat and back again. Canals with suitable boats will remedy all this, and enable passengers and goods to travel at one tithe of the present cost and certainly as quick. I cannot resist the temptation to state the fact that horses do not thrive in Canara during the season of the cutting land winds, neither do Bullocks thrive, there being great difficulty in getting grass for one fourth of the year.

Canals and not roads suited to the wants of Canara.

My

25. My survey of Sedashegur River or the Kalee Nuddy is herewith forwarded. It shews the river to be navigable twenty or twenty two miles up, or to about 2 Miles above Malapore, at which place my survey ended, but will be resumed when the rainy season is over. If it can be made navigable for 15 Miles more (as is most likely from all accounts) a great advantage will be gained, the importance of which I shall not overlook.

How far Kalee Nuddy is or may be open.

26. The entrance of the river has improved since my first examination in January 1855 having moved Northward until stopped by the black rock which forming a natural groin deflects stream, and will doubtless keep it in one channel henceforth. Already has this groin operated to advantage. The entrance channel has now 15 feet at low water, and 20 feet at high water, and this will admit vessels of 500 Tons in the fair season. They will be able to lie off the steep South bank, near the entrance of my proposed Canal, where a pier 100 yards long would give 20 feet of water

Effect of a groin at the Kalee Nuddy Entrance

water at its head. Another advantage is gained by the entrance of the Kalee Nuddy being kept so far North, which is that the alluvium brought down by the river freshets is, on its exit to the ocean, encountered by the South west swell and deposited to the Eastward of those rocks situated about a mile to the Northwest of the groin rock, (vide plan No. 2) which rocks are now joined to the mainland by a sand spit dry at low water. Thus is the deposit prevented from entering the Southern portion of Sedashigur bay where our harbour is to be.

Another object gained by the groin

27. There are no impediments to boat navigation up to Malapore. Nearly opposite that place the Sungawady ghaut comes down to the river on the right or North bank. On the South bank is the Kyga ghaut. These two roads when completed should bring the whole of the Southn Mahratta country cotton and other produce to Beitkul. The rains which commence in April by the Western ghauts make the roads very heavy, and do much damage to the cotton, so that

Roads that come down upon the Kalee Nuddy that *very little* arrives on the Coast, from the interior before the Southwest monsoon sets in; the greater part being kept above ghaut until the rains are over— until then a harbour be obtained, it is of little use having the roads kept in good repair during the rainy season when there is no traffic.—

28 At present the Cotton goes down by principally the Devimunny ghaut to Cutzal, on the North bank of the Tuddree river, thence instead of going by boat to Tuddree, it is carried in Carts up a hill again and then down to the **Munky** ferry about 2½ Miles from Coomta town; the Carts, Bullocks, and Cotton are then carried across the stream, a breadth of 300 yards, when the Carts being reloaded proceed onwards to Coomta.— Some Carts come down the Arbyle ghaut, but the ferry on the Gungavelly river between Sooksaul and Goondabaly, which is fordable for only 6 or 7 months of the year, is a great drawback. The Gungavelly river from this ferry to its mouth, is navigable all the year round— clearly then it should be used, and connected

to

Devimunny Ghaut

Arbyle Ghaut line of Road

how it may be improved

to the Tuddree by a Canal as represented in the Coast Chart No. 1 the details of this arrangement will be found under the head of Tuddree. An Estimate was made by the late Civil Engineer of Canara, for bridging the river by the above mentioned ferry; this bridge was to cost half or three fourths of a lac of Rupees— now I am certain the small piece of Canal which I recommend cannot cost more than a quarter of a lac—

Tuddree a fine season Port.

29 But we have a fine season port Tuddree, which is far superior to Coomta, from which most of the up country produce is now exported— with a small Canal of less than 1½ Miles length (vide letter A on No. 1 Canal Chart) the Gungavelly river can be connected with the Tuddree, and so the Arbyle be made of use during the whole year instead of only being an indifferent road for two thirds of the year as it is at present— then again the produce that is brought down the Devimunny ghaut should go no further by land than Cutzal, where it could be put on boats and sent to

Arbyle Ghaut

Tuddree

Hemmany Ghaut

Tuddree at far less cost than by the present system, which carries it up a hill 200 feet high, along its top and down again to Munkey ferry, a distance of 6 Miles; then over the ferry, which involves the operation of unloading on one side, and reloading on the other, and then a 3 Mile drive to Coomta—

Neelcoond Ghaut

The Neelcoond ghaut comes down upon the Tuddree river some Miles above Oopunputnum—the river could either be improved, or the road made along its right or North East bank to the highest point where it is now navigable above Oopunputnum, and thus the Neelcoond ghaut be brought down to Tuddree at but little expense—

Tuddree Harbour

Vessels of 400 Tons can enter

30 With these three ghauts (excellent during the fair season) coming down upon Tuddree that port ought to be the most frequented, as it is the most excellent on the Coast. It is sealed for 2½ months in the year or from middle of May to beginning of August, after which large vessels might lie outside of the river, and others of less than 400 Tons could run in and load—there is now 11 feet at low water and 18 at highest on the bar, and I have no doubt we could get upwards of 21 feet by preventing the first of the ebb-tide from running out over the sands on the West side of entrance—this I propose doing by a groin of loose stone thrown down as marked in red on the plan of Tuddree No. 5 accompanying this report. This work would cost some 10,000 Rs., which will be recovered by the additional duty that would be levied on grain and other Produce embarked in square rigged vessels from Tuddree direct—at present all this goes to Bombay in Native crafts, and there the duty is collected instead of in Canara— Before the harbour of Beitkul can possibly be ready to receive vessels, this work at Tuddree will have paid for itself over and over again—

The Bar may be deepened

Export duty Can be levied.

Tuddree

Present refuge harbour for the Native Vessels

31. Tuddree is the haven for which many native vessels steer in our periodical Cyclones, and Southerly gales, it is the next port North of Cochin, and with a light house would be a nice harbour of refuge

for the native craft; — it is 25 miles
more to windward than Sedashigur in
the abovementioned breezes, and a small
port light here, could never be mis-
taken for the lofty one which it is
proposed to place on Carwar Head,
which as I have said before should
be a first class light, like that of
Madras. With the interest of Canara
fully at heart I deem it my duty here
to record my opinion that a lighthouse
and flag staff on the highland west of
Tuddree would be of far greater ge-
neral advantage than the present
column of Coomta, which is situated
far back from the sea on a
receding part of the Coast, whereas
Tuddree point is so prominent. My long
experience of this Coast shews me
that a light is not cared for except in
bad weather on this particular part
of a coast so mountainous — I have
felt my way by night in fine
weather as the tindals of Pattamars
do by knowledge of the form and
features of the land — only in squally
weather is a light an immediate
necessity, and then Coomta is too far
back to be of use, for in bad weather
Vessels

Light at Tuddree instead of at Coomta

At what times the Lights is wanted.

Vessels must not keep in shore, but
an offing must be maintained, whence
the light would be scarcely visible. —

32. The Gungavelly is the river
down which most of the Teak Timber
for Bombay dockyard is floated —
it has a very poor entrance and con-
sequently Pattimars have mostly to
be loaded outside in the open sea, the
Timber being rafted out; these rafts
frequently break adrift, and away goes
the timber — if the small piece of Canal
to connect Gungavelly and Tuddree rivers
be first executed, this timber could be
taken on board in the quiet river of
Tuddree, and much expense thus saved
to the Government of Bombay; the Arbyle
ghauth would then be brought down, as
it were, to an excellent sea Port, and it
would then relieve the Devimunny
of a great deal of that superfluous R
Traffic which, now incessantly plying
upon it during October, November and
December so severely cuts it up. —

33. To my mind then, the works
of primary importance for North Canara
are.

1st The Gungavelly and Tuddree Canal

Canara Teak for Bombay Dockyard

Canal between Gungavelly and Tuddree

A

2dly A wharf wall and a few small improvements at Cutgal.

3dly Bringing the Neelcoond road on to the river above Oopenpatnam, where also should be a wharf.

Works of primary importance

4thly A wharf at the spot where the Arbyle ghaut comes down upon the Gungavelly.

5thly A small lighthouse on Tuddree hill.

6thly Two buoys to mark Tuddree bar, and

7thly The groin at the entrance of Tuddree river.

34. I have long been impressed with the utter inferiority of Coomta to Tuddree in every way, and have not failed to express my conviction of the same to the Authorities of Canara. The Natives say that the God or Goddess of riches (I forgot which) has taken up an abode at Coomta, but I think the first year's saving to them by adopting Tuddree would prove that their deity has also a country seat there. Indeed the famous temples of Gokurn are within half an hour's walk of Tuddree. A little was done

Tuddree Harbour better than the Coomta Roadstead

for

for Coomta at first. Trade gradually increased, and the cry was ("What more shall we do for the place's benefit?") now people say, "It is getting on so well, we cannot neglect it even in favor of a better, something more must be done for Coomta" And thus is the original mistake perpetuated, instead of the inferior port being at an early stage of its existence superseded by the better one of Tuddree. I have not the least doubt that Tuddree bar may be much improved by the means I have above recommended in para 30, and at a very small sacrifice of money. At indeed one tithe of what is intended to be spent on the Coomta Canal, which work, the very Inhabitants of that place (for whose benefit the Canal is said to be contemplated) deprecate as a waste of money without commensurate advantages.

35. This canal between Coomta and Tuddree has been, I understand, sanctioned, but it seems the general opinion of the natives that if any toll be levied on it, the old ways of conveying goods

to Coomta as explained in Para 29 will be maintained – That Coomta (a wretched little port from which the native craft fly, on the approach of a gale, to Tuddree) should ever have been allowed to supersede the latter fine port is greatly to be deprecated. A Lighthouse has been built at Coomta but being not on the proper site is not of any use in making the port from the North. The Devimunny and Neelcoony ghauts both are interrupted by the Tuddree river, which seems to invite the Traffic on to its stream to Tuddree – will then the Native Merchants, who are so knowing in money matters carry their merchandize to Coomta to ship it in an open roadstead when they can take it with less trouble and no Tolls to pay, to Tuddree; and there ship it from the pier that is about to be built at that place; the canal must be free to boats passing, otherwise it will not be used. For one fourth the sum it is estimated to cost, we could make a lighthouse on Tuddree point and the Tuddree more accessible for 9 months of the year to Vessels of 600 Tons – Doubtless at some remote period when the Gairsipa ghaut is opened, the canal may, in connection with others connecting the

Honore

Canal between Tuddree and Coomta not open [illegible]

Disadvantages of Coomta

could with greater ease enter and depart from Tuddree, where the bar is quite + smooth during the fine season – the west point of land (on which I propose to place a light marked on the charts No. 1 and 5) so completely breaks the swell of the North west winds, which are the only breezes that during the fine season last long enough to produce any swell that is troublesome to vessels on this coast – In these North west winds Coomta is an open and exposed roadstead, and I have heard many complaints of the cotton and other goods getting wet alongside native crafts. I believe the Merchants allow about 2 per cent for the deterioration and loss of Cotton in shipping and transit to Bombay from the Coast.

Tuddree not open throughout the year, but made use of by Native Vessels in gales of wind.

38. Tuddree is the Port to which the attention of the Merchants is now turned, 2 or 3 Screws are now ready to press the cotton bales, and Vessels of 300 or 400 Tons will be able to load from a pier and sail direct to England. Tuddree is however as I said before merely a fair season port, it is sealed from the middle of May till the beginning of August, but for 9 months of the year can be made the centre of a great trade and is

the next port North of Cochin wherein Native Craft seek shelter during gales of wind— In the cyclone which committed such havoc in Bombay on November 1st 1854 and which was felt all along the Malabar and Canara Coasts nearly 30 Pattemars put into Tuddree for Shelter, and at the early setting in of the monsoon of 1856 many took advantage of it likewise.. It is well known that loading vessels from a wharf or jetty is far cheaper and more expeditious than the method pursued at Coomta of loading by means of many small boats— The jetty constructed by Mr. Price at Tuddree, has, I am assured in half a year paid its cost by saving boat hire— In the face of this fact can it be expected that Coomta will continue to hold up its head before the rising importance of Tuddree, an open roadstead (from which vessels have to fly on the appearance of a gale) before a safe and commodious harbour.— Cotton will have to be landed at Tuddree, as it has to be pressed, but linseed and other seeds can be packed and weighed at Cutgal, placed in a boat, and sent

directly

Saving in loading from a pier or jetty

directly alongside the Merchants vessels, either in Tuddree river, or outside; here then is another source of saving to the Merchants.—

Gain in shipping direct from the Coast

39. I am assured that the value of Seeds exported from Coomta and Tuddree, in the official years 1855 and 1856 was 40,000 Rupees, whilst in 1856 to 1857 it was 80,000 and still increasing.. I append a Memo given me by the Firm of Price & Co. to shew what saving is effected by shipping Cotton and Seeds from Tuddree direct in English bottoms, instead of transporting it as is now the Custom to Bombay where it is shipped and the duty levied..

		Rs. As. P.
Cotton American Value 100 Rupees per Bombay Candy of 7 cwt.	Freight to Bombay.	1 „ 8 „ 0
	Marine Insurance	0 „ 12 „ 0
	Extra Landing in Bombay	0 „ 12 „ 0
	Bombay Agents Commn.	1 „ 0 „ 0
	Interest of money for 1 month @ 3/4 p. cent	0 „ 12 „ 0
	(Nearly 5 per cent) saving -----	4 „ 12 „ [illegible]
Linseed at Rs. 4 per Cwt.	Freight to Bombay	50 Reas.
	Insurance	4 „
	Landing & Shipping in Bombay	50 „
	Interest 1 month	4 „
	About 6 per cent saving...	108 Reas.

This

40. This is the saving to the Merchants and it is independent of loss by deterioration and pilfering which cargo has to undergo on its passage to Bombay in native vessels and on being landed there - this is sufficient inducement indeed to attract many to these parts. In the latter end of last year Messrs. Brice & Co. wanted to charter a vessel to load at Tuddree but the demand for Tonnage which the Persian war created made freight too high - however, the principal objections to going there made by Masters of Merchant vessels were, that there was no Magistrate at Tuddree and that they had no correct Charts of the Coast - If as above suggested by me Tuddree be made the head quarters of the Timber Agency, the first of these difficulties would vanish; the second will soon be removed by the Publication of the Coast Charts, copies of which, from Cape Ramas in the Goa territory to Mount Dilly in Malabar, I have now the honor to forward together with one of Tuddree river entrance.

Charts of Tuddree wanted

There

Canals auter to the south of Canara

41. There is another argument so much in favor of water communication in Canara - It is this, the native Cart men are so loath to go a few miles beyond their own villages, that they look upon it as a great favor being discharged as soon as possible; thus frequently have Goods to be shifted from Cart to Cart during their progress - so at the Munky ferry, each cart has to be unloaded, and a reloading takes place on the other side of the river - All this is avoided by the Cheaper and quicker method of transport by Boats - The Arbyle ghaut comes down upon the Gungavally, or Baidle river about 2 Miles below the Village of Arbyle and if the river were navigable from this place to the Canal, which is propos to join it with Tuddree - a great point would be gained, there would be so much less (some 20 Miles) roadway to keep in repair. If the Kalee Nuddy were made navigable from Taree Malapore, or Barbull, 15 Miles above Malapore to its mouth, there seems every probability that a line of road could be made from either of

Gungavally River to be made navigable -

The Kalee Nuddy to be made navigable higher up those places to Gurrus between Idda-goonjee and Yellapore. - If so, there would be so many miles less of road (some 15) to make and keep in repair - these are important points and I propose examining these two river so soon as the season permits me to resume work. -

42 I have already surveyed the Kalee Nuddy as high up as Malapore as will be seen by the accompanying Chart No. 4 which demonstrates that the navigation so far is excellent; there is said to be a small barrier some 2 or 3 miles above Malapore, but I fully expect it will fade into insignificance on a careful inspection. - I shall endeavour to get through the survey of this river from Malapore to Kaneall as quickly as possible, for I understand that the Kyga ghaut is to be proceeded with at once - now if the river be navigable, or may without difficulty be made navigable higher up than Kyga, it will clearly be a mistake to carry that ghaut so low down

A better line than the Kyga Ghaut may perhaps be found. -

down the river. The hurrying on of the Kyga ghaut will not accelerate the development of Sedashegur, for until the harbour is formed we cannot expect ships to go there. They may at once go to Tuddree in the fine season indeed I fully expect several will load there before the close of this year. -

Kyga Ghaut

43 I learn from Messrs Rice & Co that it would be absolutely necessary, in case of half the transit of goods from above ghaut to the coast being by land, and half by water that Merchants should have an office and warehouse at the place of shipment; Goods having to be weighed and taken care of in shipping from Carts to Boats. - Here then is another point we must not neglect - viz that the locality for such office be healthy. - I shall bear this in mind during my examination of the rivers; Cutgal, on the Tuddree river already adopted as a halfway house by the above enterprising Firm, is decidedly well chosen. - I have visited the river above the last named place a little higher than Gopeegutmum, and

Halfway house between Ghauts and the Coast. -

and found no impediment to regular water Communication, so far - The Maps of the Great Indian Atlas represent a Road running along the Right bank of this river to the Neelcond road - It is evident then that we shall not need an entirely new line of road to Connect that ghaut with Tuddree river as proposed in para 29, but only a few Repairs to an old road.

Road from the Neelcond to Tuddree

44 I cannot think of any point that has been omitted in demonstrating the great value some years hence of a grand refuge harbour and Commercial port at Sedashegur, and the present advantages possessed by the little port of Tuddree - As charts of the whole Canara Coast may be useful to Government, I have the honor to forward them, they are in three sheets marked respectively Northern, Central, and Southern Canara.

Charts of Canara

45 Honore river is navigable by small boats for 20 Miles from its mouth, up to the old Town of Gairsoppa, where there is a good ghaut road passing by the falls of Gairsoppa to the Mysore Country. I cannot see that any improvement is needed on this river, The

Honore River

The entrance is indifferent, but nothing need be done to that as Canal Communication will subsequently connect the river with the great harbour to the North shewn in the Canal Chart No. 1. - I have before stated in Para 35, that difficulties (not insuperable however, but to be overcome by Engineering skill) exist in the way of Continuing a Coast Canal Southward. The space of seaboard from Honore to Byndoor abounds with little Capes projecting into the sea, there may be low level ground at the back of these, but it has not been Examined beyond - Below Byndoor again and as far South as I have surveyed every facility for a Continuous Coast Canal Exists.

Coast Canal below Honore.

46. Coondapore, a place of very considerable trade is situated just to the south of all that rocky foul ground in the South of Hog and Pigeon islands where rocks ← a few feet above water and in some places just under water lie so far as 3 to 3½ nautical miles from the mainland in 7 fathoms of water. I have not yet Examined the Coondapore river inside, but this is said to be navigable for small boats for some distance from its entrance both towards the

Coondapore

the Coolloor and the Agoombee ghauts, where the 2 ghauts come down upon the river. Here again therefore we have water communication and no roads are needed entailing unnecessary expense upon the Country — A small port Light at Coondapore would be very useful to the native shipping; no part of the whole Coast of Canara is so dangerous at night as that between Hog island and Molky rocks on account of the many rocks at so great a distance from the shore —

A Small Port light for Coondapore

47 Between Coondapore and Mangalore and to the South of the latter port to Malabar there is every facility for a Coast Canal, the backwaters running in numerous instances parallel to the Coast for several Miles, few and short Cuttings are all that are needed to perfect the system of water Communication for hundreds of Miles — The Chart of Canara will give a tolerably good general idea of what is wanted for the Country.

Coast Canal already half made by nature

48 I now proceed to lay before you a few remarks on Mangalore shewing what has been done and what suggested by others, and finally what is my own proposal for the improvement of that port at the least possible outlay; so that the river entrance may be permanently kept at one spot and consequently be rendered deeper and more accessible.

Mangalore. River Entrance.

My first examination of the river entrance took place in April 1855. Copy of this was furnished to the Civil Engineer of Canara who during the monsoon of that year was engaged in operations contemplated to prevent the river mouth from moving up Northward; these operations were unsuccessful — A second survey taken after that rainy season shewed that notwithstanding the impediments to the cutting action of the ocean swell and ebb tides when augmented by the freshets that the laterite battery on the North side of the entrance was expected to afford a strip of nearly 100 yards in breadth and 300 in length including about 2/3 of the battery itself was swept away. On the South side of the entrance what was in April of that year a projecting point always above water was after the rains a spit, which scarcely

How the North point has been cut away since the year 1855.

scarcely dried at low water the main body of the point was removed from 200 to 300 yards to the South west.—

The River mouth is moving up Northwards

49 My latest survey in November 1856 is represented on the plan No. 7 in lake whilst in black is shewn the Contour of the sand in January of the same year— Much of the North point was cut away in the rainy season of 1856 and with it went the last remains of the Battery. In November of last year I found a depth of 25 feet water over the site of that battery, A startling proof of what a scouring current we have to deal with— I feel confident that if left to itself the river will find its way out by the Goorpore mouth in ten (10) years much of the Buntwall stream goes out of the Goorpoor mouth and this year my officers report that this has occurred more than formerly— To prevent the river mouth from thus moving Northwards year by year is an important consideration— It was my opinion that such a result could be attained, though not without a heavy outlay by a substantial revetment from the vicinity of the Custom house in a right line or in a gentle curve to the North sand, until where it bends round to the Seashore; but a work of this sort would be very costly as it must of course have a deep foundation to withstand the scouring action of the current upon the stones which unless protected by a facing of piles and wales, would be picked out in detail and swept away by the stream.—

How to prevent that and to keep it in one spot.

50. The Ocean swell is the most active agent in cutting away the North point; the sand is broken up by it, the trees shaken in their foundations, and the ebb tides carry them away; Sheet piling of cocoanut trees, deeply sunk, and backed up by stones would protect the Seashore of this North point, and when the sand is no longer removed year by year from that locality, we may expect the Southerly current to carry with it much of what is now deposited near the Bar.— By such a revetment as above described we should gain a long wharf facing, where + pattamars

pattemars may load and discharge cargoes under cranes, an immense advantage for the native shipping. The whole space before the Custom House is fast filling up, and the groin if allowed to remain will accelerate that process, the little bank to the North west of the groin was formed in the Rains of 1855 and is a type of what may be expected in a series of years.— Close to the extremity of the groin the present survey shews 11 feet at low water, where prior to its construction were only six feet— this exemplifies the scouring power of the stream even on a small scale, and convinces me that had the attempt to open a mouth by means of that groin and by cutting away the sand succeeded, the groin itself would in process of time be undermined, and its materials swept away piecemeal by the ebb, when the river mouth would again move Northward year after year.—

Mischief done by the groin where it now is.—

57. I ~~would~~ recommend ~~that~~ the Goorpoor stream be kept as it is and that no attempt be made by

stopping

Argument against closing of the Goorpoor mouth.—

stopping the present outlet, to bring it down as counterbalance to that of Buntwal, in anticipation of an increase of scouring power; for if so brought down it will inevitably bring with it all that mass of sand banks, which now dries at low tide in the backwater between the 2 streams; these banks have been deposited by the dead water where the 2 freshets meet.— Unless a groin be built off the Custom House towards the west some 200 yards, the greater force of the Buntwal stream will overpower that of Goorpoor and render it a difficult task to prevent the latter from taking to its old outlet the attempt to close which will of itself be a difficult job.— Abreast of this groin if one be built will be the river mouth, into which such a swell will roll that no boat could round the groin to pass from the Buntwal to the Goorpoor stream, without risk of being swamped, or carried out by the freshets and wrecked on the North Shore.— A glance at the plan will shew how the sand off the river mouth is deposited in patches (thus forming so many blind channels) when only one stream has its outlet there.—

If that of Goorpoor be led to the same mouth, I fear these banks will be even more spread about, and the result will be we shall have no single deep channel, but the bar will be extended over an immense area. One of the agents (and by no means an inactive one) in the formation of the bar must be the currents that runs to the South along the coast in the South West monsoon, and much of the peculiar direction the sand banks take must depend upon *this*, whether its action, that of the ebb, and of the South west swell, be synchronous or not.-

Rains in the latter part of monsoon scour the bar most, their effect witnessed on the bar of Sedashigur.

52. I had during the rains of 1855 an excellent opportunity of witnessing the effect of the monsoon swell at Sedashigur and am convinced it is the latter rains only that we must depend on for scouring the bar; these happening in October when the sea is comparatively calm the freshets are met by no antagonistic forces.- Before the middle of October there was one continuous breaker right across, and the fishermen said there was actually no deep water channel, but my soundings in the beginning of November shewed the channel was then better than in the season before.-

Probable effect of closing the Goorpore outlet, and if works on a small scale be tried, the freshets will soon re-open it.

53. Shutting up Goorpoor outlet will I fear cause the flooding of both the Buntwal and Goorpoor lands, and I cannot agree in propriety of such a measure. I said in para 51 that to close Goorpoor mouth will be a difficult job, the late attempt in May 1856, failed; though it was said to have been, *very nearly* successful, I still hold to an opinion formed at that time, that even if it had succeeded then such success would only have been temporary, for early in June when the freshets came, they would by impinging against the battery rocks, and by meeting with the opposing currents of the Buntwal stream (as mentioned in para 49) being at such periods higher by several feet than the usual high water level soon force themselves out at their original outlet.- This is supposing that only works on a small scale be tried, for I by no means intend to say that if that outlet be *effectually* shut up, the stream will not in a measure, by counterbalancing that of Buntwal maintain the river mouth in one

place (as is the case at Moolky for instance) but the combined freshes of the two Rivers will bring out so much more sand, and I fear we shall as I said before have no longer a good deep entrance, a result more to be deprecated than the mere shifting of the opening in the sand.— When the Goorpoor stream joined that of Buntwal (previous to an opening of its own being made to the North) the Buntwal entrance was some two miles South of where it now is, and then doubtless their co-operation tended to do good.— Now that the Buntwal mouth has moved up so far North, the case is widely different, the one stream running exactly opposite to the other whereas formerly the one met the other at right angles—

Arguments against shutting up the Mouth of Goorpoor River

54 Another disadvantage resulting from the closing of Goorpoor is that boats wishing to communicate with large vessels which anchor so far off Shore, during the prevalence of the heavy North west winds of March, April and May, will not as now, be able to avail themselves of the backwater and Goorpoor mouth to get to windward and drop down upon the vessel, and will be compelled to pull directly in the face of a heavy breeze. The water communication which now exists between Buntwall and Goorpoor town by their two streams, will be stopped during the monsoon months if the latter mouth be closed, for the 2 streams will deposit their silt in the eddy water abreast their common mouth far out from the line of Custom house shore, and no small boat will be able to pass round the projecting point from one stream to the other without encountering the force of the monsoon swell and wind.— This will be a serious impediment to Canal communication along the Coast, such boats as we require for canals must not venture out near the sea; if they get into deep water they will be carried out by the strong ebbs and swamped.—

As this will cause an interruption in the Communication between the two stream in the Southwest monsoon.

55. A reference to my plan of Mangalore and Goorpoor river entrance will show what an extent of rock there is off Custom Battery— That little fort is built on a solid granite foundation which

The little Fort by Goorpoor

Entrance called Sultan's Battery forms a natural groin

which is some 10 feet above the level of high water— the parapet of the battery is 25 feet higher. I have colored the rocky parts a green tint to shew them more clearly and I would recommend to have the backwater South of the battery examined by boring to ascertain if more rock exist there.— I think it would be best policy to let the mouth go on moving Northwards year by year, until the rocks off Sultan's Battery prevent it; then will the two mouths be kept in their proper positions by a solid natural groin at no expense at all.—

Proposal to allow Buntwall river to have its exit at the South side of Sultan's Battery.

The lands of Goorpoor and Buntwall will not be flooded as to a certainty they will be if the former mouth be Artificially Closed.— The sandy Islet now intervening between the 2 mouths is 2600 yards or 1½ Miles in length, and in places very narrow, there is but little cultivation upon it, and would not be much loss to Government whilst the removal of all trees from it would purify Mangalore town by allowing the sea breeze unimpeded to blow along the line of shore.—

Effect of a natural groin at the Kalee Nuddy—

56. Since my Survey of Sedashigur river in January 1855 its mouth has moved, as I stated before, Northward to the black rock fronting Madhully Stream, which rock forming a natural groin has prevented the entrance from moving further North, and has given a greater depth of water there, viz.t 15 feet at low water, or 21 feet at high tide— we may expect the same advantageous operation at Mangalore if, as I suggest, the mouth be allowed to work itself up till it reaches Sultan's Battery rocks— which acting as a groin will deflect the stream out to sea and the Goorpoor river in the North side acting as a check upon it, we shall have the entrance kept permanently in one place.—

Similar effect expected at the Goorpoor Battery

I do not recommend an attempt to keep the Mangalore river mouth from moving up North by any small works such as were tried in 1855 and again early in 1856, and only ended in a total failure, the money (and no small sum either) being literally sunk in the stream— if it be deemed essentially necessary to save that small piece of cultivated ground between the 2 mouths (and I cannot myself see what is to be gained by it) works on a large scale must be undertaken; nothing under half a lac of Rupees will do any good.—

57 I am of opinion moreover that the addition of the little battery to the entrance of Mangalore will be a great point gained. It is built of very large blocks of granite fitted well into each other,- The trade of Mangalore in common with that of all the West Coast ports is fast on the increase and if the river mouth be kept where it is by any works there will be no increase of anchorage room obtained; there is scarcely enough now for the few small vessels that come inside. But if, as I have above advised, the mouth be allowed to go up to Sultan's battery, we shall gain the whole of that straight reach from the groin to the battery, a length of more than 2 Miles, and the channel may be kept near either side, as most needed, by little groins on either bank, the present Light house is now too far North with respect to the river entrance. It is better situated as a land mark for an entrance near the battery - I think it may be objected that this project will cause the same impediment to continuous Canal Communication as that suggested in para 54; but I am prepared with a remedy

Means of Keeping up the Coast Canal Communication-

remedy in this case which would not be feasible in the other, because, off the present Custom house there is now so much (and in the event of bringing down the Goorpoor stream there would be so much more) sand deposit.- My remedy is to carry a small Canal as is shewn in blue round the back of the battery rocks, a stream now exists for half the required distance which drains the Town in the rainy season. The suggestion I have now made as to the best method of improving Mangalore river, and keeping its mouth permanently at one point did not occur to me whilst Colonel Arthur Cotton was with me on the West Coast, and I cannot but think it will meet with his approval-

Swiftness and great scouring power of Mangalore freshets

58 There is such a vast quantity of water brought down in the rainy season by the Buntwal river, and so swift is its stream that in the month of June just passed, after a heavy fall of rain, the velocity of the stream was measured by Massey's patent log from the Pronah, (moored in the river) and found to be in 24 hours no less than 77 knots or 88 Statute miles

Here

How then is a security power for any works to stand against. Assuming the breadth of the Stream of 80 Miles at only 200 yards (and it is more) and its mean depth at 11 yards we find that 124 million Cubic yards of water found there exit in one day, or upwards of 5 Millions Cubic Yards per hour. Sand is fast accumulating in front of the Custom House, through the baneful influence of the elongated groin and landing is getting more and more inconvenient. If the outer part of that groin (say a length of 500 feet) be removed and thrown down on the Sand opposite it, on the Spot marked A in the Plan, so as to turn the stream over towards the Custom house wharf, we should gain deeper water there, and thus enable boats to come alongside the wharf wall at all times of tide, an advantage which was intended to be obtained when that piece of ground now constituting the Custom house wharf was gained from the river by building that wall.

Proposal to Remove part of present Mangalore groin to opposite bank and thereby deepen the stream of the warf.

59 If then the Government deem my proposal, to [illegible] river mouth go up north to Sultans battery, to be worthy of Consideration I shall be happy to examine the locality of the battery to ascertain more thoroughly what amount of rock foundation there is. I anticipate that we shall find it much more extensive than what I have shewn on the plan in green tint, and if so, so much the better. I shall not enter more into the details of this scheme, until a more thorough examination has taken place.

60. In Conclusion I beg to state the number and titles of the different charts and plans sent with this report.

No. 1 General Chart Comprising the Coast from Cape Ramas to Honore.
" 2 Sedashigur bay and Baitkul Cove shewing proposed harbour works.
" 3 Baitkul Cove shewing the same on a larger scale.
" 4 Sedashigur River or Kalee Nuddy including part of the Bay.
" 5 Tuddree River entrance on a large scale to shew proposed works of improvements.
" 6 Tuddree Bay on a smaller scale (to be Lithographed if Required)
" 7 Mangalore river entrance, with that of Goorpur.

North

No. 8 North Canara } On a scale of
" 9 Central Canara } about 1½ inches
" 10 South Canara } to 10 Statute Miles.
" 11 Beypore River entrance. (To be Lithographed if required)
" 12 Ponany River entrance.

I have the honor to be
Sir
Your most Obedient Servant

A. D. Taylor
Lieut. I.N.
Comd. H.C.S.V. Pownah

Madras,
July 27th 1857.

in 7th Lets 15/ No 9

Copy in a Letter to ...
d/ 10 April 1858 ...

R

Copy to Govt. of India –
11 March 1858
No. 435 –
Do. Govt. of Bombay
10 June /58 –
No. 1093 –

368/70

Public Works 1857 Depart.t
Cons: 1st September

No. 1598

From Lieut. A. D. Taylor
I. N. Comg. H. C. S.
Vessel Pownah.

D/ 27 July &
Recd. 8th Augt. /57.
Enclosures 12 –

Forwarding a Report on the Harbours & Rivers of Canara, and stating that upon re-considering his Report on the Harbour of Beitkul, he is now of opinion, that his former views were too circumscribed, & that any Works to be undertaken at Beitkul, should be on a large scale; with observations & suggestions on certain neighboring Ports & Outlets.

From Colonel A. T. Cotton d/ 4th March 1858 C. No. 475 in 1st June No. 55-56

From Mess A. Brier Co 20 October 1858 C. No. 2553 ... Enc: 16 Nov /58

With an order No. 1664 1st ...

C No. 1664.

Ordered that the foregoing report be forwarded to Colonel A. T. Cotton for any remarks that he may wish to offer.

Fort St. George
1st Septr. 1857

Copy to Colt. A. Cotton with 13 Enclosures ...

5 No. 52853

19th Augt. R24th