(1) Number of pages 32

(2) Date of repair April 88

(3) Initials of the Referencer Cns

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W.D. DEPARTMENT

G.O. No. / B.P. No.	2719 W.	Press. / Mis.
Dated	14.10.1887	~~198~~ .

Not to be folded or roughly handled.

Archives —I 10,006-9 88

14th October 1887, No. 2719 W., Public Works.

2719/1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following papers :—

Proceedings of the Madras Government in the Marine Department, dated 5th September 1887, No. 395, Marine.

From the Port Officer, Madras, to the Chief Secretary to Government, dated 15th July 1887, No. 6349.

Abstract.—Recommending for sanction an estimate for repairing the groyne works at Cochin at a cost of Rs. 4,610.

From the Secretary to Government, Public Works Department, to the Chief Secretary to Government, dated 22nd August 1887, No. 464 D.

Abstract.—Recommending for sanction the plans and estimates prepared in accordance with the Chief Engineer's instructions.

Order—dated 5th September 1887, No. 395, Marine.

The estimate is sanctioned from Port Funds.

(True Extract.)

(Signed) H. E. STOKES,
Ag. Chief Secretary.

Order—dated 14th October 1887, No. 2719 W., Public Works.

Communicated to the Superintending Engineer, IV Circle, and the Examiner of Public Works Accounts.

2. The question of providing funds, as shown in the margin, will be considered in the Financial Department.

3. The sanction accorded in the Marine Department has been registered as Excluded Local, No. 27 W. of 1887-88, and classified as Miscellaneous Public Improvements, Repairs.

	RS.
Works	4,610
Establishment	1,061
Tools and Plant	69
Total ...	5,740

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, IV Circle, with eight enclosures.
" Examiner, Public Works Accounts, with the duplicate abstract estimate.
" Marine Department.
" Financial "

Exd. L. Passaigne. E. J.
Spare Copies

used instead, the greatest weight likely to be shipped being a horse in a horse box. Proceeded on to—

Mangalore and anchored at 7-30 P.M. At daylight on 26th landed at the Ullal mouth, and was agreeably surprised to find more water in the space leading to the Custom House than I have ever seen before. The boat, in which I landed, at low water came up to ten feet of the steps, whereas 200 feet of mud extended all along this portion of the port on my former visit. It seems as if nature was disposed to renew the former favorable conditions of Mangalore with reference to native coasters, without artificial assistance, and really I do not think any judgment of ours could direct engineering help in a direction likely to ensure permanent good effects. To project the two river mouths, and make a dock between them, would most certainly project the whole bar and sand action further out to sea, and make it worse than it is at present for the larger portion of the trade. I am satisfied that nature had better be left to herself for sometime longer.

Lighthouse—Everything connected with it and the lamps are in good order, but the same effect of the monsoon is observable as at other West Coast ports. A small sum should be sanctioned for painting, cleaning and repairing every year, the work to be carried out as soon as the wet season is over. The lightning conductor has to be looked after, but estimate is already prepared.

Left Mangalore on the same morning, and at noon on 27th was off Ponáni. There were eleven large pattimars in the roads, and two laid up inside the river. At 5-30 anchored off the Government steps at—

Cochin, and went on shore. There were no ships in the inner harbour. Two sailing vessels were in the roads. On the 28th, at daylight, visited the Cruz Milagre gap. In spite of the various scares that reach Madras from time to time regarding this dam, it bears a quite unaltered appearance to my former visits, and looks as strong and satisfactory as could be wished. Some little adaptations suggested themselves to the Chief Engineer, and money and stone are ready to carry them out. The sand strip on the coast line, which confines the lagoon, is being planted with cocoanut trees and screw pine. The reclamations of land are going on with dangerous rapidity, owing to which the deep-water basin of the back-water is being much curtailed, and it will be very likely that nature will seek some other opening for the freshes to relieve Cochin, in which case, if it occurs near Alleppy, either naturally or by engineering assistance, the bar of Cochin will be raised, and its harbour facilities much reduced. The lighthouse and lamps are in good order.

The Government jetty has been renovated. The only things that can be improved are the boat-house to shelter the boats in the monsoon, which is sadly out of order, and a store-room constructed in the Marine office for oil and sundry stores. These two small works should be attended to.

Steamed out of Cochin at noon, and found 15 feet least depth on the bar, low water. Landed at—

Muttum at noon 29th, and found lighthouse and lamps and everything connected with it in good order. The roof of the new bungalow leaks in strong, windy rains, the rain being driven under the tiles. Attempts are in hand to remedy this. The sea being very smooth, no breakers were observable on the Crocodile rocks. The question of a red sector to indicate the exact line of direction from the light to the rock is under consideration, owing to the fact of a vessel having lately struck on the rock—the only instance on record, so far as I can discover. A special report on this subject is preparing.

Tuticorin.—Anchored at this port at 1 P.M. on 30th January. Inspected the Hare Island lighthouse and found everything satisfactory. Left for—

Pámban, steaming up to the Pámban light, which showed very dim and unsatisfactory, bearing north. On an inspection of the same, several small alterations as to the colour of the paint were made, and as it seemed to me that the light was not exactly in the plane of the prism, I caused an inch-and-a-half to be cut off the block on which the lamp stands. On leaving Pámban, a very marked improvement was observed in the light, probably owing partly to this alteration and the fact of

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our presence and the extra attention it compelled. The Port officer is directed to furnish reports on this light, and take great pains to secure the keeper's attention. The column is in good order.

At day-break on 31st steamed through the Pámban passage. I pointed out to the Chief Engineer the shoal line, $3\frac{3}{4}$ to $3\frac{1}{2}$, from Shingle islet to the main body of the island. This must be canalled; a mere passage dredged through the sand would soon be filled up again, owing to the strong currents charged heavily with sand. On landing at Pámban, we visited the trial pits ordered by the Madras Government some years ago, and thence to Rámesvaram. It is worthy of mention in connection with the new canal that Mr. Lindsly, who recently inspected the situation, informed Mr. James, the Port officer, that a breakwater would be run between the Shingle islet and the obelisk. This, with any similar works, would seriously increase the tendency of the passage to silt up, and would necessitate some action of Government to compel attention to the Company's agreement not to injure the present pass.

Point Calimere.—At daybreak on 1st February, passed between it and the great reef which extends from this to 30 miles below Point Pedro. We carried less than 3 fathoms water in the passage, but possibly to the eastward a foot or two more might be found. It is reasonable to suppose that the new Canal Company may contemplate placing a light here, and making a passage of a canal or a dredged pass out and in from Palk's Bay and the open sea. This will be a work of which it is impossible to overrate the difficulties; they are more of a technical marine nature than a simple engineering action. If a canal is formed, the sand-laden currents will at some seasons run up and down it, and bars form at either end. If a dredged passage only is attempted, it will soon silt up.

If the passage is set aside on account of these difficulties, the only other which can be relied on will be 30 miles south of Point Pedro, which will increase the distance from Colombo to one even greater than round the Basses and Dondra head. I note that the Company profess to have received reliable opinions from P. and O. captains and B. I. S. N. officers, and a very favorable one from Sir John Coode, but neither that eminent engineer nor the officers in question have visited the spot, and have only a chart of great antiquity to guide them. I cannot accept their confidence. The simple cut through Rámesvaram island is easy, but maritime dangers, delay and expense attend all the other features of the design.

Negapatam.—Arrived here on 1st February, and inspected the lighthouse and lamps, all in good order. There is no plan for river improvement ripe yet for professional judgment. The dredge is not ready. The return from Cocanada of Mr. Cockburn, the officer sent from England to look after the dredges, is awaited. Left this port, and, passing Karikal, Nagore, Tranquebar, and Cuddalore, anchored off—

Pondicherry on 2nd February. Inspected the lighthouse, which is now fitted with a new French light, which is certainly very superior to our 4th-order class, and which the Port officer told me only cost (134) one hundred and thirty-four pounds sterling—a startling difference between Chance Brothers and the French. Started from that port on the same morning, and after half-an-hour steaming, the after-boiler leaked very badly; in fact, the water soon ran out, and fires had to be drawn instantly. The vessel went on very fairly with one boiler, and arrived at 10 P.M. at—

Madras.—Mr. Massey went on board, and carefully inspected the boilers, &c. He found the combustion chamber badly burnt, two holes in one plate, and evident signs of former repairs to it, of which I have never heard, and which must have been made before the purchase of the boat by the Secretary of State. This present injury has been caused by carelessness on the part of some one of the engineers who have had charge of her. Such repairs could never have been executed since the boat has been in my hands, and no bills for such work have ever come in. Ten or twelve days the least that can be reckoned on for repair.

Owing to the break-down of the Steamer "Madras," an agreement was made with the British India Steam Navigation Company for passages being provided for the inspection party by their steamers to the Northern ports and back to Madras for a lump sum of Rs. (5,000) five thousand. Left Madras by the Steamer *Asia* on the 10th

February, and passed the *Pulicat* lighthouse, which was seen very clear, no casuarina being near, and anchored at—

Masulipatam on the 11th February. The Port officer did not call on board, and the vessel proceeded on her voyage at 5 P.M. At daylight on 12th February anchored at—

Cocanada.—Mr. Baker, the Port officer, met us in the S. S. "Arthur Cotton," and we went to Vakalapudi, landing at that place in a fishing boat. The lighthouse was inspected, and found in good order. The lightkeepers' huts want renewing. Four iron lightning conductors should be removed, a copper one being substituted.

Steamed in to Cocanada. The Marine Villa was found in very good order, except the roof leaks, which have not been attended to yet. The shears are repaired, and quite equal to taking boilers out of the Steamer "Madras." It was found that the committee of the groyne improvement works have grown weary of the tedious nature of the same, and wish it stopped and dredging substituted, replacing the work in the Port officer's hands. I hope on return to see the Collector and have a meeting of the committee to interview the Chief Engineer. There were only three feet on bar at low water. It seemed a general opinion that the silting over the Bay has stopped. Mr. Baker, the Port officer, was anxious for an anchoring buoy, but the experience at Masulipatam, Calicut, and elsewhere goes to show that captains will anchor at their own will without reference to directions. It was noticed that ships were taking in cargo till 11 P.M.

Vakalapudi light was seen very brilliant, and the Hope Island light was also quite up to other 4th-order lights.

Vizagapatam.—Arrived at daylight on 13th February. There were 9 feet of water on the bar. Proceeded on, and reached the same day—

Bimlipatam, and found nothing changed about the place. The groyne is finished and offers some protection to the cargo boats, but does not fix the mouth of the river. This failure I now find to be owing to bunds placed at intervals up the river to suit the convenience of irrigation for the different land-owners on the banks, whereby all freshes are stopped and port improvement rendered impossible. Weighed at 6 P.M., and the moment the ship was out of the Bay saw the new—

Santopilly light very clear and bright.

Gopálpur.—Arrived here at daylight on 14th February, and landed at the new pier. The works were found well done, but depart in many particulars from my design, and much time and money wasted in consequence. The platform of the pier is 22' 8" above the sea, being six feet higher than the pier at Madras itself, the pier at Pondicherry, which this was intended to imitate closely, being 14' above mean sea level. The effect of this change will be to double all hand work at the pier, and seriously diminish its utility, while at the same time much expense is added, as the original piles have all been lengthened by cutting pieces from others—an operation which also weakens the resistance of the whole platform to wind and weather.

The Custom-house and Port officer's quarters were not commenced yet. The conclusion was arrived at that the plan to construct a joint Custom-house with a Port officer's house as upper story is a mistake. The adoption of a marina will allow the question of the size, &c., of the Custom-house to be deferred, but the Port officer's house must be constructed, and inquiries were made resulting in the fact that on the opposite side of the road looking upon the pier, and perfectly eligible as a site for building, a plot of ground can be acquired at small cost. I shall recommend Government to build the Port officer's house there as speedily as possible on the original grant of Rs. (5,000) five thousand. This will cheapen the building for revenue purposes, and leave the Marine Department independent.

Return Voyage by British India Steam Navigation Steamer "Patna."

Calingapatam.—Arrived here on 16th February. The question of rebuilding the Customs shed does not enter into marine consideration.

The light on the obelisk is good, but the ladder up to it is dangerous, and one that in bad weather the keepers, I am sure, will never attempt, so that danger of the

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light being neglected is almost certain. This ladder must be replaced by a wood or iron one, rigid throughout, with hand-rail, no ropes to be employed.

From this port we passed on to—

Santopilly, arriving there on the same day, and proceeded to the lighthouse. Inspected the light-room and prisms. It is a very fine and efficient second-order light, but many glasses of the chamber are broken, to replace which others have been indented for to England. The superintendent and his assistant are evidently unequal to the care of such an important machine, and are on bad terms with one another. The condition of the house and surroundings is not what it should be.

Cocanada.—Arrived here on the 17th February and visited the—

Hope Island Light-house.—The journey was partly effected in the Steamer "Arthur Cotton," and the rest by canoes through mud and jungle. The lighthouse and light were found in good order. Some slight repairs are required, paint, &c. One lamp was brought away for inspection by Mr. Orr at Madras. Returned on 18th February to Cocanada, and interviewed the Groyne Committee. These gentlemen have found out after another year's experience that my views and observations were correct. They are now most anxious to give up the Department Public Works' overseership, and replace affairs in the Port officer's hands, to which, as the Collector will be permanent Chairman, and no offensive action can be adopted in future, I have no objection to offer.

Masulipatam.—Arrived at this port on 19th February, but too late to go to Point Divi. We called to see the Collector, Mr. Sewell, and discussed various matters relating to the port, the tidal creek, &c. The creek wants clearing out; head of water in canal above the lock is four feet higher than the creek. Proceeded on 20th February to—

Point Divi Lighthouse, having worked a tedious way through mud and creeks. The lighthouse and lamps were found on the whole satisfactory. It is a dreary place. The present superintendent has been 22 years here, and has no wish to move. Weighed and proceeded on to—

Armeghon.—Reached this place at 8 A.M., and, as no preparations were made for landing, went close in in ship's gig, then took fishing boat for the surf. Ship's boat leaking very badly was kept afloat by baling. The lighthouse presented a curious appearance, the cement, paint, &c., being scaled off the walls, and in many places only the bare bricks being visible. The wind in the November cyclone must have been very strong. No such effects have been seen in Madras, and a similar wind and sea would have inflicted severe damage, if they had come in our town. New lines are being constructed for the lightkeepers. Light-room wants painting and keeping clean. The general apathy observable among all our Eurasian light superintendents was shown here. They will do nothing for their own comfort, or make any effort to save and preserve Government property. Their one idea is, as soon as things have reached a certain point, to report defects, and have estimates for repairs drawn up by District Engineers. Re-embarked, and at 5 P.M. reached—

Madras.—Captain Pearson, of the British India Steam Navigation Steamer "Patna," the vessel placed at our disposal by the British India Steam Navigation Company, to whom we are indebted for much kindness and attention, brought his ship through the southern passage from what is called Blackwood's harbour in a very seamanlike and satisfactory way by use of lead, there being no marks whatever for guidance, and the only survey chart 64 years old.

Wednesday, 9th, inspected *Pulicat* with Colonel Hasted. Column did not suffer in the cyclone equally with Armeghon, owing to the wind being off-shore, and the plaster on that side not having been exposed to the action of the sea air. Paint wanted in the light room and gallery. Keeper's lines in good order. Superintendent's bungalow repaired. The roof of this bungalow had been much injured in the storm, and it was proposed to terrace the upper part of it to give additional strength. Sanction was obtained for this work, but meanwhile the tile roof was repaired, so that there is no occasion to move in the matter. Until a new occasion for repair arises, the sanction must be cancelled. The superintendent has been some time very ill, and it is doubtful if he can ever resume duty, which is, meantime, being carried on by his brother on his responsibility. The plan, however, does not work well, and a permanent settlement will be placed before Government as soon as necessary forms are gone through. This completes the coast inspection.

Notes of Inspection by the Chief Engineer, Public Works Department, 22nd January to 3rd February 1887, *and* 10*th to* 21*st February* 1887.

Mangalore.—The lighthouse is in good order and only wants white-washing. The store-rooms at foot of column need a little repair. There is a lightning conductor of copper wire, which it was decided should be led into a nullah at a little distance where the ground would be moist. Conductor Lennon, who has been instructed in testing conductors, is to test this conductor and arrange for its proper earth connection. The lantern and lighthouse are very well kept and painted where necessary. Three of the glasses of the lighthouse were cracked long ago it is said, but the cracks have been mended with strips of lead, and do not interfere with the light.

Tellicherry.—In good order, but wood-work needs painting or tarring. On the West Coast all wood-work should be painted or tarred once a year. An estimate for a lightning conductor is under preparation; it can be led into an old well outside the ramparts. The peepul and banian trees growing in the fort wall, in the immediate vicinity of the lighthouse, should be destroyed.

Cannanore.—In good order, but the ladder needs attention, and the rope used as a handrail should be replaced by a round iron rod. A lightning conductor should be attached to the flagstaff which is close alongside the pillar and much higher, and led down one of the wire stays and through an embrasure down to the sea.

Calicut.—In good order; the iron railings at top would be the better for a coat of paint. The pillar itself appears to have been painted over old plaster; it should be scraped and painted white. An estimate has been prepared for enclosing the ground round the lighthouse now in a filthy state and open to cattle, &c.; this should be sanctioned, and the lascars' shed, a wretched little thatched building, should be re-roofed with Calicut tiles, and then the surroundings of the lighthouse will be decent. Estimate for a lightning conductor, which is certainly wanted, is under preparation.

Cochin.—This lighthouse is in very good order and neatly kept. Lightning conductor has been tested and found deficient. An estimate will be submitted for carrying the copper rod down into moist soil, and making a proper earth connection. The groynes on the coast immediately round the lighthouse have been very little damaged, and sand has been accumulating between them. An estimate will be prepared for making up the noses where necessary and the southernmost groyne which has been most knocked about, but no lengthening of the groynes should be allowed, and they should be kept, as nearly as possible, all of one length from the shore line.

The landing stage and marine buildings are in good order, but the boat-shed wants improvement, the posts which support it being apparently decayed in the ground.

Cruz Milagre Gap.—There seems to be no reason for alarm with regard to the bank; a little of the revetment has subsided somewhat on the lagoon side, and this is to be made up with stone on the spot. Sections are now being taken, which will show where there has been any scour near the foot of bank, and then the ballast stone, which has been collected, should be thrown in to protect the toe of the bank. The planting of screwpine and creepers has not been properly attended to by the watchman.

It would be well to make some arrangements whereby all ballast brought by ships to the port can be brought and stored as a reserve at the bank.

Muttum.—The only first-class light on the coast besides Madras. The building was constructed in 1882, and is very solid and in excellent order. Everything is well kept here, and the lighthouse and apparatus are scrupulously clean. The lightning conductor is led into a hollow where the ground is kept moist, but it should be tested when there is an opportunity. The dwelling-house is roofed with Mangalore tiles, and the Superintendent represented that in strong wind and rain, water gets under the tiles. The position is so exposed to the burst of the south-west monsoon that it

will be difficult to prevent this unless corrugated iron is placed under the tiles; but the Superintending Engineer will see what can be done to prevent the leakage, it would seem that the slope of the roof is too flat for these tiles.

Tuticorin Lighthouse on Hare Island.—The lighthouse is in excellent order, and the light good and well kept. The sandstone, of which the column is built throughout, has been slightly affected in places by the sea air, but at present this is of no consequence; if the evil extends, it may be necessary to plaster the column with Portland cement, but this will probably not be required for some years. The lightning conductor is said to have been tested some years ago; when opportunity offers it should be tested again; the island itself is so little above sea level that the conductor must be in moist soil. The buildings for the lighthouse attendants are small, but well kept and in good order, and seem to be all that is necessary.

Jetty.—Some complaints have been made regarding the depth of water at the landing place, and that the former lengthening of 250 feet is insufficient; but it appears that boats still unload between the head of the jetty and the shore, and it is very seldom that boats drawing 4 feet cannot get up to the pier head at low water, while a further lengthening of 250 feet would only give 6 inches more water at the head. Under these circumstances, it does not seem necessary to lengthen the jetty; it would, however, be a great convenience to traffic if it were widened, and this could easily be done, doubling the width from the head to the shore; it would then be advisable to carry the tramway to the pier head, and perhaps to lay down a double line of rails.

Pámban Lighthouse.—The column appears to be sound and in good order, but much discolored; it should be scraped and painted with white anticorrosive paint. The light, a 4th order dioptric light, does not compare favorably with other lights of the same class on the coast. For some unexplained reason the glass lantern is fixed on the level of the platform, without the iron light-room, which has been sent out and is in use in other places; and it may be due to the light having so nearly below it a wide platform, painted white, that some of the light is absorbed, and it is very awkward for the men who attend on the light, as there is hardly head room for any one to stand up inside the lantern. It seemed doubtful also whether the flame of the lamp was immediately in the centre of the lenses, and at Captain Taylor's suggestion it was lowered, and this seemed to have a good result, as on leaving the port at night we could easily discern the light at a distance of 12 to 14 miles, measuring our distance by the logline. I would, however, paint the platform a darker color, which I understand can be done on the spot. If complaints of the light then continue, I would raise the lantern on a wooden octagonal light-room, about 3 feet high, securely bolted down to the head of the column; this would not be very expensive and would be much lighter than the ordinary cast-iron light-room, which may have been omitted from there being some doubt of the fitness of the column to carry so heavy a weight.

The buildings at foot of the lighthouse are in good order.

The Pass itself is understood to be clear, but the shoal below has accumulated, and dredging seems to be very necessary there. Nothing is known in this department about the reference made to the Secretary of State for a suitable dredger, and it may be that, in the face of the proposal to cut a ship canal through the Rámesvaram island, a dredger may be considered unnecessary; but in the proposed agreement between the Company to be formed for cutting the canal and the Secretary of State, it is specially provided that the Pámban Pass shall not be interfered with, and as the canal cannot be available for some years, even if country craft will ever use it, it seems very desirable that a dredger should be obtained as early as possible. Speculation on the prospects of the canal seems unnecessary; but after examining the ground on the proposed line of the canal and studying the charts, the conclusion arrived at was that the canal itself with immediate approaches is feasible if sufficient money is spent, but that the real difficulty will be found in the shoals lying between Point Calimere and the island of Ceylon through which it seems almost impracticable to keep open a passage of sufficient depth to enable large vessels to navigate.

Point Calimere.—The pillar at the point partly fell down some time since, and it looks as if the portion remaining were leaning over. It seems advisable, as it is is doubtful if he can ever resume duty, which is, meantime, being carried on by his brother on his responsibility. The plan, however, does not work well, and a permanent settlement will be placed before Government as soon as necessary forms are gone through. This completes the coast inspection.

Notes of Inspection by the Chief Engineer, Public Works Department, 22nd January to 3rd February 1887, *and 10th to 21st February* 1887.

Mangalore.—The lighthouse is in good order and only wants white-washing. The store-rooms at foot of column need a little repair. There is a lightning conductor of copper wire, which it was decided should be led into a nullah at a little distance where the ground would be moist. Conductor Lennon, who has been instructed in testing conductors, is to test this conductor and arrange for its proper earth connection. The lantern and lighthouse are very well kept and painted where necessary. Three of the glasses of the lighthouse were cracked long ago it is said, but the cracks have been mended with strips of lead, and do not interfere with the light.

Tellicherry.—In good order, but wood-work needs painting or tarring. On the West Coast all wood-work should be painted or tarred once a year. An estimate for a lightning conductor is under preparation; it can be led into an old well outside the ramparts. The peepul and banian trees growing in the fort wall, in the immediate vicinity of the lighthouse, should be destroyed.

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Tuticorin Lighthouse on Hare Island.—The lighthouse is in excellent order, and the light good and well kept. The sandstone, of which the column is built throughout, has been slightly affected in places by the sea air, but at present this is of no consequence; if the evil extends, it may be necessary to plaster the column with Portland cement, but this will probably not be required for some years. The lightning conductor is said to have been tested some years ago; when opportunity offers it should be tested again; the island itself is so little above sea level that the conductor must be in moist soil. The buildings for the lighthouse attendants are small, but well kept and in good order, and seem to be all that is necessary.

Jetty.—Some complaints have been made regarding the depth of water at the landing place, and that the former lengthening of 250 feet is insufficient; but it appears that boats still unload between the head of the jetty and the shore, and it is very seldom that boats drawing 4 feet cannot get up to the pier head at low water, while a further lengthening of 250 feet would only give 6 inches more water at the head. Under these circumstances, it does not seem necessary to lengthen the jetty; it would, however, be a great convenience to traffic if it were widened, and this could easily be done, doubling the width from the head to the shore; it would then be advisable to carry the tramway to the pier head, and perhaps to lay down a double line of rails.

Pámban Lighthouse.—The column appears to be sound and in good order, but much discolored; it should be scraped and painted with white anticorrosive paint. The light, a 4th order dioptric light, does not compare favorably with other lights of the same class on the coast. For some unexplained reason the glass lantern is fixed on the level of the platform, without the iron light-room, which has been sent out and is in use in other places; and it may be due to the light having so nearly below it a wide platform, painted white, that some of the light is absorbed, and it is very awkward for the men who attend on the light, as there is hardly head room for any one to stand up inside the lantern. It seemed doubtful also whether the flame of the lamp was immediately in the centre of the lenses, and at Captain Taylor's suggestion it was lowered, and this seemed to have a good result, as on leaving the port at night we could easily discern the light at a distance of 12 to 14 miles, measuring our distance by the logline. I would, however, paint the platform a darker color, which I understand can be done on the spot. If complaints of the light then continue, I would raise the lantern on a wooden octagonal light-room, about 3 feet high, securely bolted down to the head of the column; this would not be very expensive and would be much lighter than the ordinary cast-iron light-room, which may have been omitted from there being some doubt of the fitness of the column to carry so heavy a weight.

The buildings at foot of the lighthouse are in good order.

The Pass itself is understood to be clear, but the shoal below has accumulated, and dredging seems to be very necessary there. Nothing is known in this department about the reference made to the Secretary of State for a suitable dredger, and it may be that, in the face of the proposal to cut a ship canal through the Rámesvaram island, a dredger may be considered unnecessary; but in the proposed agreement between the Company to be formed for cutting the canal and the Secretary of State, it is specially provided that the Pámban Pass shall not be interfered with, and as the canal cannot be available for some years, even if country craft will ever use it, it seems very desirable that a dredger should be obtained as early as possible. Speculation on the prospects of the canal seems unnecessary; but after examining the ground on the proposed line of the canal and studying the charts, the conclusion arrived at was that the canal itself with immediate approaches is feasible if sufficient money is spent, but that the real difficulty will be found in the shoals lying between Point Calimere and the island of Ceylon through which it seems almost impracticable to keep open a passage of sufficient depth to enable large vessels to navigate.

Point Calimere.—The pillar at the point partly fell down some time since, and it looks as if the portion remaining were leaning over. It seems advisable, as it is supposed that a landmark here is necessary, to estimate for a tripod of iron screw piles here.

Negapatam Lighthouse.—The column seems to be in good order and does not require painting at present, but the lighthouse, lantern and outside platform and rails are sadly in want of a coat of paint. It was stated that the building had been lately struck by lightning although provided with a lightning conductor, and in proof of that 3 panes of glass, a good deal cracked, were shown; it is difficult to understand how this occurred, though it seems possible that sudden very great heating of the metal-frames might have caused expansion and cracked the glass; the discharge, however, must have been carried off by the conductor, as there is no trace of damage to the column.

The buildings at foot of the lighthouse are in need of repairs; the masonry is being eaten away by the sea air; it should be thoroughly scraped and cleaned and then plastered with Portland cement. Nothing else will stand so near the sea.

Jetty.—The jetty up to the landing ramp has been repaired since it was damaged by the last storm, but nothing has been done towards filling up the boat basin. An estimate should now be submitted for removing the concrete blocks with which the basin is lined, and filling it with soil which may be procured from a large bank in the creek just above the basin opposite to the Railway premises; the estimate should also provide for building a face wall to the creek similar to the one below the boat basin, so far as Government land extends, using the material taken from the basin as far as possible. Captain Taylor's proposal to extend this face wall along the Railway premises seems a good one, but it is understood the Railway authorities object to this. An officer having been placed at the disposal of the Negapatam Municipality to draw up a scheme for water-supply and drainage, it is hoped that his proposals will enable the vexed question of the discharge of the town drainage into the sea clear of the jetty, may shortly be settled. At present it must apparently all flow down the ramp used for landing cargo—a very objectionable arrangement.

Madras Lighthouse.—The outside of the column, at all events near the top, requires pointing in places with Portland cement, and the inside of the well requires plaster renewed in places where it is crumbling away from the action of the sea air.

The apertures, which give light to the stairs, are intended to be closed by glass windows during strong winds, but these windows are very much out of repair, glasses and sometimes frames broken and hooks rusted almost through; they should be properly repaired and furnished with brass hooks and eyes. The iron supports to the handrail are in places a good deal corroded; they might be painted with advantage.

The lantern and light-room are in good order, and painted once a year. Lightning conductor is said to have been tested about a year ago.

The outside gallery at the top is dangerous, owing to the parapet being only about 2 feet high; it should certainly be made safe to visitors by a stout double rail on standards all round.

The store-rooms at foot of the lighthouse are in need of repair; it is stated that the roofs leak, and they have been thickly covered with tar all over. If the joists are sound, it will probably be the best way to remove all this tar and old plaster and replaster throughout with Portland cement. Several glasses are broken in the skylights which need renewal, and a little repair to inside walls is necessary.

Pulicat Lighthouse.—Column in good order; on a high ridge of sand much above the storm-wave of the 9th November last, which was recorded at Coromandel as more than 8 feet above H. W. spring tides. The casuarina trees here are all bent to the east, quite the contrary direction to which they were bent at Armeghon, 30 miles higher up the coast, showing that the centre of the storm hit the coast between these two points. The lightning conductor was bent and some tiles blown off the Superintendent's quarters, and this seems to have been all the damage that was done. The column requires coloring again, and the lantern painting both inside and out; all should be white. A little plastering round the building at foot is also needed, and the shutters to the loopholes should be repaired.

The Superintendent's house has had the tiling replaced, and now requires nothing but some plastering and white-washing inside. The lascars' quarters are new and good.

The sea-wave in the late cyclone seems to have destroyed the good-water supply in Pulicat, and the inhabitants are said to send across the backwater to the wells near the lighthouse for drinking water.

Armeghon Lighthouse.—The cyclone of November 1886 was felt with great severity, as is evidenced by the trees in the neighbourhood. The sea flowed over the sands, and rose to a height of about one foot on the steps of the lighthouse and dwelling-house. The plaster of the column was much damaged. It is understood that an estimate has been prepared for replastering, and no time should be lost in carrying out this work. The lantern and lighthouse, with railings outside, only require repainting, and white paint would be the best to use now. The light is good and the lenses in good order, but the place might be kept cleaner.

New houses are being built for the lascars. The Superintendent's house suffered comparatively little in the cyclone, but some of the verandah tiles have been displaced and require to be renewed.

Point Divi Lighthouse.—The column and adjacent dwelling-house seem in good order; the light is good and the lantern and light-room only want repainting; if the inside of the latter were painted white, any dirt would be noticeable and could at once be removed. The wall built round the end of the lightning conductor at foot of the tower has cracked very considerably in consequence of its having been built partly on the column foundations and partly on surrounding platform.

If it is considered necessary to increase the accommodation in the Superintendent's house, one or two such rooms can be built on the terrace of the upper storey; but the lower storey might be made use of to increase the accommodation if space were economised.

The good-water tank has a good supply, but the water is fouled by buffaloes, &c., which are turned out by the villagers in the mangrove jungles. Some sort of fence is necessary to protect it, and this might be made roughly of the mangrove wood itself.

It was represented that the river had of late years cut away the ground towards the lighthouse, and there are signs of some erosion having taken place years ago; but from sections which have lately been taken, it appears that there is a good sloping foreshore, and no erosion is now taking place. To prevent future erosion, it would be well to plant up with mangrove this foreshore from the creek above the lighthouse to the creek below.

Hope Island Lighthouse.—The column is in good order, and though in the high tide which accompanied the storm of last year the sea is said to have surrounded the lighthouse, no damage was done, and there is no sign of any scour. The terraced godowns attached to the column need attention, as the joists supporting the terraces have been attacked by whiteants, and in one of them the ends of the joists have rotted away, leaving the roof unsupported; these should be supported at once by a beam or plank held up by stout posts, and an estimate should be prepared for making both roofs good. The lantern is in very good order, and the light showed well at sea, but the new lamps evidently want to be better arranged as regards the draft. It may be a question whether, as the light is not required at all on the land side, a catadioptric light would not show a better light at sea; but judging from the appearance of the light on a dark night, it did not seem that much improvement was required.

The lighthouse keeper's quarters need a little plastering and white-washing; the lascars' lines are very good here, and there is a good separate store-room.

Vakolapudi Lighthouse.—The column is in good order, but requires to be painted white. The light is the one formerly in use at Hope Island, and the lenses are much cracked; but this does not appear to affect the light, which shows well at sea. The machinery works fairly well and smoothly, and the light is well kept. There are four lightning conductors, the upper portion being of copper and the lower of iron rod, the iron has corroded to a great extent; it would be better to have one good copper rod or wire conductor instead.

The Lighthouse Superintendent's house is in need of repairs to the roof; the flat-tiles have in many places decayed and need renewal, and the pan-tiles should be turned, otherwise the bungalow seems in good order.

The lascars' sheds are only thatched round huts which need constant repair; it would be well to have tiled lines, something like our lock lascars' sheds. It is understood that an estimate for these is under preparation.

Santopilly Lighthouse.—A new 2nd order light put up last year; it shows very well to sea, the elevation being, so far as could be ascertained, about 180 feet above sea level; distance inland one mile. The building is on a small hill, and the front part of it has lately been somewhat lowered and built up with solid masonry to receive the new lantern, the back of the building being store-rooms. All of it seems to be in very good order. Several new glasses are required to the lantern, which it is understood are to be supplied, and the lenses have suffered somewhat before being put up, but not so as to affect the light. The general appearance of the lighthouse indicates that a better class of Superintendent is necessary to maintain a light of this description.

There are two lightning conductors, and in the stores are several lengths of hollow copper rod intended for a conductor, but never put up. One good conductor would be sufficient for both lighthouse and building in rear; but it is unnecessary to disturb the present arrangement if the earth connections of the existing conductors are good; they should be tested, if this has not been lately done.

The Lighthouse Superintendent's house is in fair order, and needs nothing but ordinary repairs. The Assistant Superintendent's house is said to leak in several places, and part of the house is used as a cook-room, the consequence being that the building is extremely dirty. A small detached cook-room should be built near the house, and the rooms cleaned and white-washed. The lascars' sheds are of mud, thatched, and only require rethatching.

Calingapatam Lighthouse.—The column is in good order, but in the storm of last year the sea washed round it, and the Lighthouse Superintendent stated that he subsequently threw some stone, which was lying about, at the foot; there is, however, no sign of scour round the building. The light is a common lantern with two reflectors, which needs a little repair in places, and the roof, with wood and iron work, requires painting; behind the light some tatties have been tied up to afford a shelter to the lascar attending; but they are, of course, liable to be blown away in any storm, and it would be better to plank in a portion to afford shelter. The ladder of rope with wooden rungs and wire-rope handrails is in need of repair in places; it would be much better to have a wooden-step ladder starting from masonry steps of some height; lascars can hardly be expected to go up and down the present shaky ladder on a bad night.

The lascars' shed is of leaves on the sand, and in the storm was quite surrounded by water; there are three men, and two huts at least are wanted; the Lighthouse Superintendent suggested that pucka lean-to quarters might be constructed round the square base of the tower, and the suggestion seems a good one. An estimate might be prepared for this; there is no site near the lighthouse available for building the usual lines.

No. 1031-C.

MEMORANDUM.

Transferred to the Marine Department, with advertence to Proceedings in that department, No. 529, dated 3rd December 1884.

(Signed) J. O. HASTED, Col., R.E.,
Secy. to Govt., P.W.D.

To the Marine Department, with notes.

ORDER—dated 14th April 1887, No. 160, Marine.

The recommendations of the Chief Engineer for the improvement of the Pámban light and the other suggestions made in the foregoing reports are approved. Steps should be taken to carry them out at an early date.

2. The remarks of the Chief Engineer, in regard to the Negapatam jetty and drainage scheme, will be communicated to the municipal council with reference to G.O., No. 706, dated 24th December 1886.

3. The attention of the Chief Engineer is drawn to G.O., No. 618, dated 11th November 1886, which was communicated to the Public Works Department, from which it will be observed that the supply of a dredger for Pámban has been suspended at the suggestion of the Port officer.

4. These reports should in future be accompanied, for convenience of reference, by a statement in the form printed on page 1 of G.O., 24th April 1886, No. 207, Marine, in which the condition and further requirements (if any) of each lighthouse should be concisely stated.

5. A copy of these proceedings will be forwarded to the Government of India with reference to the remarks made by the Port Officer, Madras, in connection with the Pámban Pass and the proposed Rámesvaram Canal.

(True Extract.)

H. E. STOKES,
Ag. Chief Secretary.

To the Port Officer, Madras.
" Public Works Department.

ENDORSEMENT—dated 14th April 1887, No. 161, Marine.

Copy to the Government of India, Department of Finance and Commerce.

H. E. STOKES,
Ag. Chief Secretary.

T. O'Connor.

Communicated for the information of Supg. Engrs concerned and for the necessary action with reference to para 1 of the Marine Dept: order.

2. The attention of the Chief Engineer will be drawn to paras 3 & 4.

(Sd) J.O.H.

H.

Govt. of (1887) Madras.

MARINE.

Issued

Recd. Encl.

G.O., &c., 14th April 1887,
Nos. 160, 161.

APRIL.

Lighthouses and Ports.

Passing orders on the inspection reports of — submitted by the Port Officer and the Chief Engineer.

Ch. Engr. P.W.D.
Supg Engrs I, II, IV, V & VII C

With order

1887.

P. W. DEPARTMENT.

Current No. 6097. 8219/8

From

The Marine Dept.

Enclos.— 10
3 plans

C No. 633.
Dated 4. 8. 87.
Received 20. 8. 87.

SUBJECT.

Groynes at Cochin

Transferring estimates of Rs: 4610 for repairing the — and raising them to a uniform level.

DISPOSAL.

No. 4664 D. Dated 22 Augt 1887.

The plans and estimates have been prepared in accordance with the Chief Engineers instructions, and are recommended for sanction.

(Sd)

J.O. Hasted Col R.E.
Chief Engr P.W.D.

To the Marine Dept
with enclosures returned. Desptd. 22/8/87

Public Works Department

G.O. No 1301W of 12.5.57.

PWC No 6097

Repairing groynes at Cochin.

87/9

The Est has been prepared in accordance with the remarks made in the Notes of Inspection of EW ~~written~~ published with GO 160 Marine 14th April/57

The only point that strikes me, is that the slopes ½ to 1 allowed for the groynes is too steep. The action of the waves always flattens slopes very considerably, and the result of building the groynes with slopes ½ to 1 will be that before long they will subside and require more stone to make them effective

16.5.57

Practically they will not be built with slopes at 1½ to 1 probably
When a flatter slope would [illegible]
[illegible] the base & make the Est.
present Est. may be Sa

B No 1301 W/ 12th

Communicated for
the information of
Supg. Engrs concerne
and for the necessa
action with reference
to para 1 of the
Marine Dept. order.

2. The attention of
the Chief Engineer wi
be drawn to paras
3 & 4.

(Sd) J.O.H.

4.

Ch. Engr. P.W.D.
Supg Engrs I, II, IV, & VII C

G. 16.8.87

Public Works Department.

Current No. 6097 $\frac{8}{1}$ 19/0

Letter No. 633

Dated the 4th August /87

From the Secry. to Govt. Marine Dept.

16.8.87.

NOTE OF REMARKS.

1. The accompanying plans & estimate provide for raising the Groynes at Cochin to a uniform level.

The amount of estimate is Rupees 4,610.

2. There are seven groynes of drystone thrown out into the Sea from the beach in the neighbourhood of the Light house at Cochin

3. Two groynes on the north and three groynes on the south of the Light house have been of the greatest service in preserving this portion of the Seaface of the town.

4. These groynes have been more or less damaged by the waves, have sunk into the sand and are generally

Communicated for
the information of
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3 & 4 -

(Sd) J.O.H.

H.

Ch. Engr. P.W.D.
Supg Engrs I, II, IV, V & VII C

G. 16.8.87

Public Works Department.

Current No. 6097 87/19/10
Letter No. 633
Dated the 4th August/87
From the Secry: to Govt: Marine Dept

16.8.87.

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4. These groynes have been more or less damaged by the waves, have sunk into the sand and are generally

generally in need of repair.

5. They are to be raised to a uniform level of 11 ft. below the B.M. on basement of the Light house & 6 ft. above High Tide level, the top being of a uniform breadth of 6 ft. and the slopes ½ to 1 throughout.

6. A data list is submitted and shows Rs. 18½ for 100 Cft. of rough stone groyne seem fair.

7. Report & specification are submitted.

8. Contingencies & superintendence are both charged together at 5 percent.

9. The plans and estimate have been countersigned by the Ag. Port Officer & forwarded to this Office by the Marine Depart^t.

EH
11-8-87.

2719/11

— Much too steep.

464 D — 22-8-87

Marine Department.

CHIEF SECRETARIAT MADRAS

2719/12

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following paper

from the Port Officer, Madras, No 6349. D/ 15th July 1887, recommending for sanction an estimate for repairing the Groyne Works at Cochin, at a cost of Rs 4610.

1st only.

from the P. W. D. No: 464 D, dated 22 August 1887, recommending for sanction the plans and estimate prepared in accordance with the Chief Engineer's instructions.

Order 5th September 1887, No 395.

The estimate is sanctioned from Port Funds.

(True Extract)
H E Stokes
Ag. Chief Secretary

To
The Port Officer, Madras
The Public Works Dept., with Encs:
The Accountant General

7
T.D

[6]

P.W.C. No. 7326

Govt. of {188 } Madras.

G.O. 1301 Wa/12.5.87
No. 464 D d/22.8.87

To

The P.W. Dept

R. 20.9.87

Proceedings, dated No. 255	5/9/	1887

Subject.

E + 9

(+3 plans)

Sanctg plans & estes
for repairing the
groyne works at
Cochin

Circ. 12-10-87 R. 14-10-87
C. 30.9.87 [illegible]

27/9 W

Public Works Department.

Current No. 7326
Letter No. 395
Dated the 5th September 1887
From the Chief Secry. to Govt. Marine Dept.

NOTE OF REMARKS.

1. The accompanying estimate and plans provide for Raising and making up the noses of the Groynes, along the beach opposite to the Light house at Cochin.

The amount of the estimate is Rupees 4,610.

2. These plans and estimate have already been examined and found correct in the Technical Section on the 11th August/87 when a note of remarks on the subject was submitted, it is at Ooty vide No. 464 D of the

C. 30.9.87 [illegible]

the 22nd August 1887.

3. These plans and estimate were sent to the Marine Department for approval with this Office No. 464 D of the 22nd August/87. They are now approved and forwarded for sanction in the P. W. Dept.

JC.

22-9-87.

Circ. 12-10-87 R-14-10-87

C. 30-9-87 [illegible] 10-87

Aw/[illegible]

B&R
Awo1[illegible]

PUBLIC WORKS DEPARTMENT.

No. 2719 W 7719/15

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 14th October/87

READ the following

Proceedings of Government Marine Department H. S. No. 395 d/5th September 1887.

Communicated to the Supdg Engineer IV Circle and the Examiner of P. W. Accounts.

Works	Rs 4,610
Establishment	1061
Tools and Plant	69
Total	Rs 5740

2. The question of providing funds as shown in the margin will be considered in the Financial Department.

3. The sanction accorded in ~~the Proceedings of~~ the Marine Department ~~[illegible]~~ has been registered as Excluded Local No. 27 W of 1887-88, and classed as Miscellaneous Public Improvements, Repairs

D 25/10

To

The Supdg Engineer IV Circle with 8 enclos
" Examiner of P. W. Accts with the duplicate abstract estimate
" Marine Department
" Financial Department.

To ~~the Chief Secy for favor of~~ ~~[illegible])~~.

E J

30.9.87

1/10/87

11/10.

W 30/9

2719/16

7 - 14-10-87
15 n 14/10

Circ. 12-10-87 R. 14-10-87
D. 30-9-87 R. 14/10
Circ. 12-10-87

7326

Govt. of (1887) Madras

PUBLIC WORKS.

15/10

Dated

Recd. Encl.

G.O., 14 Oct 1887, No. 2719 W.

Groynes at Cochin

Orders on proceedings of the Marine Dept. Sanctioning Estimate for repairing the — and raising them to a uniform level

60/5

15/10