

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public works

DEPARTMENT

G.O. No.	995-96	Press
B.P. No.		Mis.
430-431-432		
Dated	31- 3	1843.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
31st March 1873.*

No. 730. Read the following endorsement of the Marine Department, dated Fort St. George, 6th February 1873:—

From the Master Attendant, Administrative Department, Madras, to the Chief Secretary to Government, Marine Department, Fort St. George, dated Madras, 28th January 1873, No. 383.

I HAVE the honour to forward, for the information of Government, two estimates of the cost of a floating light for Cocanada, recommended by Mr. Robertson, Harbour Engineer.

2. I regret that illness prevented me from reporting earlier to Government on the scheme.

3. I however instructed my First Assistant, Mr. Marshall, who was well acquainted with my opinions regarding the relative advantages of fixed and floating lights, to draw up an exhaustive memorandum on the subject, which I have now the pleasure to forward to Government, with a few additional observations regarding this proposed floating light.

4. With reference to the estimates now forwarded: as I am well acquainted with Captain Castor's abilities and the general correctness of his estimates, I have no doubt that he could provide a floating light for the sum specified; but as a work of this sort must go to a Government Dockyard, where the authorities are responsible for first class materials and skilled labour, the estimate furnished by the late Captain Boon must be accepted.

5. By this estimate it will be observed that a light-ship, with every thing on board ready to take up her station, including stores for six months, will cost Rupees 1,27,000, and this is not all: for, to keep faith with the shipping interest, a duplicate light-vessel will be absolutely necessary to replace the one afloat, which is liable to accident by fire or wreck, or may be blown out to sea during a hurricane, and there founder with all hands on board.

6. Mr. Robertson's principal reasons for recommending a floating light are the following:—1st, "that it may be shifted when required by the increase of the delta;" and, second, "that a light on screw-piles at the mouth of a river in flood is liable to be undermined by the current."

7. Now, in regard to the first reason assigned, it is to be borne in mind the expenses of the light-ships are as specified in the margin, whereas a screw-pile lighthouse could be built for one-fourth of the cost.

Cost of a light-ship and a duplicate one including stores for six months as per estimate from the Master Attendant, Calcutta, at Rupees 1,27,000 each, Rupees 2,54,000.

8. In answer to the second reason assigned, I may observe that firm ground can be found three miles to the northward and eastward of the present light-house on Hope Island, where a brick and chunam lighthouse could be at once constructed, and according to the present rate of extension of sand banks in that direction, another would not be required further to the northward for many years to come.

9. Taking all these incontrovertible facts into consideration, it is my opinion that this proposed enormous outlay on a light for a single port in the Madras Presidency will be held to be entirely out of the question, and I respectfully recommend that orders be issued to Captain Castor and the Superintending

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Engineer of the district to examine the north-eastern coast of Hope Island, and to choose a site for a new lighthouse, as decided on by Government, on a secure piece of ground as far north as it can be obtained, where, I believe, a solid foundation may be found for a brick and chunam lighthouse, which would cost one-fourth of a screw-pile one.

10. In closing this report I must endorse my Assistant's recommendation of a reference, if His Excellency the Governor in Council see fit to do so, to Colonel Fraser, R. E., C. B., etc., etc., whose opinions, based on his own experience, regarding the positions and construction of lighthouses are invaluable.

Memorandum on the subject of a light for leading vessels clear of the shoals off Point Godevare and Hope Island and into Cocanada Bay.

THE Government in a recent order have adopted a suggestion made by Mr. Robertson, Marine Engineer, in his report on Cocanada Harbour, viz., to do away with the light column on Hope Island, and substitute in lieu a floating light-vessel, to be moored in deep water, clear of the north-eastern extremity of the shoals off the Point.

Mr. Robertson's reasons for proposing this change are, "first, that floating light-vessels may be shifted as required with the increase of the delta off the point; second, that a light on screw-piles, if adopted instead, and fixed at the mouth of a river in flood, is liable to be undermined by the current if the ground is soft, and especially if subject in addition to the action of breakers."

It is apparent from the report referred to that Mr. Robertson concluded with certainty that there were but two plans available for *efficiently* lighting this part of the coast, and a reference to Taylor's Chart will show, I think, that he was right.

Granting this to be the case, it behoves us then to compare the two plans available, viz., a floating light and a lighthouse on screw-piles, looking closely at the advantages and disadvantages of both systems, with their relative actual cost and annual upkeep, with a view to arriving at a satisfactory result.

We will first take the light-ship, and consider its uses, enumerating its advantages and disadvantages.

Light-vessels have from the close of the last century been employed as leading lights, and for the purpose of indicating the fair way channel to the entrance of a river, and particularly of large rivers, bays and estuaries, as well as shoals and hidden reefs at sea, at a distance from the land. To exemplify this statement, I will give a few instances:—The light-vessels on the Goodwin Sands, where, from the shifting nature of those sands, it has been found impossible to erect a structure of any kind whatever; the mouth of the Thames River, the entrance to the Hooghly River, the entrance to Bombay Bay or harbour; and the light-vessel referred to by Mr. Robertson in Moorcambe Bay may also be cited as an example, where there are no less than five lights and two light-ships to guide vessels solely into the bay. It is here worthy of remark that, while there are no less than 456 lighthouses and harbour lights along the coasts of the United Kingdom, there are but 49 light-ships. While France has 224 lighthouses, but no floating lights along her coasts. The light-ship has but one advantage and one alone over the fixed light, and that is the one mentioned by Mr. Robertson, viz., that it can be shifted as wanted without any extra cost. But its disadvantages as compared with the fixed light are many:—

1st.—It is more liable to casualties; for instance it may drift away from its position, and thereby endanger life and property by misleading vessels.

2nd.—It may be lost with all hands on board.

3rd.—It can only be maintained at more than four times the annual cost of a fixed light.

4th.—A duplicate light-vessel would be absolutely necessary to replace the one afloat for repairs either from wear or tear or in case of accident, thus increasing the original cost two-fold.

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5th.—The light is liable to become dimmed by sea spray, in heavy weather, when most needed.

6th.—A ship afloat cannot exhibit a steady and brilliant light, as it would be affected by the motion of the sea.

7th.—Light-vessels are only adopted in places where it is utterly impossible to build a structure of any kind from various causes.

8th.—These lights are seldom exhibited at a greater elevation than 40 feet, and are not visible at a greater distance than 10 miles to 15 miles.

It will thus be seen that the one sole advantage derived from the adoption of the light-ship is greatly counterbalanced by the risk to life and property, and diminution of illuminating power, both of which contingencies might be avoided by the adoption of a fixed light.

Next, we have to consider the cost of a light-ship suitable for Cocanada and its upkeep, with costs of annual repairs, etc.

Two estimates have been received for the construction of a suitable vessel, one from Calcutta and another from Cocanada. The first is from the Government Surveyor and Builder to the Supreme Government; and the second from Captain Castor, Master Attendant at Cocanada; the former as coming from a professional man deserves the best consideration. He estimates the cost of a light-ship of 250 tons, builders' measurement, with a dioptric apparatus for the light, and spare stores, together with a supply of provisions for the first six months (for a native crew) at Rupees 1,27,000. The annual repairs are estimated at Rupees 2,000, and the maintenance of the light-vessel at Rupees 1,100 per mensem.

It is a rule with the Trinity Board to have in almost every instance a duplicate light-ship, and taking into consideration the resources of this Presidency in marine matters, which are simply nil, it will be absolutely necessary to have a duplicate vessel ready at all times in the event of the loss of the first one, or, in the event of any serious accident occurring to her, to be substituted in her place. I would therefore add to the first cost that of a second vessel with illuminating apparatus complete, which would bring it up to say Rupees 2,54,000.

Captain Castor's estimate is for a smaller vessel of 150 tons, and the dimensions of which, though not given in his estimate, would probably be those of some of the Trinity Board light-vessels, which run about 150 tons and cost about 30£ per ton, somewhat less than the Calcutta vessels appear to do. A vessel of this size would hardly be quite large enough for the purpose, 200 tons being a more convenient and safe size for riding out the cyclones prevalent on our coasts. Captain Castor's estimate fixes the rate per ton of hull at Rupees 210, which is the full value of a vessel such as would be constructed at Coringa, where labour is much cheaper than at Calcutta. This item however is without ground tackling and hawsers, which Captain Castor estimates at 5,875 Rupees, but which is low, and may be put down at, say, 7,000 Rupees in round numbers, thus raising the rate of hull and stores to 220 Rupees per ton.

If it is finally decided that a floating light is the best method to be adopted, then there can be no doubt to have her built at Calcutta would be the best course, with a view to have a first class vessel.

We then, with the data above given, arrive at the following results:—

	rs.
Cost of a light-vessel of 200 tons register with ground tackling, spare stores, etc., complete, at 365 Rupees per ton...	73,000
Apparatus (if first class dioptric) ...	36,000
	<hr/> 1,09,000

Its annual cost of maintenance would be as follows:—

Commander's and crews' wages, including provisions, as particularized in the Calcutta estimate, 1,100 Rupees per mensem ...	13,200
Repairs ...	2,000
Oil and contingencies for apparatus ...	1,680
Per annum Rupees...	<hr/> 16,880

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10. In closing this report I must endorse my Assistant's recommendation of a reference, if His Excellency the Governor in Council see fit to do so, to Colonel Fraser, R. E., C. B., etc., etc., whose opinions, based on his own experience, regarding the positions and construction of lighthouses are invaluable.

*Memorandum on the subject of a light for leading vessels clear of the shoals off Point
Gordware and Hope Island and into Cocanada Bay.*

The Government in a recent order have adopted a suggestion made by Mr. Robertson, Marine Engineer, in his report on Cocanada Harbour, viz., to do away with the light column on Hope Island, and substitute in lieu a floating light-vessel, to be moored in deep water, clear of the north-eastern extremity of the shoals off the Point.

Mr. Robertson's reasons for proposing this change are, "first, that floating light-vessels may be shifted as required with the increase of the delta off the point; second, that a light on screw-piles, if adopted instead, and fixed at the mouth of a river in flood, is liable to be undermined by the current if the ground is soft, and especially if subject in addition to the action of breakers."

It is apparent from the report referred to that Mr. Robertson concluded with certainty that there were but two plans available for *efficiently* lighting this part of the coast, and a reference to Taylor's Chart will show, I think, that he was right.

Granting this to be the case, it behoves us then to compare the two plans available, *viz.*, a floating light and a lighthouse on screw-piles, looking closely at the advantages and disadvantages of both systems, with their relative actual cost and annual upkeep, with a view to arriving at a satisfactory result.

We will first take the light-ship, and consider its uses, enumerating its advantages and disadvantages.

Light-vessels have from the close of the last century been employed as leading lights, and for the purpose of indicating the fair way channel to the entrance of a river, and particularly of large rivers, bays and estuaries, as well as shoals and hidden reefs at sea, at a distance from the land. To exemplify this statement, I will give a few instances:—The light-vessels on the Goodwin Sands, where, from the shifting nature of those sands, it has been found impossible to erect a structure of any kind whatever; the mouth of the Thames River, the entrance to the Hooghly River, the entrance to Bombay Bay or harbour; and the light-vessel referred to by Mr. Robertson in Moorcambe Bay may also be cited as an example, where there are no less than five lights and two light-ships to guide vessels solely into the bay. It is here worthy of remark that, while there are no less than 456 lighthouses and harbour lights along the coasts of the United Kingdom, there are but 49 light-ships. While France has 224 lighthouses, but no floating lights along her coasts. The light-ship has but one advantage and one alone over the fixed light, and that is, it is mentioned in the text.

The light-ship has but one advantage and one alone over the fixed light, and that is the one mentioned by Mr. Robertson, *viz.*, that it can be shifted as wanted without any *extra* cost. But its disadvantages as compared with the fixed light are many.

1st.—It is more liable to casualties; for instance it may drift away from its position, and thereby endanger life and property by misleading vessels.

3rd.—It cannot be recovered.

4th.—A duplicate light may be made for less than four times the annual cost of a good one.

4th.—A duplicate light-vessel would be absolutely necessary to replace the one afloat for repairs either from wear or tear or in case of accident, thus increasing the original cost *two-fold*.

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5th.—The light is liable to become dimmed by sea spray, in heavy weather, when most needed.

6th.—A ship afloat cannot exhibit a steady and brilliant light, as it would be affected by the motion of the sea.

7th.—Light-vessels are only adopted in the structure of any kind from various causes.

8th.—These lights are seldom exhibited at night, and are visible at a greater distance than 10 miles to 15 miles.

It will thus be seen that the one sole advantage of the proposed system is greatly counterbalanced by the risk to life and property, and diminution of illuminating power, both of which contingencies might be avoided by the adoption of a fixed light.

Next, we have to consider the cost of a light-ship suitable for Cocanada and its upkeep, with costs of annual repairs, etc.

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Two estimates have been received for the construction of a light-vessel, one from the Government Surveyor and Builder to the Port of Callao, and another from Cocanada. The first is from the Government Surveyor and Builder to the Supreme Government; and the second from Captain Castor, Master Attendant at Cocanada; the former as coming from a professional man deserves the best consideration. He estimates the cost of a light-ship of 250 tons, builders' measurement, with a dioptric apparatus for the light, and spare stores, together with a supply of provisions for the first six months (for a native crew) at Rupees 1,27,000. The annual repairs are estimated at Rupees 2,000, and the maintenance of the light-vessel at Rupees 1,100 per mensem.

It is a rule with the Trinity Board to have in almost every instance a duplicate light-ship, and taking into consideration the resources of this Presidency in marine matters, which are simply *nil*, it will be absolutely necessary to have a duplicate vessel ready at all times in the event of the loss of the first one, or, in the event of any serious accident occurring to her, to be substituted in her place. I would therefore add to the first cost that of a second vessel with illuminating apparatus complete, which would bring it up to say Rupees 2,54,000.

[illegible]

If it is finally decided that a floating light is the best method to be adopted, then there can be no doubt to have her built at Calcutta would be the best course, with a view to have a *first class* vessel.

sel. We then, with the data above given, arrive at the following results:—

Cost of a light-vessel of 200 tons register with ground beam, &c.	73,000
stores, etc., complete, at 365 Rupees per ton...	36,000
Apparatus (if first class dioptric)	
	<hr/> 1,09,000

Its annual cost of maintenance would be as follows:—

Commander's and crews' wages, including 10 per cent. in the Calcutta estimate, 1,100 Rupees per mensem	...	...	13,200
Repairs	...	...	2,000
Oil and contingencies for apparatus	...	...	1,680
		Per annum Rupees...	16,880

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(a decade having expired between the two surveys,) Lieutenant Fell's Chart gives $3\frac{1}{2}$ fathoms beyond the shoals, at a distance $4\frac{1}{2}$ mile from the lighthouse, on a bearing of E. N. E. Lieutenant Taylor's Chart on the same bearing and at the same distance gives $3\frac{1}{2}$ fathoms at a distance of $4\frac{1}{2}$ miles off. But on a bearing of north by east, that is *inside of the bay*, there is a difference. In Lieutenant Fell's Chart, on a bearing of north by east at a distance of $5\frac{1}{2}$ miles, there is a depth of $\frac{1}{2}$ fathoms; while in Lieutenant Taylor's Chart at a distance of $6\frac{1}{2}$ miles, there is only 4 fathoms. But, although the shoals may be extending on *this bearing and further west*, there appears to be no rapid extension to E. N. E. and N. E. of the lighthouse. Hence we may conclude that a lighthouse on piles, placed on this latter bearing, would not be required to be shifted for a period of, say, 50 years, as it would from the spot indicated be visible over an arc extending to 17 miles seaward, where a ship would be *beyond soundings*, and the light once made all difficulties are at an end, as any vessel would find her way in by the help of the lead, the beacon buoys, and cross-bearings with the Cocanada light. It would, however, be advisable to abandon the present column at the mouth of the Cocanada river, and erect a flagstaff of the same elevation as at Gopaulpore to exhibit a fifth order light, which would be seen at a distance of ten miles off, and lead a ship to the anchorage direct.

The matter is one requiring serious consideration, and it would be advisable to forward the whole correspondence to the Supreme Government for final decision, after consulting Lieutenant-Colonel Fraser.

MADRAS,
28th January 1873.

(Signed) F. E. MARSHALL,
First Asst. Master Attendant, Administrative Department.

From the Master Attendant, Cocanada, to the Master Attendant, Administrative Department, Madras, dated Cocanada, 3rd August 1872, No. 573.

I HAVE the honour to submit an estimate for a light-vessel of 120 tons burthen, to be built entirely of teak and copper-fastened, and the bottom covered with yellow metal. The estimate for the hull embraces every requisite for a light-vessel.

2. The ground tackling must be furnished from England. Manufactured iron is rising so rapidly in price that the amount fixed for this item may or may not suffice.

3. I believe Stevenson's Dioptric Light apparatus, such as those furnished for the vessels at the Sandheads, cost £ 500; but, as we shall require some lanterns, regulation lights, and other spare stores and duplicate articles, I have fixed the sum of Rupees 8,500 so as to cover the outward freight and all incidental charges.

4. The wages for the crew include their provision. I am of opinion that the men had better find their own provision at fixed rates of wages, than this expense with its endless waste to be borne by Government. It will be necessary to include the item under the head "Crew" in the Budget of 1873-74.

5. As the light-vessel will occupy seven or eight months in building, arrangements should be made to watch the fluctuations of the market, so as to secure good timber at the cheapest rates. Moreover, if it is decided *positively* to build a light-vessel, timely notice to secure the widest publicity possible should be given that the Hoop Island light will be discontinued and a floating light substituted instead. The date of the change might be fixed for the 1st January 1874.

6. The order of Government on this question embraces a Marine Survey of the locality. As the light-vessel will be so fixed as to leave all dangers to the westward of her position, I am respectfully of opinion that no Marine Survey is necessary.

From the Officiating Master Attendant, Calcutta, to the Master Attendant of Madras, dated Fort William, 21st October 1872, No. 6,255.

With reference to your letter No. 4,884, dated 3rd September, I have the honour to forward a plan* and specification of a floating light-ship. The cost of a vessel with everything on board ready to take up her station, including stores for six months, is Rupees 1,27,000, of this sum 35,000 represent the value of her fittings, apparatus, etc.

* Mastig Plan.

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2. Her annual repairs would amount to about Rupees 2,000
3. Spare cables, etc., are obtained from England on indent. All our floating lights are fitted with Saunders' springs.
4. Copy of the Establishment of a light-vessel is appended for your information.

Cost of Establishment of a Light vessel for a Month.

	RS.
1 Commander	300
Mess allowance	100
1 Chief Mate	150
1 Second Mate	100
26 Crew	438
Fresh Provision	12

Total... 1,100

(Signed) S. BOON,
Officiating Master Attendant.

CALCUTTA,
21st October 1872.

TRANSFERRED to the Public Works Department for disposal.

(Signed) W. HUDLESTON,
Chief Secretary.

MEMORANDUM.

In his letter recorded with G. O., No. 146, of 25th May 1871, Mr. Dalrymple reported that Mr. Robertson and he had come to the conclusion that in consequence of the encroachment of the land on the sea to the northward, eastward, and southward of Hoop Island, the lighthouse on its south side should be abandoned, and a new one erected about five miles to the northward and eastward, either on a dry patch of shoal or farther out in 6 feet water. In conformity with which the above order was passed in the Marine Department, calling for plan and estimate of a new lighthouse.

2. Mr. Robertson's report, however, advocated a light-ship for reasons which he has repeated in his letter printed with G. O., No. 1,915, of 12th August 1872, *viz.*, the facility with which it might be shifted as the water shoaled, the liability of any structure on soft ground at the mouth of a river subject to violent floods to be undermined, and the objection to expose piles to the action of breakers. Provision for a light-ship was accordingly ordered to be made, and a revision of the survey of Cocanada Bay to be undertaken in the Marine Department.

3. Mr. Dalrymple now submits a memorandum by his Assistant, Mr. Marshall, with two estimates for light-ships, and recommends that a masonry lighthouse be constructed on a favourable site, to be chosen to the northward and eastward of the present light. The one estimate prepared by the local Master Attendant, Mr. Castor, amounted to Rupees 40,000 for provision of the light-ship and apparatus complete, and an annual outlay of Rupees 6,300 for its maintenance. The other estimate, amounting to Rupees 1,27,000, represented the actual cost of the light-ship at the mouth of the Hooghly river, including six months' provisions, Rupees 2,000 per annum being allowed for repairs, and Rupees 13,200 for

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maintenance. This estimate is reduced by Mr. Marshall to Rupees 1,09,000 first cost, the maintenance including oil and contingencies being raised to Rupees 16,880 per annum. His estimate for the screw-pile lighthouse which he recommends is Rupees 76,000, including apparatus, and Rupees 3,600 annual cost of maintenance.

4. The Chief Engineer has the honour to remark that in the abstract the advantages of a lighthouse over a light-ship are incontestable. Even the single advantage claimed by the latter, that of being movable, being participated by the iron screw-pile lighthouse to the extent that it may be taken up and utilized elsewhere, although, meanwhile, it must be replaced by another structure. A light-ship should accordingly be adopted at Cocanada only if it be found impossible to place a lighthouse in such a position as shall secure all the objects in view.

5. The site recommended by Mr. Dalrymple for the construction of a masonry lighthouse is objectionable, as being little more than $2\frac{1}{2}$ nautical miles in advance of the present lighthouse; he himself having originally recommended, and Mr. Robertson insisting on, an advance of twice that distance. There are two sites along the same bearing laid down in Commander Taylor's Chart, between which the advocates of a screw lighthouse appear to be undecided. One marked "hard sand, dry at half ebb," between $3\frac{1}{2}$ and 4 nautical miles advanced, and one in 3 fathoms water all but 5 miles advanced; supposing no alteration since 1857, the date of the chart, the first site would be objectionable for both the reasons brought forward by Mr. Robertson: first, its liability to be undermined by the action of the eastern channel, an arm of which runs behind it; and, secondly, its exposure to action of breakers, especially in storms. Moreover, its position as well as that indicated by Mr. Dalrymple for a masonry lighthouse would not apparently be easily accessible.

6. A more advanced position, in 3 fathoms water, (which at the rate of accretion of the ten years preceding 1857, would be nearer 6 than 5 nautical miles in advance of the present lighthouse,) would be unobjectionable, but that the rate of advance of the coast line would in little more than ten years bring it from the 3 fathoms line on to the line of breakers. And if that trial were survived, the lapse of a further indefinite period might subject the site to the other danger, that of becoming part of the deep bed of the channel in rear. The great difference between any site proposed by Mr. Marshall and that of the Krishna Shoal lighthouse, is that the latter lies inside a shoal which is permanent, not shifting; and is founded on a suitable bottom not liable to be undermined. The parallel lies rather with the proposal to build a screw-pile lighthouse on the Prings at Bombay, which has been so strongly deprecated by Colonel A. Fraser.

7. Altogether, Colonel Walker cannot recommend the attempt to place a lighthouse far enough in advance of the present one to be of any use, until at least a partial, but thorough, re-survey shall have been made of the shoals as at present existing in a north-easterly direction from the latter; and he has so little hope of a satisfactory result from such investigation, that he would prefer immediate action in the matter of providing a light-ship. And he sees no good reason for not accepting Captain Castor's estimates, and having the work locally carried out; the exigencies of a light-ship at so exposed and distant a spot as the mouth

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of the Hooghly being very much greater than those of a light-ship off Cocanada Bay can be. No survey will then be required, as pointed out by Captain Castor; and it is to be borne in mind that in case of anything happening to the light-ship there is the present lighthouse to fall back on at once till she can be replaced, so that a duplicate light-ship may be dispensed with.

8. A reference to Colonel Fraser may, as suggested by the Marine authorities, be the most satisfactory mode of deciding the question.

(Signed) G. W. WALKER, Colonel, R.E.,
Chief Engineer, P.W.D.

27th February 1873.

No. 731.

ORDER THEREON, 31st March 1873, No. 995.

CIVIL WORKS, No. 44.

ORDERED that the following letter
be sent:—

(Here enter No. 996, dated 31st March 1873.)

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,
Secretary to Government.

Exd. S. T. Austin.

PUBLIC WORKS DEPARTMENT,
FORT ST. GEORGE, 31st March 1873.

No. 732.

No. 996.

To

THE SECRETARY TO GOVERNMENT, NORTH-WEST PROVINCES,
IN THE PUBLIC WORKS DEPARTMENT.

CIVIL WORKS, No. 45.

SIR,—I am directed to request
that you will obtain the permission of
His Honour the Governor of the North-

West Provinces for submission of the accompanying papers to Colonel A.
Fraser, C. B., Chief Engineer of the Public Works Department, for his opinion.

2. They relate to the question of lighting the entrance to the Port of Cocanada,
a subject on which Colonel Fraser's decision will be acknowledged as final by
those holding either side. And I am directed to refer for such decision the follow-
ing points, viz.:—

I.—Whether a lighthouse on piles can safely be placed on the sands north of
Cape Gordeware at a sufficient distance in advance of the existing lighthouse to
warrant the removal of the latter?

II.—Whether further survey is necessary for determination of the above point,
or whether it can satisfactorily be settled from existing data?

III.—Whether, under all the circumstances, a new lighthouse on piles; a
masonry lighthouse of an improved description $2\frac{1}{2}$ miles in advance of the present;
the retention and improvement of the latter; or a light-ship, is the preferable
expedient?

IV.—Whether in such a position, if a light-ship be determined on, its original
supply in duplicate is indispensable?

3. His Excellency the Governor in Council would also, I am instructed to
add, be glad of any information Colonel Fraser may have it in his power to give
as to the susceptibility of iron-piles to corrosive influences when used in such
structures as lighthouses or piers.

I have the honour to be,

Sir,

Your most obedient servant,

(Signed) G. W. WALKER, Colonel, R.E.,
Secretary to Government.

Exd. S. T. Austin.

Memorandum
on the subject of a light for leading
vessels clear of the shoals off Point
Gordwain and Hope Island and
into Coronada Bay.

The Government in a recent order
have adopted a suggestion made by Mr.
Robertson, Marine Engineer, in his
report on Coronada Harbour, viz to do
away with the light column on Hope
Island, and substitute in lieu a floating
light vessel, to be moored in deep water,
clear of the North Eastern extremity
of the shoal off the point.

Mr Robertson's reasons for
proposing this change are first - that
"floating light vessels may be shifted
"as required with the increase of the
"Delta off the point. Second, that a
"light on screw piles, if adopted, instead
"and fixed at the mouth of a river,
"in flood, is liable to be undermined
by.

by the current, if the ground is soft,
and especially if subject in addition
to the action of breakers.

It is apparent from the
report referred to that Mr. Robertson
concluded with certainty that there
were but two plans available for
efficiently lighting this part of the
coast, and a reference to Taylor's chart
will show, I think, that he was right.

Granting this to be the case,
it behoves us then to compare the
two plans available viz, a floating light
and a lighthouse on screw piles, looking
closely at the advantages and dis-
advantages of both systems, with
their relative actual cost and annual
upkeep, with a view to arriving at a
satisfactory result.

We will first take the
light ship, and consider its uses
and advantages.

Light

155
Light vessels have from the
close of the last century been employed
as leading lights, and for the purpose
of indicating the fairway channel to
the entrance of a river, and particularly
of large rivers, Bays and Estuaries,
as well as shoals and hidden reefs
at sea, at a distance from the land.
To exemplify this statement, I will
give a few instances. The light vessels
on the Goodwin sands, where from
the shifting nature of those sands
it has been found impossible to erect
a structure of any kind whatever;
the mouth of the Thames river,
the entrance to the Humber river,
the entrance to Bramber Bay or
Hearbow, and the light vessel referred
to by Mr. Robertson in Morecambe
Bay may also be cited as an example,
where there are no less than 5 lights
and 2 lightships to guide vessels safely
into

into the Bay. It is here worthy of remark
that while there are no less than
156 lighthouses and harbour lights
along the Coasts of the United Kingdom,
there are but 49 lightships. While
France has 224 lighthouses, but no
floating lights along her Coasts.

The light ship has but one
advantage, and one alone over a
fixed light, and that is the one
mentioned by Mr. Robertson, viz.
that it can be shifted as wanted
without any extra cost.

But its disadvantages
as compared with the fixed light
are many.

1st It is more liable to
casualties, for instance it may drift
away from its position, and thereby
endanger life and property by
misleading vessels.

2^d It may be lost with
all

all hands on board.

3^{rdly} It can only be maintained
at more than four times the annual
cost of a fixed light.

4^{thly} A duplicate light vessel
would be absolutely necessary to replace
the one afloat for repairs either from
wear or tear, or in case of accident,
thus increasing the original cost
two fold.

5^{thly} The light is liable to
become dimmed by sea spray, in heavy
weather, when most needed.

6^{thly} A ship afloat cannot exhibit
a steady and brilliant light, as it
would be affected by the motion of
the sea.

7^{thly} Light vessels are only
adapted in places where it is utterly
impossible to build a structure of any
kind from various causes.

8^{thly} These lights are seldom
exhibited at a greater elevation than
40 feet, and are not visible at a
greater.

greater distance than 10 miles to 15 miles

It will thus be seen that the one sole advantage derived from the adoption of the Lightship is greatly counterbalanced by the risk to life and property, and diminution of illuminating power, both of which contingencies might be avoided by the adoption of a fixed light.

Next we have to consider the cost of a lightship suitable for Cocanador and its upkeep, with costs of annual repairs &c.

Two estimates have been received for the construction of a suitable vessel - one from Calcutta and another from Cocanador. The first is from the Government Surveyor and Builder to the Supreme Government; and the second from Captain Baston, Master Attendant at Cocanador, the former as coming from a professional

man deserves the best consideration. ¹⁹⁹ He estimates the cost of a lightship of 250 tons, builders' measurement, with a Dioptric apparatus for the light, and spare stores, together with a supply of provisions for the first 6 months (for a Native crew) at Rupees 12,4000. The annual repairs are estimated at Rupees 2000, and the maintenance of the light vessel at Rupees 1100 per annum.

It is a rule with the Trinity Board to have in almost every instance a duplicate lightship, and taking into consideration the resources of this Presidency in Marine matters which are simply nil, it will be absolutely necessary to have a duplicate vessel ready at all times, in the event of the loss of the first one, or in the event of any serious accident occurring to her, to be

substituted

substituted in her place, I would
therefore add to the first cost that
of a second vessel with illuminating
apparatus complete, which would
bring it up to say Rupees 2,54,000.

Captain Coates's estimate
is for a smaller vessel of 150 tons, and
the dimensions of which, though not
given in his estimate, would probably
be those of some of the Trinity Board
Light vessels, which run about 150 tons
and cost about 30 £ per ton, somewhat
less than the Calcutta vessels appear
to do. A vessel of this size would
hardly be quite large enough for
the purpose, 200 tons being a more
convenient and safe size for riding
out the cyclones prevalent on our
coasts. Captain Coates's estimate
fixes the rate per ton of Hull at
Rupees 210 which is the full value
of a vessel such as would be constructed

at

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at Loringa, where labour is much cheaper
than at Calcutta. This item however is
without ground tackling and hawsers,
which Captain Coates estimates at
5875 Rupees; but which is low, and
may be put down at say 7000 Rupees
in round numbers; thus raising the rate
of Hull and stores to 220 Rupees per
ton.

If it is finally decided that
a floating light is the best method
to be adopted, then there can be
no doubt, to have her built at Calcutta,
would be the best course, with a view
to have a first class vessel.

We then with the data above
given arrive at the following results.

Cost of a light vessel of 200 tons register with ground tackling, spars stores &c complete, at 365 Rupees per ton. Rupees 73000.	
Apparatus (if first class dioptric) —————	36000.
	109000.

Its annual cost of maintenance would be as follows.

Commanders and crews wages, including provisions as particularized in the Calcutta estimate, 1100 Rupees

per annum ————— Rupees 13,200

Rupees ————— " — 2000

Oil and Contingencies for apparatus ————— " — 1680

per annum Rupees 16,880

Let us now see what the cost of a screw pile lighthouse with apparatus would be, and for this we have capital data to go upon; this system of lighting having been already adopted by the Supreme Government (after much discussion) for lighting the coasts adjacent to Rangoon.

There have been erected no less than 4 lighthouses on screw piles, one on the Krishna Shoal in 3 fathoms water, one on China Bunker, one on the Eastern Gyro, and one on Oyster reef near Akyab.

Let us take a second class light

light of this description, which would ³⁹amply satisfy the wants of the shipping making Escanador, and we have the following results.

A screw pile lighthouse and tower like that on China Bunker (vide plan) to display a light of the 2 order, at a height of 90 feet above the level of the sea and visible at a distance of 17 Nautical miles from the masthead of a ship ————— Rupees 60000

Apparatus 2 Order Dioptric fixed white light ————— 16,000

Rupees 76000

Annual cost of maintenance together with the cost of oil and contingencies ————— Rupees 2600

Superintendent per annum Rupees 100
Head lightkeeper ————— 15
8 Messrs at 10 Rupees ————— 80
1 Sweeper ————— 5
Oil and Contingencies per annum ————— 100

It now remains only to compare the two systems from a primary point of view, and it will be

be apparent at a glance that the screw piles have the advantage over the floating light vessel.

The difference in original cost is Rupees 33000 in favour of the screw piles. The difference in annual cost and maintenance Rupees 11,286 per annum.

The cost of maintaining a floating light for 5 years would at the end of that time build a new screw pile lighthouse further out if required. That is taking it for granted that any visible increase of the delta would take place in so short a period.

Before concluding this portion of the subject, it is very necessary, in order to establish the superiority of this system over the floating light, to quote freely the opinions of Lieutenant Colonel Fraser, whom no better authority could be obtained, and who has for the

last 12 years and more made the subject his earnest study, and on whose advice the Supreme Government places implicit reliance. Lieutenant Fraser, in reporting on the lighthouses referred to above says, "On consideration of the expenditure in money and time on these lighthouses, I went closely when at home in 1865-66 into the subject of a cheaper style of lighthouse more quickly and more easily erected, and also into the question of putting up such lighthouses in lieu of light ships, with reference to the saving of cost in erection and maintenance, and the comparatively smaller risk to human life, and as a good opportunity offered for testing the conclusions I had arrived at from careful investigation, the Government ordered the lighthouse on the Krishna to be put upon screw piles in deep water, as also those on shore at the China Bunker and Eastern Gyara from

from which a clear test of the economy of the two latter as compared with one light ship could be ascertained.

The piles of the Krishna Shoal have now been driven for two S.W. Monsoons, and none of the fears expressed in regards same have been verified.

It was lighted within 16 months of its having been commenced, is in deep water, and has cost including the light (which is fixed) not more than £16,000. Had circumstances been favourable, it might easily have been erected in from six to eight months. It is in three fathoms of water, at low water, is exposed to a heavy sea during the S.W. Monsoon, with a sea knust tide running at springs, and an important position for a light has been secured in deep water, where to have attempted any other kind of structure it would have cost ten times that sum, if it could have been done at all. This lighthouse

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bears a fixed light of the 2^d order.
Again, a lighthouse is exposed to danger from collisions though not from earthquakes, but in the latter kind she is exposed to the danger of being driven from her position, and she is generally in such a position at all events in these seas that if driven from her position she goes ashore. The Government of India have lost four

N. 3^d.

These vessels cost lightships within the last five years 5 lack of Rupees. with all hands on board.

Then looking at the difference of risk of human life, six men are necessary to the charge of a lighthouse, thirty men are necessary to the charge of a lightship. If the four light ships, which have been lost at the sandheads, had been four lighthouses, we should have lost only 24 men against 120. But in my mind one of these lighthouses in deep water, even under the worst conditions of

Collision

Collision are not in the least likely
to be wholly destroyed as the light
ships are, and therefore I am very strongly
of opinion, both as regards risk to life,
and risk to property, the light ships
are very far inferior to lighthouses, while
the superior efficiency of the lights is
shown from lighthouses instead of
lightships, is undoubted by every one
concerned in the controversy. Again
the Christiana Shoal Lighthouse costs
including establishment, etc. provisions
and stores, about Rupees 850 per month,
inclusive of a share of the salary of
the Lighthouse Inspector, and maintenance
of tender, while the maintenance of a
1st class lightship costs not less than
Rupees 2500, so that supposing the
Sandheads for instance were lighted
by six lighthouses instead of by six
lightships, the saving annually to the
Port Fund would be one lakh and
eighteen

21/2
eighteen thousand Rupees, which would
in each year pay for about $\frac{2}{3}$ of our
lighthouse, or in three years would
pay for the construction of two
lighthouses. In the above comparison
no mention has been made of the
comparative cost of repairs to either
description of light, though the wear
and tear of a lightship would be
of course much greater than of a
lighthouse.

In conclusion it is necessary
to meet the two reasons assigned
by Mr. Robertson for advocating a
floating light.

First because a floating light
can be shifted when required.

To this we reply so can a
light on screw piles, and this is a
fact which appears to have been
quite overlooked by Mr. Robertson.

Second that the screw pile
light

light would be undermined by the current from a large river, especially if subjected to the action of breakers.

To this we reply first that the lighthouse on the Krishna Shoal is situated off the mouth of a large river, the Sircacuddy; that it is situated down in very soft ooze; and that it has not yet been undermined.

But a lighthouse on one of the Sandy Shoals, which are dry at low water on the N.E. extremity of the Shoals off Godavari, could be so fixed that it would not be in soft mud, nor yet subjected to the action of breakers, for instance such a spot as is indicated in the accompanying chart.

With regard to the increase of the Delta, it has been very properly pointed out to Government by the
Acting

Public Works Dept
No 1435, dated
14th August 1872
Marine Dept
No 209, dated
20th August 1872.

31/3
Acting Superintending Engineer 1st Division,
in his letter recorded in the
Proceedings of Government marginally
noted, where he states "The late
Captain Thomson told me in 1870
that on removing the old buoy off
the point (Godavari) he could not
find that the Depth of water there
had decreased a foot, and he had put
down these buoys himself in 1854-55;
that the bay between Boringa and
Escomada has silted up no one can
doubt, and it is this which causes
the anchorage to be shifted further
and further North, a result brought
about by the Yancum river, a small
tributary of the Godavari, and not
by the main stream at all." And
it is here worthy of remark that
these buoys are still after the
lapse of nearly 17 years in the same
spot. Where there has been the
increase

increase of the Delta?

But this statement is

corroborated by a reference to two charts of the survey of this part of the Coast. The one by Lieutenant Hell in 1846 and the other by Lieutenant Taylor in 1857 (a decade having expired between the two surveys). Lieutenant Hell's chart gives $3\frac{1}{2}$ fathoms beyond the Shoals at a distance $\frac{1}{8}$ mile from the lighthouse on a bearing of E. N. E. Lieutenant Taylor's chart on the same bearing and at the same distance gives $3\frac{1}{2}$ fathoms at a distance of $\frac{1}{4}$ miles off. But on a bearing of N. by East, that is inside of the Bay, there is a difference. In Lieutenant Hell's chart, on a bearing of N. by E. at a distance of $5\frac{3}{4}$ miles, there is a depth of $\frac{1}{2}$ fathoms, while in Lieutenant Taylor's chart at a distance of $6\frac{1}{2}$ miles, there is only

212 fms.
212 fms.
212 fms.
212 fms.
212 fms.

only 4 fathoms. But although the Shoals may be extending on this bearing, and further west, there appears to be no rapid extension to E. N. E. and N. E. of the Lighthouse. Hence we may conclude that a lighthouse on piles placed on this latter bearing, would not be required to be shifted for a period of say 50 years, as it would from the spot indicated be visible over an arc extending to 14 miles seaward where a ship would be beyond sounding, and the light does make all difficulties over at an end, as any vessel would find her way in by the help of the lead, the beacon buoys, and cross bearings with the Escamada light. It would, however, be advisable to abandon the present column at the mouth of the Escamada river, and erect a flagstaff of the same elevation

as at Gopaulpore to exhibit a light
order light, which would be seen at
a distance of 10 miles off, and lead
a ship to the anchorage direct.

The matter is one requiring
serious consideration, and it would
be advisable to forward the whole
correspondence to the Supreme Government
for final decision, after consulting
Lieutenant Colonel Fraser.

Machras
Marine Office
28th January 1843.

~~Commandant~~
1st Lt. Master Attendant
Administrative Department

Administrative Department.

Madras 31.
Marine Office
28th January 1873

N. 383.

From

H. D. E. Dalrymple Esq^r

Master Attendant

Administrative Department

To

Madras

The Honourable W. Huddleston

Chief Secretary to Government

Marine Department

Fort Saint George.

Sir,

I have the honour to forward
for the information of Government two Es-
timates of the cost of a floating light
for Cocanada, recommended by Mr
Robertson, Harbour Engineer.

I regret that illness prevent-
ed me from reporting earlier to Government
on the scheme.

I have however instructed my 1st
Assistant, Mr. Marshall, who was well
acquainted with my opinions regarding
the relative advantages of fixed and
floating lights, to draw up an ex-
haustive

H.

The Letter No. 383 of 28th
January 1873 to Govt

P. M. 806/73.

Memorandum on the subject
of a light for Cocanada.

to Marine 40/73

haustive memorandum on the subject, which I have now the pleasure to forward to Government, with a few additional observations regarding this proposed floating light.

4 With reference to the Estimates now forwarded, as I am well acquainted with Captain Castor's abilities and the general correctness of his Estimates, I have no doubt that he could provide a floating light for the sum specified, but as a work of this sort must go to a Government Dock Yard, where the authorities are responsible for 1st Class materials and skilled labour the Estimate furnished by the late Captain Doon must be accepted.

5 By this estimate it will be observed that a light ship, with everything on board ready to take up her station including stores for six months will cost Rupees 12,000, and

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and this is not all - for, to keep faith with the shipping interest, a Duplicate light vessel will be absolutely necessary to replace the one afloat, which is liable to accident by fire or wreck, or may be blown out to sea during a hurricane, and then founder with all hands on board. Mr. Robertson's principal reasons for recommending a floating light are the following: First that it may be shifted when required by the increase of the Delta, and second that a light on crew piles at the mouth of a river in flood is liable to be undermined by the current.

7
Cost of a light ship, and a duplicate one including stores for six months as per Estimate from the Master Attendant Calcutta at Rupees 27,000 each. Rs 254,000.

Now in regard to the first reason assigned it is to be borne in mind the expenses of the light ships are specified in the margin, whereas a screw

screw pile light. Howe could be built for one fourth of the cost.

In answer to the second reason assigned, I may observe that firm ground can be found three miles to the Northward and Eastward of the present light house on Hope Island, where a brick and Chumam light house could be at once constructed and according to the present rate of extension of sand banks in that direction another would not be required further to the Northward for many years to come.

Taking all these incontrovertible facts into consideration, it is my opinion that this proposed enormous outlay on a light for a single Port in the Madras Presidency will be held to be entirely out of the question, and I respectfully recommend that orders be issued to Captain Easton and the Superintending Engineer of

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of the District to examine the North Eastern Coast of Hope Island, and to choose a site for a new light house, as decided on by Government, on a secure piece of ground as far North as it can be obtained, where, I believe, a solid foundation may be found for a brick and Chumam light house, which would cost one fourth of a screw pile one.

10. In closing this report, I must endorse my assistants recommendation of a reference, if His Excellency the Governor in Council see fit to do so, to Colonel Fraser, D.E. C.B. &c., whose opinions, based on his own experience, regarding the positions and construction of Lighthouses are invaluable.

I have the honour to be
Sir
Your most obedient Servant

M. D. S. Dalrymple
Master Attendant
Administrative Department

No 6255-
To The Master Attendant
Madras

Fort William Madras Attendant's Office
Calcutta the 21st October 1872

Sir

With reference to your letter No 4884 dated September 3rd I have the honor to forward a plan and specification of a Floating Light Ship. - The cost of a Vessel with every thing on board ready to take up her station including stores for six months is Rupees 1,27,000/- of this sum 35,000/- Rupees represent the value of her fittings apparatus &c. - Her annual repairs would amount to about Rupees 2,000/- two thousand. -

3 Spare Cables &c are obtained from England on Indent. all our Floating Lights are fitted with Saunders Springs. -

21 Aug 72 29-80. Arr
20 Aug 72 22-28. "
12 Aug 72 19- "
25 Aug 72 19-20 AC
27 Aug 72 29-31- "
9 Jan 73 8- "
30 Aug 72 21-28- "
10 Aug 72 23-29 AC
10 Aug 72 23-29 AC
1 Aug 73 11-12- "
1 Aug 73 11-12- "

Administrative Dept
The Master Attendant
The Chief Secretary
to Government
Marine Department
Fort Saint George.

Transferred to the Public Works Department for inspection.
The Public Works Department.
The Public Works Department.
The Public Works Department.
The Public Works Department.

Date 28 January 1873
Recd 28 Jan 1873
No 383
The Public Works Department
The Public Works Department
The Public Works Department
The Public Works Department
The Public Works Department

Brother 33 Q 141
22 Jan 73
22 Jan 73
22 Jan 73
22 Jan 73
22 Jan 73

Brother 33 Q 141
22 Jan 73
22 Jan 73
22 Jan 73
22 Jan 73
22 Jan 73

4 Copy of the Establishment
of a Light Vessel is appended for your
information.

I have the honor to be
Sir
Your Most Obedt Servt

[Signature]
Offr Master Attendant

[Signature]

Cost of Establishment of a
Light Vessel for a month.

	Rs	as	p
1 Commander	300	"	"
Mess Allowance	100	"	"
1 Chief Mate	150	"	"
1 Second Mate	100	"	"
26 Crew	438	"	"
Fresh Provision	12	"	"
Total	1,100	"	"

Fort William
Master Attendant's Office
Calcutta the 21st Oct. 1872

[Signature]
Offr Master Attendant
[Signature]

C. 23. 5. 8. 1873.

1873
The Master of the ship, 383 of 28 January

1873 4689 of 1872

From

The Master Attendant

Calcutta

Letter 21 } Oct 1872
Recd 28 }

P. M. 806/73.

Forwarded plan and

specification of a floating

light ship.

1873 4689 of 1872

4689 of 1872
The Master Attendant
Office Canada
3rd August 1872
To J. E. D. C. Dabry, Esq.
Master Attendant
Administrative Department
Made as
I have the honor to submit an
estimate for a light vessel of 20 tons
burthen, to be built entirely of
teak and copper fastened, and
the bottom covered with yellow
metal. The estimate for the hull
embraces every requisite for a light
vessel.
The ground tackling
to be furnished from England.
Iron plates furnished from England.
Manufactured iron is rising so
rapidly in price that the amount
given for this item may or may
not suffice.
The line, Standard
3. Dioptric light apparatus such as
those furnished for the vessels at the
Said heads, cost £500; but, as
we shall require some lanterns,
regulation

C. 27. 5884 1873

regulation lights, and other
spare stores and duplicate articles,
I have fixed the sum of \$8,500.
to cover the outward
freight and all incidental charges.

4. The wages for the
Crew included their provisions. I am
of opinion that the men had better
find their own provisions at fixed
rates of wages, than the expense
with its endless waste to be borne
by Government. It will be necessary
to include the item under the head
Crew in the Budget of 1873-74.

5. As the light vessel
will occupy seven or eight months
in building, arrangements should
be made to watch the fluctuations
of the market, so as to secure a good
timber at the cheapest rate. If however
it is decided positively to build
a light vessel, timely notice to secure
the widest publicity possible
should be given that the Hope
Island Light will be discontinued
and a Floating Light substituted
instead. The date of the change
might

might be fixed for the 1st January
1874.

6. The Order of
Government on this question embraces
a Marine Survey of the locality.
As the light vessel will be so fixed
as to leave all dangers to the westward
of her position, I am respectfully
of opinion that no Marine Survey
is necessary.

I have the honor to be
Sir
Your Most Obedt Servant
J. M. Castor
Master Attendant

C. 22-5847 1873

Memorandum

In his letter recorded with G.O. No. 1871, Mr. Dabrymple reported that Mr. Robertson and he had come to the conclusion that in consequence of the encroachment of the land on the sea to the Northward, Eastward, and Southward of Hope Island, the Light House on its southern side should be abandoned, and a new one erected about 5 miles to the Northward and Eastward, either on a dry patch of shoal or farther out in 6 feet water, in conformity with which the above order was issued in the Marine Department, calling for Plan and Estimate of a new Light House.

Mr. Robertson's Report however, indicated a Light ship for reasons which he has reported in his letter printed with G.O. No. 1915 of 12th August 1872, viz the facility with which it might be shifted.

The letter No. 585 of 29 January 1873 to General from the Marine Department.

3959 of 1872

The Marine Department

1873

1873

Subject an estimate for a Light vessel and establishment in the Marine Department

1873

1873

1873

for the construction of a masonry Light House
is objectionable as being little more than $2\frac{1}{2}$
nautical miles in advance of the present Light
house, he himself having originally recommended,
and Mr Robertson insisting on, an advance of twice
that distance. There are two sites along the
samer bearing, laid down in Commander Taylor's
chart between which the advocates of a Screw Light
House appear to be undecided. One marked
"hard sand, dry at half ebb" between $3\frac{1}{2}$ and
4 nautical miles advanced. And one in 3
fathom water all but 5 miles advanced, sup-
posing no alteration since 1857 the date of
the Chart the first site would be objection-
able for both the reasons brought forward
by Mr Robertson & its liability to be
rendered by the action of the Eastern
Channel, an arm of which runs behind
it. And 2nd its exposure to action of breakers
especially in storms. Moreover its position as
well as that indicated by Mr Dalrymple
for

55
for a masonry Light house would not apparently
be easily accessible. ~~in an~~ ^{more} advanced position, in 3
fathom water, (which at the rate of accretion of
the 10 years preceding 1857, would be nearer 6
than 5 nautical miles in advance of the pre-
sent Light house.) would be objectionable
but that the rate of advance of the coast
line would not be more than 10 years
bring it from the 3 fathom line on to the
line of breakers. And if that time were
diminished then lapse of a further indefinite
period might subject the site to the other
danger, that of becoming part of the
depth bed of the channel in rear. The
great indifference between any site proposed by
Mr Marshall and that of the Krishna
shoal Light house is that the latter
lies inside a shoal which is permanent not
shifting,

shifting, and is founded on a suitable bottom
not liable to be undermined. The parallel
lies rather with the proposal to build a
series of Light houses on the Prongs at
Bonleay, which has been so strongly depre-
cated by Colonel A. Fraser.
Altogether, Colonel Walker cannot
recommend the attempt to place a Light house
far enough in advance of the present one
to be of any use, until at least a partial
but thorough re-survey shall have been
made of the strait as it present existing
in a north Easterly direction from the latter.
And he has so little hope of a satisfactory
result from such investigation, that he
would prefer immediate action in the
matter of providing a Light ship. And
he sees no good reason for not accepting
the plan proposed by Captain

5928
Captain Baston's estimates and having the
work locally carried out; the exigencies of
a Light ship at so exposed and distant
a spot, as the mouth of the Hooghly being
very much greater than those of a Light
ship off Cocanada Bay can be. No
survey will then be required, as pointed out
by Captain Baston; and it is to be borne in
mind that in case of any thing happening to
the Light ship there is the present Light
house to fall back on at once, till she can
be replaced; so that a duplicate Light ship
may be dispensed with.

A reference to Colonel Fraser may,
as suggested by the Marine authorities, be the
most satisfactory mode of deciding the question.

27th February 1873. Signed G. W. Walker Col R.E.
Chief Engineer
S.P.W.

Submitted for orders

Whether to prefer
for immediate action
in the Marine Dept.
for promotion of
light ship as early
as possible for Capt
Carter -

Or to make the
reference to General
Dresser at Alaska
- best -

G.W.W.

I have read with much interest Mr. Marshall's
Memo: and Col Walker's comments thereon - and
am I confess unable to form any very definite
opinion - The advantages of a light house over
a floating light vessel are very great, and before
sanctioning the latter a fresh survey of
the shoals would seem necessary so as to
satisfy us that a light house is
impossible - Economy of human life & money

will be secured by the
light house.

Perhaps the best plan
will be to request the
Govt. of India to open
all their papers to let
Fraser & his opinion.

1st whether we have
sufficient information
as to the present condition

of the shoals & sites to determine
the question of building
a light

house on screw piles. or as proposed by Mr. Dalrymple
2ndly whether in his
opinion, a light house
should be provided on
a floating light

3rd whether the large
cost of building 2 light
ships, as proposed is
necessary, or whether

in Mr. Marshall's Memo
the number of light ships
lost with all hands on
board at the roughly
month.

it will be safe to embark
the construction of a single
light ship to Captain
Carter as proposed, falling
back on the present
light house temporarily
should an accident
happen to the light
ship.

PSE

Cd. Walker considers that after being
come in the immediate construction of
a light ship - because he does not
think that further investigation
will be "satisfactory", as a means of
enabling us to decide whether a light
house can properly be located
It is evident, however, that a light ship
will be very much more expensive
than a light house, - from Captain W. Carter

the Commission letter says that I do not

Estimate, which Col. W. Dalrymple
 thinks (for reasons which he gives) would
 be exceeded (though Col. Walker is not
 of that opinion).
 The two questions, whether a light house
 or light ship would be best (offering
 the expense & expense); and whether
 a light house is practicable; whether
 (if this is doubtful) the point can be
 decided ~~by~~ ^{by} means further investigation;
 and whether, if so, Circulate
 what course the
 investigation should take; are questions
 on which it is not seem desirable to leave
 Mr. Fraser's opinion.
 Considering that it appears likely that
 a light-ship will be prepared, - I shall be
 disposed to add another question, viz.
 whether it is really necessary to abandon
 the present structure. The reasons for doing
 so, are not fully stated: and the cost of
 July/73 light ship with a windmill large

List of papers sent to the Secy to Govt.
 N. H. P. with letter no 87.

- 1 Proposed dimensions & specification
 for a Light Vessel same as now
 moored at the mouth of the River
 Hooghly
- 2 Sketch showing the mooring plan of
 a floating Light Vessel
- 3 Estimate from the Master Attendant
 at Cocanada for a floating
 Light Ship
- 4 Drawing of a Floating Light
 Vessel
- 5 Chart of Coniger or Cocanada
 Bay showing the Wm. Goddard
 Monitors surveyed by Lt
 Taylor May 1-1872
- L. G. O. - No. 1449 of 12 June/72 with Chief
 Eng's Memo: of 8 Mar/72
 attached

- by GO-146. 25 May /71 Marine Dept
 8 - no 5 - 9 Jan /71 - Co -
 9 - no 90 27 Mar /71 - Co
 10 - no 1243 26 April /67 PWD
 with memo. by Mr. A. Fraser CB
 R2 on Light Houses on Screw
 piles - (printed)
 11 - G.O.S. - 1596 - & 1597 2732
 July /72. PWD
 12 - Letter to G. Robertson Esq.
 2730 July /72 - 1597 -
 13 - G.O. no 1538 2714 Aug /72
 14 - G.O. no 1915 2712 Aug /72
 15 - G.O. no 146 - 2726 May /71
 16 - Chart forming a Bay by the H.M.S. "H"
 17 - Chart of the coast of Peru.
 18 - Plan of Light House.

Manuscript Encls.

- Letter by Capt. Engr. 27 Feb /73
 Memo - May 1st 1873. Mr. A. Fraser Esq.
 day 28 Jan - '73.
 Letter from Mr. A. Fraser Esq. 21 Oct /72.
 no 6255 day 21 Oct /72.
 Letter from Mr. A. Fraser Esq. 28 Jan /73.
 no 383 day 28 Jan /73.
 Letter from do - no 573 - 3 Aug /72.

From the

Proceedings of the Marine Court
995 Read the following

The Master Attendant
Administrative Dept.
thru the Marine Department

H.E. No. 3837 28 January 1873

996 Ordered that the following
letter be sent

The Secy. to Government
N.W. Provinces
in the Dept. of Works

M.

Sir,
I am directed to re-
quest that you will
obtain the permission
of His Honour the
Governor of the N.W.
Provinces for submit-
tion of the accom-
panying papers
to be sent by Colonel
A. Fraser C.B.
Chief Engineer of
the P.W. Department

in the Province under
his protest in his opinion

They relate to the
question of lighting
the entrance to the

Port of L'Anse-au-Loup,
a subject on which
Colonel Fraser's
decision will be ac-

knowledged as final
by those holding either
side. And I am di-
rected to refer for
each decision, the
following points, viz.

I. Whether a Light-
house on Piles can
safely be placed on
the sands north of
Cape Godsway at a
sufficient distance in

advance of the existing
Lighthouse to warrant
the removal of the
latter?

II. Whether further
survey is necessary for
determination of the
above point, or whether
it can satisfactorily
be settled from existing
data.

III. Whether under all
the circumstances a
new Lighthouse on
Piles, a Masonry
Lighthouse of an im-
proved description
2 1/2 miles in advance
of the present, the re-
tention and improve-
ment of the latter,
or a Lightship, is the
preferable expedient.

IV - Whether in such a position, if a Light-ship be determined on, its original supply in duplicate is indispensable -

His Excellency the Governor in Council would also, I am instructed to add, be glad of any information Colonel Fraser may have it in his power to give as to the susceptibility of Iron Piles to corrosive influences when used in such structures as Light-houses or Piers

I have &c

W.W.

72

N 730 to 732.

610 Mar 13 @ 14

to S. Despatch 3/3/73 into enclosure
as per list annexed.
to plans despatch 2/4/73
S.E. despatched - 24/4/73

1/28/86 *

Govt. of 1873 Madras.

PUBLIC WORKS.

To The Secretary to the Govt
of M. P.

Date:

Recd.

Encl. 3

G. O. 31 "Mails" No. 990296

No. 730-731 & 732

Flanking Light of Cocanada.

Passing orders on letter from
the Master Attendant, Madras,
forwarding, with statement
estimates of the cost of
planting light of Cocanada.

Forwarding papers
on the relating to the question
of placing a flanking
light at the entrance to the

Port of Cocanada and in
quoting that the permission
of His Honor the Governor of
the N. W. Provinces may
be obtained for their sub-
mission to the Local Board for its
opinion.