NEW SOUTH WALES.

NEWCASTLE LIGHT HOUSE.

REPORT FROM THE SELECT COMMITTEE ON

NEWCASTLE LIGHT HOUSE,

WITH APPENDIX

AND MINUTES OF EVIDENCE.

ORDERED, BY THE COUNCIL, TO BE PRINTED,
31st August, 1852.

SYDNEY:
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1852.
EXTRACTS FROM THE VOTES AND PROCEEDINGS OF THE LEGISLATIVE COUNCIL.

VOTES No. 8, FRIDAY, 18 JUNE, 1852.

8. Newcastle Light House:—Question,—That a Select Committee of eight Members, inclusive of the Mover, be appointed to inquire into and report as to the best position and means for the erection of a Light House at the entrance of the Harbour of Newcastle—put and passed.

Question—That such Committee consist of Colonel Barney, Captain King, Captain Lamb, Mr. Nichols, Mr. Cowper, Mr. A. Osborne, Dr. Douglass, and Mr. Bowman—put and passed.

VOTES No. 46, TUESDAY, 31ST AUGUST 1852.

2. Newcastle Light House:—Captain King as Chairman, brought up the Report of, and laid upon the Table the Evidence taken before, the Select Committee appointed on the 18th June last, to inquire into, and report as to the best position and means for the erection of a Light House at the entrance of the Harbour of Newcastle.

Ordered to be printed.

LIST OF WITNESSES EXAMINED.

Mr A. Livingston .............................. 2 | Charles E. Robinson Esq ....................... 4
Captain John E. N. Bull. ...................... 3 | E. T. Blacket Esq .............................. 6
The Select Committee of the Legislative Council, appointed on the 18th of June, 1851, "to inquire into and report as to the best position and means for the erection of a Light-house at the entrance of the Harbour of Newcastle," have the honor to report for the information of your Honorable House that, having taken Evidence, they have agreed to the following Report:

That in consequence of the Port of Newcastle being situated at the extremity of the Long Beach, and in the depth of the indentation of the Coast to the south of Point Stephens, a light to point out the position of the entrance is absolutely necessary for the safety and guidance of vessels, particularly of strangers, approaching the Port during the night; and inasmuch as the trade has increased during the last two years to a considerable extent, it is of the greatest importance that the present insufficient and frequently useless substitute, which is merely a heap of ignited coal on the Signal Hill, should be replaced by a substantial light on the Nobby Rock; which, being situated at the extreme outer end of the Breakwater, and forming the south point of the entrance, is well adapted for the purpose of enabling ships, arriving off the Port at a late hour in the evening, to keep their position during the night; and even, if pressed by stress of weather and unable to keep an offing, to reach an anchorage.

Having satisfied themselves as to the proper site for the light, the attention of the Committee was then called to the consideration of the materials of which the Light-house should be constructed; and having heard the Evidence of Mr. Robinson respecting the advantages as well as the cost of erecting one of iron similar to the Light-house at Port Morant in Jamaica; and also the Evidence of Mr. Blacket, the Colonial Architect, in recommendation of its being built of timber, they have decided in favor of the latter, in consideration of its being sufficiently durable, and that it could be erected in a much shorter space of time, as also at a much less cost than one of iron.

An Iron building by Mr. Robinson's estimate would cost independent of the light apparatus, but including freight, £2,500, whereas Mr. Blacket considers that the cost of a building sufficient for the purpose of carrying a similar light, including a dwelling for the light keeper and his assistant, would not be more than £750.

The light which would be common to either, and which Mr. Blacket recommends to be on the Dioptric principle, he thinks may cost including freight about £1200; so that the wooden building in its complete state would be erected for about £2000, to which adding for contingencies 10 per cent., the amount would be £2,200, whilst the Iron light-house completed with the light would cost £4,000. (This sum includes the expense of erecting the Iron building not allowed for in Mr. Robinson's estimate.)

Doubtless the greater durability of the latter ought to be taken into consideration; but the hardwood of this Colony, if carefully selected and protected from the effects of the white ant, by being saturated with hot coal tar, would endure for a considerable time, and at a fitting opportunity may give way to one of a more durable material.

The Committee also ascertained that the expense of maintaining a Dioptric light would be very much less than one on the Catoptric principle. The quantity of oil consumed by the former in the climate of England is 384 gallons per annum; whilst double that quantity is required for the latter.

The attention of your Committee having been incidentally called to the possibility of the light at Nobby's interfering with the site for a battery, they satisfied themselves, after due inquiry, that if it were found necessary that any defensive works should be constructed to prevent an enemy from entering the Port or from firing into the Town, the better position for...
for a battery would be the Signal Hill; but that even if the Nobby were to be selected for the light, the proposed building would not be in the way. A half-moon battery (Vide Captain Bull's Evidence,) might be built at the base of the Light-house.

Your Committee therefore, in submitting this Report to the consideration of the Council, beg to recommend—

1. That no time be lost in ordering a light of the second order on the Dioptric principle, to be procured from England, with the least possible delay.

2. That the necessary materials be immediately procured and placed in situ, in order that no delay should take place in the completion of the building upon the arrival of the light.

3. That in the mean time the Nobby be cut down to the level of 65 feet above the high tide mark, leaving or erecting, as may be found desirable, a parapet of six feet high round the edge of the rock to protect the dwelling and the base of the Light-house from the effects of the wind.

4. That in the mounting of the light, the Port Master be consulted as to certain suggestions which he is desirous of having adopted for the purpose of apprising vessels of their approaching certain shoals, and of guiding them in their inward course to a safe anchorage. (Vide Appendix.)

Legislative Council Chamber, Sydney, 31st August, 1852.  
PHILLIP P. KING, Chairman.

APPENDIX REFERRED TO.
COPY OF A LETTER from the Port Master, to Captain P. P. King, Chairman of the Select Committee on the Newcastle Light House.
No. 52:77.
Port Master's Office, Sydney, 20th August, 1852.

Sir,
I beg to transmit herewith a copy of a letter addressed by me to the Government more than nine years back; and a more extensive knowledge of the Port of Newcastle has only tended to confirm the views I then expressed.

2. I did not at that time enter more fully into the manner of effecting the changes in the appearance of the Light, when approaching or passing the danger, (changes with which all practical men are familiar,) knowing that abundant time would be afforded for explaining their details, when the Light House was in progress of erection.

3. I would not trouble you with these remarks, but as I did not attend the first summons of the Committee, of which you are Chairman, under the understanding that my opinion would be taken at a more advanced stage of the examination, being obliged to leave Sydney the previous day on urgent public business. That however not having been done, I am unwilling to let it appear that I have been indifferent on a matter of so much public importance, connected so immediately with the Department of which I am the Head.

I am, Sir,
Your most obedient servant,
MERION MORIARTY,
Port Master.

CAPTAIN P. P. KING, R. N.

[Enclosure referred to.]

(Copy.)
Port Master's Office, Sydney, 1st June, 1843.

Sir,
I have the honor to inform you that, in accordance with His Excellency's direction, I have visited Newcastle for the purpose of inspecting the nature and position of the Light at that Port; and to enable me to co-operate with Mr. Lewis, the Colonial Architect, in making a Report to His Excellency on that subject.
The Harbour of Newcastle is one of considerable difficulty of approach, and requires a Light of a very particular character.
The Light Beacon, as at present situated, serves merely to point out from sea the position of the Town, without in any degree indicating the dangers of the entrance into the Port.

Those dangers may briefly be classed as follows:—

1st.—The Reef outside from abreast the Town to Nobby's Island, terminating in the Bell Rock at its northern extremity, and thence westward to the Island.

2nd.—The Oyster Bank.

3rd.—The Sandspit on the west entrance.

4th.—The Rock within the Harbour, abreast the termination of its present Breakwater.

It is necessary in going into the Harbour to haul round close to Nobby's Island as soon as the extremity of the Reef is passed to the northward, in order to avoid the Oyster Bank, which a continuance of the course steered leads on; and again, as soon as Nobby is passed, it is requisite to make another alteration in the course, to avoid the Sandspit at the west entrance, after which a course may be steered into the Harbour.

In general, I would not recommend vessels to enter the Harbour in the night, with the exception of Steam Vessels, but occasion will arise in which it is indispensable to make the attempt, every possible means therefore of protecting life and property should be adopted, and a Light House should be so constructed as to indicate, if possible, all the dangers of the Port; and where that object cannot be secured by one, additional Lights should be resorted to.

However, in my opinion, one Light might be so constructed as to answer all the objects alluded to, by being placed on Nobby's Island, and by causing certain changes in the appearance of the Light, as one danger was passed and another approached.

This plan, if approved of by His Excellency, will require time; in the interim I have concurred with the Colonial Architect in a temporary expedient, the account of which will be transmitted from his Office.

I have, &c.,
(Signed) MERION MORIARTY,
Port Master.

THE HONORABLE THE COLONIAL SECRETARY.

COPY of a MEMORANDUM for Captain King, Chairman of the Committee on The Newcastle Light House, from the Port Master.

By referring to the Chart of Newcastle, it will be seen that there is a shoal commencing near the Town, and extending as far as Nobby, terminating in the Bell Rock, to the eastward of that place.

A Light therefore on Nobby's should be so constructed as to shew a bright light to the southward and eastward, until the Shoal was passed to the N. E.; I should then change to a red light, by keeping in the range of which the entrance of the port would be obtained, as it then becomes necessary to haul to the southward, in order to avoid the Oyster Bank; as soon as the Harbour was fairly open, the light should again change on the line of bearing of the Bank, and shew a bright light up to the Port.

The Light House should be placed in as low a position as could be obtained, by cutting the top off Nobby's; and there should also be a half tide light in the same building, to denote when a certain draft of water was on the Bar; this light should partake of the character of the general one, but need not shew up the Harbour, being only necessary for inward vessels.

The inner spit on the north entrance could also be guarded against in a similar way; as well as the rock on the Port entrance, off the upper part of the Breakwater.

(Signed) MERION MORIARTY,
Port Master.
NEW SOUTH WALES.

NEWCASTLE LIGHT HOUSE.

MINUTES OF EVIDENCE TAKEN BEFORE THE SELECT COMMITTEE ON THE NEWCASTLE LIGHT HOUSE.

FRIDAY, 23 JULY, 1852.

Members Present:

COLONEL BARNEY, MR. BOWMAN,
MR. LAMB, CAPTAIN KING,
MR. OSBORNE, DR. DOUGLASS,
MR. FLOOD,

PHILLIP PARKER KING, ESQ., IN THE CHAIR.

Mr. Alexander Livingstone, called in and examined:

1. By the Chairman: You are Harbour Master at Newcastle? Yes.
2. You have had much experience in the coasting trade between Newcastle and Sydney? About thirty years' experience.
3. And of course you are satisfied as to the necessity for a light at Newcastle so as to indicate by night the position of a vessel? Decidedly so.
4. You have brought with you a plan of the Harbour of Newcastle? I have. (The witness handed in the same.)
6. Do you think Nobby's, as a position for a Light-house, superior to Signal Hill? I think so. It lies further out, and is nearer the danger. I think the light ought to be there, and the signal station where it is.
7. Is Nobby's always visible clear of the land to vessels running up the coast? Always. You first see the Shepherd's Hill, and then Nobby stands out like a little rock.
8. So that Nobby's is always visible? She is visible inside the Red Head.
9. Red Head is about nine miles south of Newcastle? Yes, between eight and nine. You see Nobby's about sixteen or seventeen miles off.
10. So that a vessel coming up the coast would always be sure to see the light on Nobby's? Yes.
11. Are you aware of the height of Nobby's? One hundred and forty feet.
12. That is the part cut down? Yes.
13. I believe there is some inconvenience in consequence of the height of Nobby to vessels entering the channel? Coming in with the wind at south-west, south-south-west, or south, before you get a true wind you are down upon the Oyster Bank.
14. You get suddenly becalmed and drift over to the Oyster Bank? Yes. It is only about one hundred and twenty-three yards to the Oyster Bank.
15. The Shingle Beach that is under Nobby's is slightly projecting, is it not? It is washing up more to the Harbour.
16. It is not increasing in the channel? No, I think it has gone further in towards Nobby's.
17. Therefore the channel is widening? It is widening, if anything.
18. To what height do you think Nobby's ought to be cut down to prevent the inconvenience to vessels entering? I think it ought to be cut down to twenty-five or thirty feet.
19. Would that be the height at which the inclined plane begins to descend? Yes. There is a small place cut where there is a tramroad; I would cut down to just there.
20. You think Nobby's ought to be cut down to that, to prevent the inconvenience to vessels entering? Yes.
21. Have you any idea of the radius of vision the light on Nobby would be open to, between N. E. and S. W., is it as much as that? I think quite so.
22. Do you think that light ought to be seen off Port Stephens? It would be seen about twenty-five miles off.
23. That would depend upon the height of the lantern? Yes.
24. How high would you have the lantern? About fifty feet.
25. That is seventy-five altogether above the sea? Yes, it should be from seventy-five to a hundred feet above the sea.
26. By Colonel Barney: Would you not have it the same height as the present light? That is about one hundred and ten feet, I think.
1. By the Chairman: You are Superintendent of the works at Newcastle Breakwater? Yes. Captain John E. N. Bull.

2. With respect to the erection of a Light-house at Newcastle, which do you think the proper position? From conversations I have had with various captains of vessels I have always understood that Nobby's Island was considered the best position. I believe within the last eighteen months the S. Francisco, an American vessel from San Francisco, was near going on to the reef in consequence of mistaking the light for the outer entrance of the harbour. 3. How far would it be necessary to cut down Nobby's Island in order to remove the inconvenience at present sustained by vessels entering the harbour, and also to afford a proper foundation for a Light-house? It is necessary to go below shale rock of about twelve feet, which would then be about ninety-two feet above the sea, before you can get anything solid.

4. Is it of a friable nature? It is; but there is such a solid body of it that there is not the slightest danger that the foundation of a building in the centre of it will be affected for many hundreds of years.

5. If the rock were cut down to the lower inclined plane, which is sixty-five feet above the level of the sea, do you think that would be sufficient to cut down in order to obtain a foundation for a Light-house? I think that would leave too much height to be attained by the building for the light, and unnecessary, as the foundation is equally good twenty-seven feet above. I am presuming the light is to be the height of the top of Nobby—140 feet.

6. By Mr. Lamb: Do you not think it would be attended with a good deal more labor to leave this pedestal in the way you propose; presuming sixty-five feet to be amply high enough; would it not be easier to blast the rock down to sixty-five feet? There would be more stuff to remove after the blast was thrown off? I do not think it would be attended with more labor.

7. By Colonel Barney: Would you slide it down to the eastward on to the rocks? Yes.

8. By Mr. Lamb: I understand you to say that the strata from the sea up to sixty-five feet above the sea level are solid strata? It is in beds.


10. Not so friable as to be affected by the weather to any great extent? Not to any extent when in its bed, but when it is laid upon the breakwater it falls to pieces after a shower of rain, like slaked lime.

11. Over the sixty-five feet for the next twenty-eight feet is it of a more friable nature? It is the same material up to the bottom of the shale which is ninety-two feet.

12. So that in reality we can equally conveniently, so far as the foundation is concerned, erect the Light-house at any altitude from the base of Nobby's up to the shale? Yes.

13. Would the stone which would be removed in levelling Nobby's be available for building purposes? No, not at all.

14. By the Chairman: What material do you propose to use for the construction of a Light-house? I have always been led to believe that an iron Light-house would be the best and cheapest there.

15. By Mr. Lamb: Is there no good building stone in that locality? No. There is a clay on Nobby's which it has been represented to me would make good bricks.

16. And could be manufactured on the spot? There might be some difficulty from want of water, but I believe water might be found under the coal. When we were working coal on the island we had a quantity of water in the tunnel springing from below. I believe there is a spring; but they never found water when the prisoners were stationed there.

17. By the Chairman: With reference to a battery being constructed for the defence of the harbour of Newcastle, which do you think would be the proper position; I think under Nobby's.

18. On a platform under Nobby's? Yes. There is a shoal not far from it, and any vessel meeting with the slightest impediment when attempting to enter the harbour would be liable to be driven on to it.

19. You think a vessel going in would be so much occupied with avoiding the danger of going on to the shoal, that she would be more exposed to the fire from Nobby's? I think she would be in more danger than she would be if the battery were on Signal Hill.

20. Do you think Nobby's a better position than Signal Hill? I do for protection of the harbour.

21. Are you aware that an enemy's vessel might be near the shore between Shepherd's and Signal Hill and fire into the town, she being beyond the reach of Nobby's guns? I think few vessels would venture there, because they could not come within half or three-quarters of a mile of the beach. Besides, a vessel would be as near the town when off Nobby's.

22. Having the idea that Nobby's would be the better place for a battery, how would you place your guns there? I would recommend a half-moon battery, so that the guns might meet the enemy's approach as well as at the entrance, as described.

23. Would these guns be of any use against a vessel that had forced the entrance and anchored at Horse Shoe Bank? If they were fired in that direction you would fire on the west end of the town.

24. Supposing there were a battery at Signal Hill would not that take a vessel more effectually than if it were at Nobby's? I am not of that opinion, in consequence of its elevated position. I should prefer Nobby's, because I think if the battery were on Signal Hill a vessel might lie under shelter of Nobby's and fire into the town.

25. By Colonel Barney: Supposing an enemy were firing into the battery, and the Light-house were in the rear, what would become of the Light-house? If you are afraid of the Light-house being destroyed, you had better keep it where it is, but it is useless to shipping in its present position. I do not contemplate the battery and Light-house being on the same level.
27. By the Chairman: The present light is of a very inferior description? Yes; in calm weather they cannot keep it in; but in blowing weather, or in rainy weather, it is not so bad; it requires a great deal of attention.

28. In calm weather it is difficult to keep it up, in consequence of there being no wind to create a flame? Yes; you see a glare and that is all. Sometimes it can be seen sixteen or seventeen miles off the land, but at others not four.

29. Therefore it is quite useless for vessels to depend upon it in making the port? Yes, I have had a great many complaints about it; it is generally the worst about two or three o’clock.

30. Is it expensive? It burns beyond four tons of coal a week; we are obliged to keep it alight all day as well as night.

31. What sort of light do you think ought to be placed there—a fixed or a revolving light? I think it would not do to have a revolving light too near the Sydney Light-house.

32. There is no necessity for its being a revolving light, as there are no native fires to deceive vessels? No; we see no such things as native fires now. I think it would be well to have it made so that when a vessel gets to the Oyster Bank it should disappear.

33. You think there should be a sort of shutter to that side, to indicate to the vessel her position? Yes; I think that could be done easily enough.

34. How near could an enemy’s steamer lie off the point between Signal Hill Point and Shepherd’s Hill and fire over the land into the town? Gaol Hill; about half a mile off.

35. It has been suggested that Nobby’s would be a proper place for a battery. Would that interfere with the Light-house? I think Flag Staff Hill would be the best.

36. You think, if a battery were required, that Signal Hill would be a better place for it than Nobby’s? Yes.

37. Does it equally command the entrance? Decidedly.

38. Is it not a better station for raking a vessel coming in? Yes.

39. Have you any notion that the position of Nobby’s would interfere with the line of fire from a battery placed on Signal Hill,—whether the angle would be sufficient to enable a vessel to lie at anchor there so as to be screened from the fire of the battery? I think a vessel could not lie there, as there is always a heavy sea. There is not so much sea in the bight between Shepherd’s Hill and the other hill.

40. Do you think it would be prudent in any way for a war steamer to lie at anchor there for the purpose of battering the town? I should think not.

41. Would not the swell running there always be dangerous to a vessel lying there even in calm weather? Yes, there is always a swell there.

42. By Mr. Flood: In working up round Nobby’s to anchor, would not a vessel be much exposed to the fire of a battery erected at the present Flag Staff? I think she would be more exposed to the fire of a battery at the Flag Staff than to that of one placed on Nobby’s. Before she rounds the reef could she, by any possibility, damage the town? Not unless she went in the upper port. She might, in fine weather, lie there and fire over the hill.

43. Would she not be exposed to the battery in that position? Yes, but if it were at Nobby’s it could not reach her.

44. By Colonel Barney: At what distance from the present light do vessels pass Nobby’s? About three quarters of a mile. It depends upon the wind; but it is not prudent to approach nearer.

45. By Mr. Flood: In working up round Nobby’s to anchor, would not a vessel be much more exposed to the fire of a battery erected at the present Flag Staff? I think she would be more exposed to the fire of a battery at the Flag Staff than to that of one placed on Nobby’s.

46. Before she rounds the reef could she, by any possibility, damage the town? Not unless she went in the upper port. She might, in fine weather, lie there and fire over the hill.

47. Would she not be exposed to the battery in that position? Yes, but if it were at Nobby’s it could not reach her.

48. By Mr. Lamb: Between Red Head and Signal Hill, is there any part of the line of coast which a ship could approach so near as to lose sight of the light at Nobby, having previously made it from the southward? No, there is not.

49. By Mr. Flood: In working up round Nobby’s to anchor, would not a vessel be much more exposed to the fire of a battery erected at the present Flag Staff? I think she would be more exposed to the fire of a battery at the Flag Staff than to that of one placed on Nobby’s.

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27. By Mr. Lamb: Could not a vessel anchor so near to the site that you propose for a battery under Nobby's that it would be within range of musketry fire? I should say it would.

28. Then unless it were a covered work would it be possible against a Steamer well armed and manned to maintain that position and stand to the guns? Perhaps not; but the battery ought to be so constructed as to avoid that annoyance.

29. If that be the case, supposing there were only one battery, would not Signal Hill be more secure for the defenders? No doubt; the only question is whether a ship would receive so great a check from the battery at one place as at the other.

30. By Mr. Flood: I suppose guns might be placed on both sites to advantage? I think two batteries would be better than one; one might be silenced and the other left.

31. The Light-house would be in almost as great danger at the Signal Hill as at Nobby's? More so, being on the same level, if the battery was erected there; but I should say it would not be the object of vessels to destroy the Light-house; they would much rather destroy the town or batteries.

32. By Mr. Lamb: I understand you to say that two batteries would be desirable, one on Signal Hill and the other on Nobby's; but if you were confined to one which would you prefer? I think the one on Signal Hill would be the safest to the defenders, though I object to a battery of such elevation.

33. Are you aware whether the bricks that have been made at Newcastle are of a durable description? No, I believe they are not generally. I have seen a great deal of brickwork there which has gone very much to decay.

34. Have you reason to believe that the clay on Nobby's Island would make a superior brick to that which is made at Newcastle? I was told this clay would make what is called a fire brick.

35. Do you know whether any experiment has been made with this clay? I am sure no experiment has been made.

36. Would you recommend that bricks should be made of this clay at Newcastle? Bricks could be brought up by vessels at a trifling expense, and probably much better from Sydney.

37. Have you any stone fit for building purposes in the neighbourhood of Newcastle? Yes, there is high water mark under Signal Hill. That is the only good stone convenient.

38. By Colonel Barney: You have stated that you have been informed that good bricks might be made at Nobby's Island? Yes, I was told so by some of the miners.

39. Is it durable? Colonel Beddesley says it is, and I have seen a grave stone erected for an officer of the 96th which has been exposed to the weather for the last seven or eight years, and not a single letter has been injured.

40. Will it stand the sea air? It seems to stand everything.

41. How far would it be necessary to cart the stone? It is under the Signal Hill; it would only have to be removed the length of the Breakwater.

42. By Mr. Lamb: Can you state what would be the expense per perch of working this stone? No, I cannot; it is a very hard stone.

43. What is the distance from the quarry to Nobby's, supposing that to be the site of the Light-house? About 1,200 yards.

44. By Mr. Lamb: You have stated that you have been informed that good bricks might be made at Nobby's Island? Yes, I was told so by some of the miners.

45. By Colonel Barney: You could only work that stone at low water? Yes.

46. Would it not be very expensive? The stone lies in beds, and it could be wedged off and removed before the rise of the tide in considerable quantities and at little expense; but it would be expensive working it afterwards from its hard nature.

47. Has there been any experiment made as to its durability? I put up an obelisk at the top of the hill, and I have referred to the monument over Mr. Armstrong.

48. By Mr. Lamb: Can you state what would be the expense per perch of working this stone? No, I cannot; it is a very hard stone.

49. What is the height of the Signal Hill? The Signal Hill is 107 feet, the obelisk hill 202, and Shepherd's Hill 251.

WEDNESDAY, 28 JULY, 1852.

Members Present:—

COLONEL BARNEY, CAPTAIN KING,
Mr. BOWMAN, Mr. LAMB,
Mr. COWPER, Mr. A. OSBORNE.

CAPTAIN P. P. KING, R. N., IN THE CHAIR.

Charles Edward Robinson, Esq., C. E., called in and examined:—

1. By the Chairman: You are conversant with the erection of iron Light-houses? I am.

2. The Committee have it in contemplation to recommend the erection of a Light-house on Nobby's Island, and one of the witnesses who has been examined, Captain Bull, proposes that the island should be cut down to the height of 65 feet above the level of the sea, and that the Light-house should be 40 feet high; can you state what would be the cost of constructing an iron Light-house in England, of the height I have stated, and of erecting it here? From the calculations I have made, I should say a Light-house of that description would not cost more than £3,000, including the light and everything. I can lay before the Committee the minute by which I have arrived at that price. It depends first of all upon the price per ton of cast and wrought iron; these matters are generally regulated in this way in England, and I think a fair price for the metal would be £30 a ton.

3. By Mr. Lamb: Is that for cast or wrought iron? A combination of the two; it is by connecting different results that I have arrived at the price I have stated for the whole work; some parts are more expensive than others, not because of the kind of iron used, but because of
of the workmanship. A ton weight of wrought iron being in large pieces would not be so expensive as a ton weight of cast iron the workmanship being small. I consider that you may take it as a fair rule, that for every 10 feet in height of a cast iron Light-house, the additional cost will be £300; that will include the cast iron column, the inner casing of wrought iron, and the spiral staircase connecting the lower with the upper part of the building. I am taking the average size and thickness of the column as the basis of my calculation. For a Light-house 40 feet high, with a foundation of 10 feet, that would give £1,500, and I suppose other expenses would amount to about £1,000 more.

4. By the Chairman: I suppose a second class light would be sufficient? You could not have a first class light on such a column as I am contemplating; a first class light would require a larger diameter under the cap, and its construction would, of course, be more expensive. I think the first class light now lying at the Government Store, and which was intended for the Light-house at Cape Howe, cost nearer £2,500 than £2,000.

5. You have had experience in the construction of these Light-houses, more especially of one for Point Morant, in Jamaica? Yes, I was on the works in London during the whole time of its construction, and frequently looked into the minutest detail of the work.

6. You are sufficiently acquainted with the method of their construction to give the Committee clear evidence upon the subject? I think so, although since I left England no doubt some improvements have been made in the minute parts of the work.

7. Will you favor the Committee with an account of the cast iron Light-house erected at Point Morant? [The witness handed in a statement, and produced plans. Vide Appendix.]

8. Are you aware what would be the weight of an iron Light-house such as that you propose to be erected at Nobby's Island? A Light-house 40 feet high, with 10 feet foundation, including the tools necessary for its erection, and the stores, with extra plates to provide against any breakage on board, would weigh under 50 tons. There are always one or two extra plates sent out for each tier. From the memoranda which I brought with me from England I perceive that a Light-house 55 feet in height would be under 55 tons; each tier of 10 feet high weighs about 10 tons; the iron plate itself might, I think, be calculated at 16 hundredweight.

9. By Mr. Lamb: In the case of the Point Morant Light-house, did you send out persons to erect it? Yes, two men were sent out who had been employed on its construction in England.

10. Did you include the expense of employing those men in the estimate you have given? No.

11. By Mr. Cooper: Was the sum you have named the cost in London simply? It includes the tools for the erection, the stores, plates, and also the freight, but not the cost of labor in erecting the tower.

12. By Mr. Lamb: Would it be necessary, if the Light-house were constructed in London, to send out workmen to erect it on Nobby's? I think it would be very desirable. Although I know something of the erection of Light-houses, my time is so fully occupied that I could not undertake anything connected with it. Besides, as the construction of iron Light-houses was in its infancy when I was in England, it is probable that some improvements and alterations have been made since, and it would be desirable that a person who had been on the spot during its construction should come out with it, so that in the event of anything going wrong on board he might be able to superintend the repair, which a person unacquainted with the manufacture might be unable to do.

13. By Mr. Cooper: Would it be necessary that the parties coming out should be of a superior class, that they should be engineers, or would ordinary laborers be competent to complete the work? Laboring smiths, whose wages in London would be about 20s. or 25s. a week.

14 By Mr. Lamb: If Government were willing to bring out these men under the Bounty System, do you think they would be induced to come out here on condition of receiving 30s. a week, of course receiving their wages from the time of embarkation? I have made a small calculation with respect to the price of erection in this country. It would take eight men about six months, that is including the time occupied in coming from England, supposing they all came from England; I have put down their wages at 50s. a week, and that would amount to £230. The only other labor in this country would be that of excavating the rock, and I suppose men would be obtained here for that purpose. In the case of the Morant Light-house, even the granite in blocks, the iron cement, and in short every thing was sent from England.

15. Do you think, if plans and sections were sent to England, respectable parties would be disposed to contract for the entire work, and to send out the necessary workmen for the erection of the Light-house in the Colony? I am quite sure most of the manufacturing engineers would jump at it; it is a sort of monument to the manufacturer's name. Any respectable house undertaking the work would be glad to send out the necessary workmen for its erection; in fact, when works of this kind are undertaken, the contractors generally stipulate that they shall send out their own men.

[Appendix referred to]

CAST IRON LIGHT-HOUSE.

In giving an account of a cast iron Light-house erected in the year 1842, in Jamaica, a few remarks may be offered respecting this material when applied to building purposes generally. It appears to possess advantages over stone and other materials, in that upon a given base a much larger internal capacity for dwellings and stores can be obtained with equal stability; with this material plates can be cast in large surfaces with few joints, and
a system of bonding together may be adopted which will ensure the combination of every part so as to form an entire mass, and thus the best form for strength and stability may easily be obtained. From the comparatively small bulk and weight of the component parts of the structure, great facilities are afforded for transporting and erecting it, which is fully borne out by the fact, that in the case of the above-named Light-house, within three months after the date of the contract, the whole work was cast and erected upon the contractor's premises in London, and in about three months from the date the light was exhibited in Jamaica, a dispatch hitherto unknown in the history of such works. With respect to the effects of lightning, an iron building is in itself a conductor of the first class; and when such is erected near the sea, it is only necessary to afford proper communication for the electric fluid between the lowest part of the building and the surface of the water, to ensure the most perfect known safeguard. In contemplating the erection of a Light-house of this material in Jamaica, much enquiry was made respecting the effects of salt water upon cast iron, and to what extent such might be likely to interfere with the safety of the building, when the superincumbent weight to be supported was taken into consideration; the result of such enquiries was sufficient to satisfy the Commissioners that means might easily be adopted to prevent any ill effects, either from the natural filtration of the salt water at the foundations, or from oxidation in the superincurrence, and accordingly, in the present instance, the base of the tower rests upon and is caressed by granite, and the outer surface coated to about thirty feet with coal tar. The comparative cheapness of this system when applied to public works renders it particularly applicable to localities where the authorities might not consider themselves justified in going to the expense of stone; the whole cost of the Light-house in question was about one-third the estimated price of a similar building of stone.

The accompanying drawing represents the elevation and longitudinal section of Point Morant Light-house. The structure is founded on a coral rock a little above the level of the sea; the face of the rock is about ten feet above the surface of the sand, and is excavated to receive the base of the tower, as shown in the section. The diameter at the base of the shaft is 18 feet, and at the top 11 feet; it is formed of nine tiers of plates above the surface of the rock, each ten feet in height, and varying from 1 to 2 inches in thickness; the circumference is formed of eleven plates at the base, and nine at the top; these plates are cast with internal flanges, and fastened together with bolts and nuts, and the joints run with iron cement. The cap consists of ten radiating plates, which form the floor of the light room, and which are secured to the tower by twenty pierced brackets. The column is filled with concrete (weighing about 300 tons) for 30 feet, the remaining portion of the building being divided into store rooms and berths for the attendants upon the light. The light is revolving, consisting of fifteen argand lamps, presenting three surfaces with five lamps to a surface; and the Admiralty notice, which announced the light for exhibition on the 1st November, 1842, states that "the centre of the light is 96 feet from the level of the sea, and in clear weather can be seen from a distance of 21 miles."

The whole work was erected without scaffolding. Ventilation is provided by means of an inner casing, which creates a thorough circulation of air. The windows are of plate glass. The attendants upon the light reside in the the room below the light room; the internal capacity which this system affords doing away with the necessity for extra house and stores, and they have from time to time vouched for their comfort and apparent security, even during the severe hurricanes which are known to visit the Island.

CHAS. EDWD. ROBINSON,
Civil Engineer.

Sydney, May 8th, 1851.

Edmund Thomas Blacket, Esq., called in and examined:—

E. T. Blacket, Esq.
28 July, 1852.

1. By the Chairman: You are the Colonial Architect? I am.

2. The Committee are desirous of obtaining all the evidence they can respecting the best mode of erecting a Light-house at Newcastle, and will be glad of any information you can give them on the subject. It has been proposed to cut down the rock at Nobby's Island to 60 feet, and upon that elevation to erect a Light-house 40 feet high, so that the light should be 100 feet above the level of the sea; it has been also proposed to have a second class light, which may be seen at sea at a distance of 20 miles? If it is to be a fixed light of the second class, I believe experience has shown that a French or dioptric light would be the most advisable.

3. What is the nature of the French or dioptric light? It has no reflectors but a ring of lenses, it burns much less oil than the common light, and emits a perfect stream of light without any flashing.

4. Is the cost of a dioptric light less than that of an ordinary light? I am not able to state positively, but as far as I can gather from a number of instances to which I have referred, I do not think it is.

5. By Mr. Lamb: Would this light require a larger building than the ordinary light known to most of us? I believe it would if it were a revolving light, but not if it were a fixed light.

6. By Mr. Cooper: Do I understand you to say that you are strongly of opinion that this light would be the best you could recommend to the Committee? I am not sufficiently acquainted with the matter to say that I have a strong opinion; I judge from the opinions of others, and if it be a fixed light and a second class light, all evidence shows that the dioptric light is the best and most economical.

7. Will you have the goodness to give your information upon the supposition that the dioptric light will be adopted? I have prepared a plan, which, being out of the ordinary way, I have thought necessary to fortify with examples. It occurred to me that if the Light-house were
were built out of reach of the stroke of the waves, there was no need to go to the expense of iron or stone. I have here a small sketch of the plan I propose. [The witness produced the same.]

8. By Mr. Lamb: This is 30 feet high? Yes, up to the middle of the light. It is forced into the rock and then secured by iron; I do not think the iron necessary, but I recommend it as a measure of precaution.


10. By Mr. Lamb: Is this drawing made on the supposition that a dioptric light will be used? Yes.

11. What would be the expense of such an erection? All, excepting the lamps and lantern, would amount to £250.

12. By Colonel Barney: That estimate is for a Light-house 30 feet high? Yes, the additional expense for the increased height would be trifling.

13. By Mr. Lamb: Are there any accommodations in the building for the keeper? None in the tower, excepting for the man who attends to the light.

14. Then it would be necessary to have a residence near the tower for the keeper? Yes; I find that it is strongly advised by all the Elder Brethren of the Trinity House, never to allow the keeper to reside in the Light-house if it be possible to avoid it; it is objected to, because where a man and his family reside in a Light-house, the light is liable to be injured by dirt and filth.

15. By the Chairman: But the man would live in the lower part? Yes; but they strongly advise that the keeper should never live in the lower part when it can be avoided. [The witness produced a sketch.] This is a sketch of a Light-house erected by Mr. Mitchell on the screw pile principle, in the Wyre, near Liverpool; another, of a similar description, was erected at Carrickfergus. I also produce a drawing shewing the temporary barrack used for the erection at Bell Rock and Skerryvore; all these were of timber, and were in the open sea, where they received the stroke of the wave, but did not suffer any damage thereby.

EDMUND THOMAS BLACKET, Esq., Colonial Architect, called in and examined:—

1. By the Chairman: You have been good enough to promise the Committee an estimate for the cost of erecting a wooden Light-house at Newcastle, forty feet above the foundation level. Will you be good enough to give us what information you can on the subject? I have drawn out a plan, with all its settings, as near as I am able to put them at present, 4 Aug., 1851. [Vide Appendix.] I beg to hand in.

2. From this plan I perceive that you have arranged the building for the light to be of framed wood. What expense do you suppose would attend its erection under present circumstances? I estimate the cost of the timber part of the work at £250.

3. That is, considering the height of the lantern above the ground, to be forty feet? Yes, the height of the centre of the lamp above the ground.

4. How long do you think it would take to erect the scaffold for receiving the lamp itself? Yes; but I may remark that the ground on which it is to stand has yet to be cut down, which will take the whole time required for sending for the lamp.

5. Is it necessary to have that here before putting up the scaffold to receive it? Yes, in the meantime the materials could be provided on the spot and the lamp itself is included in your estimate of the cost of the lantern? Yes; the estimated cost of the lamp is about £30 only, but that is part of the £1200.

6. Do you think the lamp could be procured from England without much delay? I imagine it could; I do not know of any reason for delay.

7. By Mr. Lamb: How long do you think it would take to erict the scaffold for receiving the light, and the building for the light-keeper and his assistant? If we had got the apparatus here now, I think we could put up the whole in six or eight weeks.

8. By the Chairman: In the meantime the materials could be provided on the spot and prepared to commence the building when the lamp arrived? Yes. But I may remark that the ground on which it is to stand has yet to be cut down, which will take the whole time required for sending for the lamp.

9. The lamp itself is included in your estimate of the cost of the lantern? Yes; the estimated cost of the lamp is £250 only, but that is part of the £250. The light you describe upon the plan is a second class dioptric light? Yes. I believe it is the same sort of light as is now used at the Eddystone Light-house, and of the same size.

10. Did you ever see one of this class of lights from the sea? I cannot say I have. I have seen Eddystone Light-house, but there were only the old lamps at that time.

11. I perceive you have arranged that the building for the light-keeper and his assistant shall be placed near the Light-house? Yes.

12. What material do you propose that building should be built of? I estimate it to be built of brick.
14. At what cost? At present prices it would cost about £500, including the fences.

15. What space do you propose the whole should occupy? The whole ground, included within the fences, will be one hundred feet long by eighty feet wide.

4 Aug., 1852

16. What is the total cost at which you estimate the whole? £1950.

17. By Mr. Cowper: Then you feel persuaded, I presume, that £2000 would cover the whole? The only thing I have any doubt about is the cost of the lamp apparatus; it is a thing I have never seen myself, and I have no accurate estimate of it.

18. By Mr. Flood: What foundation do you propose to make? I imagine it will rest upon the bare rock. I was told the place was to be cut down.

19. Is the building to be slated? Yes; built of brick and slated; or I would rather have had it covered with galvanized iron tiles if we had them here; they stand the wind so much better, and you can nail them all round; they might be sent for at the same time as the lamp apparatus. I may say that one of my objects in recommending a dioptric light of the second class is the great saving of oil effected by its use in preference to any other. I find that a fixed lamp of twenty-six reflectors, that is to say, a catoptric light of the first class, burns 1040 gallons of oil a year—a dioptric light of the first class 570 gallons, and of the second class 384 gallons a year; so that there is a saving of nearly £200 a year in oil only. No fixed light, whether it be called first or second class, can properly illuminate the whole circle of the horizon with less than twenty-six reflectors. As there are several points of importance to the subject, to which I had no opportunity of alluding whilst before the Committee, I have made the following Memoranda to my "Evidence."

1st.—It was stated that the light was to be 100 feet above the sea, and be seen 25 miles off. I find that 14 lights in Great Britain are about this height, which are as follows:

**ENGLISH LIGHTS**

<table>
<thead>
<tr>
<th>Name</th>
<th>Height</th>
<th>Miles</th>
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<tbody>
<tr>
<td>Dungeness</td>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>Barmouth</td>
<td>100</td>
<td>15</td>
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<tr>
<td>Spurn</td>
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<td>Ilfracombe</td>
<td>100</td>
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**SCOTCH LIGHTS**

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<th>Name</th>
<th>Height</th>
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<tbody>
<tr>
<td>Start</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>Skynvore</td>
<td>103</td>
<td>15</td>
</tr>
<tr>
<td>Cambra</td>
<td>106</td>
<td>15</td>
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**IRISH LIGHTS**

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<tr>
<th>Name</th>
<th>Height</th>
<th>Miles</th>
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</thead>
<tbody>
<tr>
<td>Kinsale</td>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>Tuskar</td>
<td>101</td>
<td>15</td>
</tr>
<tr>
<td>Carlingford</td>
<td>101</td>
<td>15</td>
</tr>
<tr>
<td>Killy Bogs</td>
<td>104</td>
<td>14</td>
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<td>Slyne</td>
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**ISLE OF MAN**

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<th>Name</th>
<th>Height</th>
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<tr>
<td>Ayr</td>
<td>106</td>
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<tr>
<td>Douglas</td>
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</table>

Shewing that lights of 100 feet high are seen 15 miles only. Those lights which are stated to be seen 25 miles, are 300 feet and upwards.

2nd.—It was stated that the lantern was to be darkened in a certain direction, for nautical purposes. As a dioptric light cannot be omitted like the lamps in a catoptric light, would it not be well to colour that side red instead of cutting it quite off? The light would still be preserved, but at the same time, made sufficiently different from the rest of the circle to point out the position.

3rd.—These will require an addition of £200 to the Estimate given by me, for "Light Room, Stores, and Furniture," which, although no part of the cost of erection, are necessary to the works.

4th.—Another reason why the dioptric light is advantageous is, that it gives a perfectly uniform beam of light in all parts of the horizon, there being no "flashing" of bright and dull points as in the best of the fixed catoptric lights.

5th.—The dioptric light has, however, certain disadvantages which ought, in justice to the old lamps, to be stated:—1. As there is but one lamp, if this be suffered to go out by neglect, the whole horizon suffers total eclipse. 2. The vertical divergence of the rays is not so great as in the catoptric principle, and is therefore not so clearly seen quite close to the foot of the Light-house. As, however, many of the old lights are being replaced by dioptric apparatus, it appears that it is the best, notwithstanding its defects. I send herewith a model of the proposed buildings, made by Mr. J. C. White.
Appendix to Capt.'s Bull's evidence on the Newcastle Lighthouse.

North and South section.


On the top of the slate the area is 186 sq. x 206 sq.
The approach from the Breakwater to the foot of the first cut
is about 30 yards of gradual ascent from about 30 ft. to 60 ft. (high)
where it is 204 feet wide.
There is a great probability of finding water on the Nobby.

MORANT LIGHTHOUSE.

Longitudinal Section.

Elevation.

Concrete

J. Allan, Eng. Sydney

Coral
Elevation of Light House.
16 ft. to 1

Elevation of Keepers House.
16 ft. to 1

Plan of Lighthouse & Keeper's dwelling.

Scale: 16 ft = 1 in

J. Allan. Lith. Sydney