

1874.
NEW ZEALAND.

SELECTION OF SITES FOR PROJECTED COASTAL LIGHTHOUSES,

(CORRESPONDENCE RELATIVE TO).

Presented to both Houses of the General Assembly by command of His Excellency.

No. 1.

Mr. W. SEED to Captain JOHNSON.

Customs Department (Marine Branch),

Wellington, 13th February, 1874.

SIR,—

I have the honor, by direction of the Commissioner of Customs, to request that you will proceed by the “Luna,” on her approaching Southern trip, for the purpose of examining the coast at Oamaru, Moeraki, Cape Saunders, and West Cape, and of fixing on the most suitable sites for the new coastal lighthouses it is proposed to erect at or near these places.

The Marine Engineer (Mr. Blackett) will be unable, on account of pressure of business in the Public Works Department, to accompany you; it will therefore be necessary, after you have fixed on the sites, to obtain certain particulars which he requires to enable him to prepare the plans and specifications for the lighthouse apparatus and buildings. I enclose a copy of a memorandum from him, setting forth what these particulars are, and I have to request that you will be good enough to use your best exertions to procure the fullest and most precise information obtainable on the various points specified therein.

Mr. Wilson will accompany you, and will be instructed to render you every assistance in his power.

The expedition, so far as regards the examination of the lighthouse sites, will be under your directions. Captain Fairchild will be instructed to proceed to such points as you may desire to examine, and to render you generally every assistance.

The various lighthouses on the coast that you will pass, viz. Godley Head, Tairoa Head, Nugget Point, Dog Island, Farewell Spit, and Mana Island, will have to be inspected, if the weather, on arriving off them, proves favourable for landing. It is especially desirable, however, that Dog Island and Nugget Point light stations should be visited, even if a little delay should occur in accomplishing this. The Hon. the Commissioner of Customs has directed that this lighthouse inspection duty should be carried out by Mr. Wilson.

The Commissioner wishes you to understand, that although in the memorandum he addressed to you on the 2nd January, 1873, relative to the proposed new lighthouses, he indicated Windsor Point as the site for one of them, he still wishes to leave your discretion entirely unfettered in choosing the site for a light at or near that part of the coast. The Commissioner considers that you would be greatly assisted in making a judicious selection if you were to confer with the Chief Harbour Master at Port Chalmers and the Harbour Master at the Bluff, on account of their local knowledge, and of the information they must have acquired as to the parts of the coast that vessels usually make for when arriving South about. You will therefore be good enough to confer with these gentlemen on reaching Dunedin and the Bluff. If it should turn out that you have to visit Stewart's Island, you should confer also with Captain Greig, the Customs officer in charge there, who was formerly Harbour Master at Invercargill; and if you should consider it advisable to do so, you are authorized to take him with you to Windsor Point, or such other place as you may find it necessary to visit, as his knowledge of Foveaux Strait would no doubt greatly facilitate your movements.

With regard to Cape Saunders light, you will probably experience no difficulty, as there cannot be any doubt as to the suitability of that locality for a coastal light; but it may be worthy of consideration whether the beacon that is there (which I understand was intended for the tower of the lighthouse) is in the best position that could be selected for the light; for, when viewed from the sea, it has the appearance of standing some distance in from the end of the cape, and at so considerable an elevation as to render it liable to be often enveloped in fog. You will be good enough to look into this question when you visit the locality.

The "Luna" will have to call at Akaroa and at Timaru, on service connected with the Public Works Department. Whilst she remains at Timaru, it will be desirable for you to determine on the best position for a light at that place, and to consider whether it should be a coastal or a harbour light.

You will call at Oamaru and at Moeraki to take the necessary observations for determining the best place for the coastal light that was authorized by the Legislature last Session for that part of the coast.

If the weather should prove favourable for doing so, you will return by the West Coast, so that you may call at Cape Foulwind, to complete the observations at that place, and finally to fix the site for the proposed lighthouse there.

Major Heaphy will be a passenger by the "Luna," on leave for the benefit of his health. He has kindly consented to sketch the sites you may fix upon, and I have no doubt he would also gladly assist you in any other way in carrying out the important service now intrusted to you.

On your return to Wellington, you will be good enough to furnish a report of your proceedings, for the information of the Hon. the Commissioner of Customs.

* * * * *

I have, &c.,

WILLIAM SEED,

Secretary of Customs.

Captain R. Johnson, &c., &c., Marine Office.

No. 2.

Captain JOHNSON to the Hon. the COMMISSIONER of CUSTOMS.

SIR,—

Wellington, 9th June, 1874.

I have the honor to report that, in accordance with the instructions contained in your letter No. 303, of the 13th February, I proceeded by the steamer "Luna" to examine the various localities suggested for the establishment of new coastal lights, and also to inspect the lights at present in use. The result of these investigations I now place before you. It will be convenient to take the stations *seriatim*, in the order in which I visited them. I append the necessary tracings of charts, referred to in the following report simply as "tracing marked —" and some excellent sketches by Major Heaphy, in like manner referred to as "sketch No. —." These will be found very useful in elucidating my report and the suggestions therein contained.

Timaru.—The port of Timaru is a roadstead lying in a deep bight, quite out of the ordinary track of shipping, and never approached by any vessels excepting such as are directly bound there. There is therefore no necessity for a coastal light there, for no vessel has any business to be so close in unless bound for the port, when a mere harbour light would satisfy all requirements. Even should a vessel, when working to windward, stand close in before tacking, the soundings are so regular, and the water shoals so gradually, that by a reasonably careful use of the lead there would be no difficulty in ascertaining the distance from shore. I therefore recommend that there should be no light placed here for coastal purposes, but that, instead, there should be a light of small power erected for a harbour guide. This, of course, is a matter for the provincial authorities. The present light is judiciously placed, but its character and power are extremely faulty, as it is invisible at a distance of three miles in hazy weather. I made a full examination of all eligible sites, and recommend the present one to be continued. If a light were erected, as suggested, on Patiti Point, another would still be needed at the present spot to indicate the anchorage, and an additional lightkeeper and his residence would be required. Thus, as a light on Patiti Point would be, as I have shown, useless for coastal purposes, and superfluous for harbour use, I do not recommend it. The most suitable light for Timaru would be a white fixed light of the fifth order dioptric, with holophotal mirrors, and should be erected so as to show over an arc extending from N. 6° W. to S. 9° E., or about 180°. As the land at the present site is fully 10 feet higher than at Patiti Point, a tower sufficiently high to clear the tops of the houses to the southward, probably about 25 feet, would enable the light to be seen over Patiti Point, and would be visible in clear weather about fourteen miles. (See tracing marked A.)

Oamaru.—My remarks as to the absence of any necessity for a coastal light at Timaru apply with equal if not greater force to Oamaru. The neighbouring coast is remarkably free from danger. The soundings are regular, and it is in no sense a landmark or turning-point for which any vessels would make. I therefore advise that no coastal light should be placed here, but merely a light similar to that recommended for Timaru, for a harbour guide. To avoid any risk of confusion between the two lights, I would suggest that the one at Oamaru should be red, but in other respects similar to the Timaru light. This, I think, is demanded by the importance of the Oamaru trade, but a powerful light for coastal service would be utter waste of public money; and were no settlement in existence at Oamaru, the idea of placing a light there never would have suggested itself to the mind of any practical man. With reference to the site of the recommended red harbour light, several have been proposed, but the choice lies between two; one on land in the occupation of Mr. Fenwick, marked "Lighthouse Reserve" on the map in the Provincial Land Office, and the other lower down the hill, towards the landing-place. Both sites were carefully inspected by me, in company with the Harbour Master, Captain Sewell. The altitude of the former site is 250 feet above sea level, and the arc of illumination would be from S. $\frac{3}{4}$ W. to N. by W. $\frac{1}{2}$ W., showing well to the southward, and sufficiently round to the anchorage for all useful purposes; indeed, had the elevation of this site been only 100 feet instead of 250, it would have fulfilled every requirement. As, however, lights are most needed in thick weather, it is very desirable that they should not be elevated more than is absolutely necessary to show the requisite distance. It is an error to suppose that the higher a light is raised the more useful it becomes. On the contrary, the more a light is elevated, the greater are its chances of obstruction by fog, and it should only be raised sufficiently to show the needful distance clear of the earth's convexity. The second site has an altitude of only 95 feet; its illuminating arc would be from S. 20° E., or S. by E. $\frac{3}{4}$ E. to N. by W. $\frac{1}{2}$ W., the latter limit being the same as that of the first site. It is therefore obvious, that while the first site has the trifling advantage of showing farther to the southward, the

second is more advantageous on account of its lower elevation, which would cause the light to be less frequently obscured in foggy weather, when its guidance would be most needed. I may add that Captain Thomson, Chief Harbour Master of Otago, concurs in my opinion as to the description of light advisable, excepting as to colour, which question was not then raised; and Captain Sewell, Harbour Master at Oamaru, agrees with me, both as to position and description; both fully indorsing my opinion as to the utter uselessness of a coastal light at Oamaru. The respective sites are duly marked on the accompanying sketch and tracing.

Moeraki.—Off Moeraki, the soundings are not so regular as off Oamaru, and a dangerous reef, known as the Fish Reef, lies off the coast line, and projects beyond it. Vessels trading between Port Chalmers and the Northern ports pass very close to this part of the coast, and vessels bound to and from Oamaru and Timaru especially have to go very near the Fish Reef. Here, therefore, a coastal light is seriously needed, and I am of opinion that a light should be erected as soon as possible. With regard to the site, two offer themselves, both possessing certain advantages. The first would be on the extreme N.E. point of the Moeraki peninsula, which would give an elevation of 116 feet above sea level and an illuminating arc of 245° , i.e. from W. by N. round by N. and E. to S. by E. $\frac{1}{4}$ E. Of this, however, about 8° would be shut in by a hillock to a vessel approaching from the S.S.E., when close in. This is a very serious drawback. The second site would be on or near the S.E. point of the peninsula, not far from the Boat Harbour, with the highest portion of the Fish Reef bearing E. 50° S. This position would command the whole of the horizon from Vulcan Point to the South, to Look-out Bluff to the North, and from due S. to N. by W. $\frac{3}{4}$ W., and the altitude would be 60 or 70 feet. I have no hesitation in recommending this site of the two. The light need not be of an expensive description; probably all useful ends would be attained by a fixed light of the fourth order, varied by flashes and short total eclipses, which would not be likely to be mistaken for any lights in the vicinity. The site is comparatively level, and easy of access; a good foundation can be had, but the buildings would require to be of wood, as I could not discover any good stone near at hand. I am given to understand the ground is Native property. I may add that Captain Thomson fully concurs in the above suggestions. (See sketch and tracings.)

Cape Saunders.—I examined the proposed site, which is a tolerably good one, but the great altitude is a serious drawback: a light in this position would be wholly invisible during the dense fogs which so often prevail in that locality. During my visit the weather was constantly so thick that no observations could be taken, excepting as to height. Although the fog was so thick at the proposed site that it was impossible to see objects at a distance of 200 yards, on descending half-way down the hill it was, comparatively, so clear that I could see objects several miles off. As it appeared uncertain how long this foggy weather would continue, I did not detain the steamer any longer, but Captain Thomson, at my request, kindly undertook the necessary observations, from which the following information is obtained:—It appears that there is an available site about 150 feet nearer to the cape, and at about 70 feet lower altitude, or at an elevation of about 470 feet above sea-level. Of these two sites, Captain Thomson prefers the higher one, as it commands a larger arc of illumination to the northward. As, however, the additional space illuminated is only $1\frac{1}{2}$ point, and over an area already guarded by the Tairoa Head light, I am disposed to regard the lower site as the more advantageous. I fear that even in this lower position the light often will be obscured in foggy weather; but as there is no other site available, possessing the needful arc of illumination, I see no alternative to adopting it. I would here observe, in reference to the Tairoa Head light, just mentioned, that if my suggestion be carried out, as to the erecting of a red light at Oamaru, the Tairoa light should be changed to white, instead of a red one, to avoid confusion; and when Cape Saunders and Moeraki are lighted, a fifth-order light would answer all purposes on Tairoa Head. This would enable the two keepers at present employed to be dispensed with or sent to other stations, as so small an apparatus easily could be attended to by the pilot staff. This would involve a considerable saving of expense on stores, &c. While referring to the fifth-order light, I would here remark that such a light can always be managed by a harbour-master or similar functionary, without the necessity of employing a permanent keeper, the simple trimming and lighting every evening being all that is required. Such lights should therefore be erected wherever needed; they afford great assistance to mariners, at very trifling cost. For ordinary coastal lights, where the sites are suitable, I consider a second-order dioptric light quite sufficient; but, in the case of Cape Saunders, I recommend a first-order light on account of its excessive elevation and consequent tendency to be obscured. I would also recommend that it should be fitted with dioptric holophotal apparatus so disposed as to limit the arc of illumination to 25 miles,—the extreme distance at which it could be of any possible use,—distributing the rays and full power evenly over that space. On reference to the tracing (marked A), it will be seen that, under the proposed system, the whole coast between Nugget Point and Timaru will be thoroughly lighted, and, with the single drawback that Cape Saunders light must unavoidably be too high, the plans suggested are complete and unexceptional.

Centre and Rugged Islands.—Leaving Cape Saunders, and passing Nugget Point southward, the question as the best method of lighting the entrance to Foveaux Strait next comes under consideration. According to your instructions, I conferred with the Harbour Masters at Port Chalmers and the Bluff, as well as with masters of vessels trading through the Strait. I was unable to see Captain Greig, as he happened to be away on duty when I visited Port William. The Bluff Harbour Master, Captain Thomson, advised a light on Rugged Island, if only one light were proposed to be erected, and my own opinion inclined that way until I had an opportunity of examining the various localities. The Otago Harbour Master, and the Chief Pilot (Captain Lowden) were of opinion that a light should first be erected in the vicinity of the south-west cape, being the point first sighted by approaching vessels. This opinion was indorsed by all but one of the captains I consulted. Proceeding to Centre Island, I found the landing a bad one, there being some swell on although the sea was comparatively smooth. This would cause difficulty in heavy weather. The island is about 300 or 400 acres in extent, not very broken, rising gradually from the sea to a height of 265 feet on the south side, where a capital site is available for a light, which would show all round. As, however, a light between the island and the mainland is not needed, another site was marked off a little to the south, where the rays of light could be all concentrated on the opposite side instead of part being wasted by being expended where no light is

required. This site was marked by a peg, the altitude is 240 feet, and there is a good rocky foundation. As good building stone (granite) is obtainable on the spot, and as the soil is good and the island large, the cost of construction and maintenance in this case would not be heavy. For this position I recommend a second order dioptric light showing over an arc from N.N.E. round by E. and S. to N.W. by W.

We next proceeded to Rugged Island, passing Cave Point without landing, as it was obviously unsuitable. Rugged Island is well named; it is remarkably rugged and difficult of ascent, but is not over 600 feet high at any part. There is an excellent landing on the east side, safe in all weathers, excepting perhaps during a gale from the south-west, or possibly from the north-west. The gradient of ascent is about 45° , and not easy to climb; but I am of opinion that a good track could be made at small expense. On reaching the summit I found the height 530 feet, far too great for a light; it would certainly be obscured by fog during great part of the year. The arc of illumination would be all round the compass, excepting between N. 58° E. and S. 10° E. On further inspection I found that the island formed what I may call two "shoulders," one to the east and the other to the west. If the former were selected as a lighthouse site—if this could be done—the position would be admirable. As the island consists of hard syenite rock, the cutting would be very difficult, although the stone thus excavated would be excellent for the building purposes. For a better idea of the sites on these islands, see sketch. To compare the respective advantages of Centre and Rugged Islands, it must be remembered that the former lies on the lee side of the straits where heavy south-west swell sets in; it is also further in the strait than the latter, and its arc of illumination would include a large area already lighted by Dog Island; its height too would not show so far to the westward, the direction most needed, as the vessels requiring a light come from that quarter. Its one advantage is economy, as, from the fertility of the island, it would not require such frequent visits with stores. Rugged Island, on the other hand, lying further to the west, a vessel bound in that direction could keep in smooth water under the lee of Stewart's Island; however, it has the additional advantage of lighting the clear passage instead of the dangers—a great point where thick weather is so common, in which vessels would have to run almost among the dangers before the light would be visible. The position of Rugged Island, also, is a more commanding one, and I should recommend the western shoulder of that island as the best site for a light. The next best would be on a point in Centre Island—shown by sketch No. 4. The proposed site on Rugged Island is shown in sketches Nos. 6 and 7.

The South-west Points.—I next proceeded towards Green Island and Windsor Point. The weather was so bad I could only examine the coast from the ship, which I did very carefully and minutely from Green Island to Preservation Islet, where the "Luna" was detained three days by bad weather. During our detention I landed and went round the beach to Puysegur Point, which seemed to me a good position for a light at the western entrance of the Strait, as it would show admirably to vessels approaching from the westward; I found the available site to be 135 feet high, with an illuminating arc of 180° . The summit is flat, and covered with dense bush. A good road could easily be made, passing first along the beach and then on the plateau, as shown on the sketch No. 10 by a red line: the distance would be about one mile and a quarter, passing at the back of Coal-seam Hill into Otago Retreat, which is a safe anchorage. If a tower 60 feet high were erected, the total elevation would be 195 feet above sea level, and the light would be visible twenty miles. After examining Puysegur Point, I endeavoured to get overland to Windsor Point, but found it impracticable on account of the sea making right up to the cliffs in many places, while inland there was impenetrable bush, intersected by deep ravines. The distance is about five or six miles. By keeping along the shore I was able to examine the position with sufficient accuracy to enable me to form an opinion as to its suitability. Windsor Point is a prominent, low cape, rising gradually inland. At a suitable height a good site could be obtained, the arc of illumination would be from N. 52° W. to S. 87° E., being the same to the north as that of Puysegur Point, and 39° more to the east. After closely examining the coast for a landing, an inlet was found about half a mile to the eastward, but the water shoaled so suddenly a short distance within the entrance that we deemed it unsafe to go far in, especially as many rocks appeared above the surface. It was quite open to the prevailing south-west winds, and Captain Fairchild agreed with me that it would not afford the necessary safety to a lighthouse tender, a very important matter on so boisterous a coast. I find, however, on inquiry, that a small vessel named the "General Gates" once rode out a gale safely in this inlet, which is generally known by her name in consequence. The inlet is not noticed in the New Zealand Pilot or the Admiralty Chart. It is shown in the accompanying sketch No. 8. No other landing-place could be discovered.

I next proceeded to Green Island, and examined the coast from the ship. My opinion is adverse to this site, as it is too far to the eastward to be of full use in lighting the entrance to the Straits, where it is essential that a light should show as far as possible to the westward, to be of use in aiding vessels in making the land from that direction. Again, there is absolutely no practicable landing at all, which alone would suffice to condemn this suggested site. Of the two other sites, Windsor Point and Puysegur Point, I recommend the latter—the only advantage possessed by Windsor Point is a greater arc of illumination to the east; but when the light on Rugged or Centre Island is erected, this will be of no material value, as the distance is but small, and a vessel after leaving the Strait has a clear coast and open sea before her. Puysegur Point has the following greater advantages:—1. It lies nearer to the quarter whence vessels make the land, and therefore would be sighted sooner; 2. Having a less arc to cover, the rays could be reflected from the back to strengthen the sea arc, and reflected so as to show more in the direction of vessels making the land than would a light on Windsor Point; 3. The land adjoining Puysegur Point is lower than at Windsor Point, therefore fog is not likely to roll so low down; 4. Windsor Point is far from a safe harbour where a tender could lie; and there are almost insuperable difficulties in the way of making a road thither from the nearest landing-place, while Puysegur Point is only one mile and a quarter from Otago Retreat, and a road could very easily be formed. This is a matter of great importance with regard to the expense of construction, which would be enormous in the case of Windsor Point, if indeed it be practicable at all to erect a lighthouse there, while the cost at Puysegur Point, comparatively, would be trifling; 5. A light on the latter point would be of great service to any vessels bound for Preservation Inlet, while one at Windsor Point would be utterly useless

for this purpose; 6. A light on Puysegur Point would show more strongly over Bellamy Reef, and therefore would be more certainly discerned in foggy weather than one at Windsor Point (see sketches and tracings appended). The proper light for this position would be a holophotal revolving white light of the first order dioptric; and as the atmosphere is very humid, I recommend that the buildings be constructed either of iron or stone: the latter is abundant there.

General Remarks.—If a question arise whether a light on Puysegur Point or Rugged Island should be first erected (assuming that my recommendations of those sites are adopted), I should unhesitatingly advise the former, as the more urgently required, although I am aware that the Bluff Harbour Master is of a different opinion, as, indeed, I was myself until I had personally examined the locality. It is clear that a light should be placed at that point on the New Zealand coast where vessels bound for Otago or Canterbury first make the land, to guide them into Foveaux Strait. I would also venture to point out the great desirability of a light on the Snares, which lie right in the track of ships from Europe, India, and America, bound to all the middle and southern New Zealand ports, and also of the Australian homeward-bound vessels. It would prove a great saving of time to the former class, enabling them to proceed boldly, without the necessity of waiting for daylight, besides fixing their position before altering their course for the land; and to the latter it would be of great use, by allowing them to pass near and ascertain the rate of their chronometers; also, it would obviate the necessity of those vessels deviating from their course for fear of encountering those unlighted dangers well named the "Snares," and thus approaching too near the almost equally dangerous Auckland Islands. I would also remark that the very powerful light at present on Dog Island only partially fulfils its requirements in that position. The proper place for this light is on Ruapuke Island, when it would show right through the Strait, besides illuminating a much greater arc seaward than in its present position, where half the power is wasted inland. Moreover, on Ruapuke, it could be maintained at far smaller cost than on Dog Island, owing to the superiority of the soil and site. Again, the illuminating arc of Ruapuke light would extend to within ten miles of that of the Nugget Point light, and would include the dangerous Waipapa Point, where several vessels already have touched and only narrowly escaped shipwreck.

Having completed the survey of all the apparently available sites at the south-west point of the Middle Island, I next visited the site of the proposed Cape Foulwind Lighthouse, and found that the bush had been cleared sufficiently to enable me to select the best position for a light. This was done, and the exact position is marked by a large tree, marked with a crow's nest, and bears N. 40° E., distant about 6 chains from the original rata tree marked by Mr. Blackett and myself on a former visit. This site is on a small schist granite ridge about 15 feet high and 15 feet broad on the top, at an elevation of 190 feet above sea level. To clear the surrounding cliff both north and south, a tower, 36 feet in height will be needed, when an arc extending from S. round by W. to N. 68° E., will be illuminated (see sketch No. 11, and tracing marked C). Before the lighthouse is erected, a road will have to be made from the Charleston road, and the present track formed by the bush-clearers seems a capital direction for it to run. In the neighbourhood of the site, and in the direction of the highest land to the north and south, more bush will have to be cleared to avoid intercepting the light. The exact places where this will be required were pointed out to Mr. Rome, the foreman in charge of the clearing party.

Before concluding this report, I wish to call attention to the necessity of a better survey of the locality between the Steeple Rocks and the Buller River. When the Cape Foulwind light is erected, probably many vessels will run for shelter under the cape in south-west gales. The charts indicate neither soundings nor foul ground in this neighbourhood; and the "New Zealand Pilot" states that under Cape Foulwind vessels may find shelter in southerly winds. I however observed, from the "Luna's" deck, broken water far off the shore, and I therefore conclude that the shelter a vessel would find under Cape Foulwind is not altogether free from danger. I may also add that although I have recommended for Cape Saunders and Puysegur Point lights of the first order, as the best and most suitable to the requirements of those positions, should the cost be too great, second-order lights might be substituted without very great loss of power. The difference is indicated in the tracings.

I shall have the honor to give in a second report the results of my visit of inspection to the North Island stations and proposed new sites.

The Hon. the Commissioner of Customs, Wellington.

I have, &c.,
R. JOHNSTON.

No. 3.

Captain JOHNSON to the Hon. the COMMISSIONER of CUSTOMS.

SIR,—

Wellington, 10th June, 1874.

Following up my report on the Middle Island, I have now the honor to inform you that, for the examination of the various sites for the lighthouses proposed to be erected at once in the North Island, I left the Manukau in the "Luna," on the 24th March. Mr. Seed, Mr. Blackett, and Mr. Wilson were also on board. After calling at Kaipara, Hokianga, and Ahipara, we arrived off the Three Kings Islands on the 30th. The weather proving very fine, we were enabled to closely examine the coast of the islands from the ship, and although a tolerably good landing-place was found on the western shore of the main island, we considered it unnecessary to land, as the great height of the island—something like 1,000 feet—rendered it perfectly unsuited for a light. On its southern side, however, there appeared a point with an altitude of about 400 feet, but this is even very high; and if a light was erected thereon it would not show all round. From its position, it would be difficult to build the tower, and it would also be considerably out of the direct course of English ships bound to Auckland. Moreover, the Three Kings are steep and bold, and can be seen in thick or foggy weather, where a light in

a high position would be likely to be obscured; therefore, after taking all these circumstances into consideration, I came to the conclusion that a light erected on the Three Kings would not possess the same advantages as one in the vicinity of Cape Maria Van Dieman.

From the Three Kings we steered for Cape Maria Van Dieman, arriving there and anchoring in $2\frac{1}{2}$ fathoms just inside of the island, which lies off and close to the cape in a place tolerably well sheltered from all winds except northerly. Here a fair landing-place was found, which will need, however, to be improved in the event of a light being erected there. On examining the island we found it well suited for a light, and on the northern end we discovered an excellent site, at an elevation of 320 feet, easy of access, with ample room for keepers' dwellings, the island being large enough to keep a cow or two, leaving room for a kitchen garden. The light from here would show from N. 25° E. round to N., W., S., and S. 56° E., or over an arc of 261° , and right in the track of vessels making for Auckland or the east side of New Zealand from Europe or the southern Australian ports. I therefore consider this position an important one, and would recommend the erection here of a first-order revolving light on the holophotal system, showing white, except over the Columbia Reef, where it should be red.

Owing to a report that Cape Reinga would offer a good site for a light, the "Luna," after leaving Cape Maria, proceeded thither; on arriving we found a landing difficult, although the weather was fine. The height of the cape proved to be 456 feet, far too great a height, in my opinion, for a light. We also found that the arc to the southward—the direction from whence English ships approach, and where Australian ships often find themselves driven by the set of the current—was much obstructed by the high land in the vicinity of Cape Maria Van Dieman. I therefore came to the conclusion that Cape Reinga was not so suitable a position for a light as the island lying off Cape Maria Van Dieman. As no one light, wherever placed, will be sufficient to guard the northern end of the island for both inward as well as outward bound vessels, the question of site for another light as well as the one on Cape Maria had to be considered; therefore, after leaving Cape Reinga the coast from there to the North Cape was well examined. Arriving off the latter place an excellent landing was found on its inner extreme point, and on the top, at an elevation of 250 feet, a very good site can be had with an illuminating arc of 270° , showing over an arc of sea horizon from N. 61° W. to S. 29° W., only leaving a dark arc over the land. On reference to the tracing marked D, it will be seen that, with these two lights erected, that part of the New Zealand coast will be thoroughly lighted.

From the North Cape we steered for Moko Hinou Island, and after calling at the various small ports on the road, arrived there on the 3rd April. From the ship the several islands were at once examined, and, fixing on the main island as the most suitable, a good bay, with shelter in all winds except south-east, was found. Here the "Luna" anchored, and a landing was effected without difficulty; the ascent to the summit was easy, and the altitude of its highest point we found to be 340 feet, where a capital site is available, which would enable a light to be seen all round. This position commands the whole of the northern entrance to the Hauraki Gulf, and is right on the track of the San Francisco steamers as well as the South Sea traders; and as the passage between this island and Moro Tiri is broad, safe, and clear, and is now much used by coasters, and will be more so when the light on Moko Hinou is erected, the position is undoubtedly a very good one. Taking all these circumstances into consideration I recommend a first-order light; one similar to that suggested for Cape Maria Van Dieman would be most suitable. In considering the best position for a light in this vicinity, the position of the neighbouring light had to be taken into account. Like that of Cape Maria, it will therefore be seen, by reference to tracing E, that with a light on Cuvier Island, which has already been recommended in a joint report of Captain Edwin and myself, a light on Moko Hinou would command both the approaches to the Hauraki Gulf.

From the Moko Hinou the "Luna" proceeded to Moro Tiri Islands, as these islands had been spoken of as affording a suitable site, especially for coasters. On nearing the islands, we closely examined the shore from the ship, and after some difficulty a landing was effected on the southern side of the most eastern one, but no anchorage was found, however. On ascending to the top, we found it rather difficult and steep. The altitude was 450 feet, a height too great to insure a light being seen during thick or foggy weather, the time when it is most required. I therefore consider that this position does not possess the same advantages as Moko Hinou Island, but is decidedly inferior.

On passing the East Cape it was considered advisable to examine the site here, although I understand it is not the intention of Government immediately to erect a light hereabouts. On examining the coast from the ship, it was evident that East Cape Island would be the best position. The best landing-place was found on its N.W. side, where, however, it can only be effected in tolerably fine weather, without some expense being incurred for improvement. We found the island difficult of ascent. The southern end is the highest, and stands at an elevation of 420 feet. It is formed of a steep ridge or peak, with indication of a not very old slip, and altogether offers but a very indifferent foundation for a light. Towards the northern end the ground slopes, and about the centre a good site was found at an elevation of 340 feet, from whence a light could be seen from S. 9° W. round by E. and N. to N. 82° W., (as shown in tracing F). Although the island is covered with scrub and is small, it will be found large enough to supply the keepers with vegetables, &c.

Portland Island is one mile and a quarter long by a quarter of a mile broad, and is therefore about 250 acres in extent. The top is flat, covered with fern and scrub; the soil is good; 20 to 30 acres would be sufficient for the use of keepers. Between the island and Mahia Peninsula there is a channel for small vessels. Inside of this, on the north end of the island, a fair landing-place was found, which however will require some improvement in the event of a light being erected. On the south end, at an elevation of 310 feet, a capital site was found, from whence a light with only a 10-foot tower would show all round seaward from N. 10° E. to N. 27° W., or equal to an arc of 320° .

The light recommended in the report furnished by Captain Edwin and myself on the 3rd April, 1873, would answer well for this position, and the red arc over the Bull Rock, which bears from site N. 47° E., would be advisable.

I would draw the Government's attention to one or two matters connected with navigation:—
1. The Pilot and Signal Station at Kaipara has been placed on the wrong side of the entrance to the

harbour; for while all vessels go up the northern arm, the station is on the southern side; and the distance is so great that a vessel outside the bar cannot possibly see a signal made. Also, on looking from the station seaward, the view is across instead of along the channel. This drawback, combined with that interposed by the spray arising from the continued breakers, renders it impossible to observe the course a ship is making. The signal station is therefore, in my opinion, perfectly useless. From my own observation and the information received from Captain Laurie, the Harbour Master, I consider there can be no difficulty in removing the station, which ought to be done as soon as possible. Whether this be done or not, I would strongly recommend that leading beacons be placed on the South Head for the Galatea Channel, and a buoy on the shoal patch extending off, or rather seaward of, Pouto Point. 2. At Hokianga, there is a sunken rock just within the entrance. Vessels in avoiding this danger, from want of knowing its exact position, often keep away too much, and run into other danger. I recommend that a buoy be placed near this rock to mark its position; also that the present two leading beacons for crossing the bar be removed further apart, or an additional one erected—the latter would be the preferable course.

The Hon. the Commissioner of Customs.

I have, &c.,
R. JOHNSON.

No. 4.

Captain JOHNSON to the Hon. the COMMISSIONER of CUSTOMS.

REPORT ON MANA LIGHT.

SIR,—

Wellington, 23rd June, 1874.

In accordance with your instructions in reference to Mana Island light, I have the honor to report that this light was erected by the Chief Marine Board in 1864. The site was chosen after a great deal of consideration, and the reasons which induced the Board in selecting Mana as a site, with other information, is given in a report of Captain Sharp, Master Warden, and myself, copy of which I hereby attach. In addition to those reasons, I would also state that the Board considered, with a light on Mana, vessels passing northward of Stephen's Island would be enabled to steer with confidence in thick weather direct for the light, as no danger lies in their track, and the irregular tides in the vicinity of Cook's Rock, as well as that danger, would be avoided. Since its erection, however, I find that many of these vessels, particularly when proceeding westward, instead of keeping well over to the Mana shore, make a short cut by steering in a more direct course for the Brothers, and thus shortening a little the distance at the expense of an increased risk.

The altitude of the site on Mana has also proved too high, and the power of the light too small for the altitude; and the result is that while the rays can be seen by an observer whose eye is 15 feet above the sea at a distance of twenty-nine miles in clear weather, the power is only sufficient to enable the light to be seen eighteen miles in a mean state of the atmosphere; and at much less distance than this (owing to a large amount of the rays being overhead), the light is subject to be obscured at a time or in such weather when it ought to be seen. This light, also, from its similarity of character, has been mistaken for that at the entrance to Wellington Harbour, and *vice versa*. To obviate this mistake, as well as to lighten the entrance to Tory Channel, the Board had intended to erect, as soon as it had funds, a red light in the vicinity of Wellington Heads, with sufficient power to throw its rays right across the Strait to Terawiti, forming, as it were, a red arc between two fixed white lights; this light, as you are aware, is now ordered, and, when erected, will lessen the possibility of vessels making that mistake again, except to those who will not keep a look-out and pay that attention to navigation which this part of the Strait requires.

Since 1863 the number of steamers trading through the French Pass have greatly increased, and a light on Mana, to those vessels, is of little good, while one on the Brothers would be of great service. By reference to the report it will be seen that the principal reason the Board had for not erecting the light on the Brothers in the first instance was want of sufficient funds. The superior position of the Brothers was always understood; and had the Brothers the same facility of erecting and maintenance of a light as Mana, no doubt the light would have been erected there.

Having considered the whole question, I am of opinion that one of two things should be done, viz.,—1. Either a new flash white light, with a red arc over Cook's Rock, be erected on the northern Brother, and, if possible, 25 feet blasted off top of Cook's Rock; or, 2. A new flash white light be substituted for the one on Mana, with lower altitude, and the present light removed to the North Cape, where the altitude of site is less and more suitable, and where it cannot be mistaken for a neighbouring light.

Should Government entertain the first proposition, I would suggest that Mr. Blackett and myself should survey the Brothers, as well as Cook's Rock, before any further action is taken.

The Hon. the Commissioner of Customs.

I have, &c.,
R. JOHNSON.

No. 5.

REPORT of a Visit to the islet Brothers, in Cook Strait, for the purpose of ascertaining its suitability as the Site for a Lighthouse, by Captain SHARP, Master Warden, and Captain JOHNSON, Warden, Chief Marine Board.

On the 25th August, 1863, having obtained the services of the Wellington Steam Navigation Company's vessel "Lady Bird" to convey us to the Brothers, we left the port of Wellington shortly after 1 p.m. The weather was very fine, a light southerly wind prevailing. On the northern shore there was a slight swell, which decreased as the vessel neared the opposite side of the Strait; indeed a more suitable day could seldom have been chosen, and such might not happen again for

months—the narrow part of Cook Strait being notorious for the continuous prevalence of boisterous weather. At 4.30 p.m. the southern islet was rounded at the distance of a few yards, and the vessel passed slowly along the western side of both, so that every part of the water-line could be distinctly seen and examined, so far as applied to the purposes of being used as a place for landing.

The evidence of nautical men whose opinions have been required as to the best position for a light in Cook Strait has varied considerably—Cape Terawiti, Stephen's Island, The Brothers, Mana, Cape Campbell, and Cape Farewell being named. It appears that the greatest danger and difficulty of navigation exists in the narrows, which may be embraced between Stephen's Island and Cape Terawiti, the Chief Marine Board have resolved that a light to guide mariners through that particular locality is most required. The Brothers, from their prominence and central position, and being in the immediate neighbourhood of hidden dangers, has claimed the preference. This site is named by Captain Richards, H.M.S. "Acheron," in the "New Zealand Pilot," as being excellent. No account, however, of landing having been made is mentioned.

The northern islet appeared by far the most suitable, it standing further towards the centre of the Strait, and is less abrupt; neither, however, even during the present comparatively quiet state of the sea, offered easy access, the water-line being at almost every point precipitous, and the wash against the rocks sufficient to endanger life had a landing being attempted. One small slope (at an angle of about 45°) might possibly be made available by the construction of strong stages and other works of sufficient strength and magnitude for the lifting and storing the material required for the erection of a lighthouse. But upon this particular, as it would, if practicable, necessarily involve a very large expenditure, we would suggest the expediency of obtaining the opinion of a competent engineer.

The islet, having but a small face and an elevation of 230 feet, is steep on all sides, consequently much labour and outlay would be incurred in the construction of a road by which the building material would have to be conveyed to the site of erection, as also in preparing for the keeper's residence and other necessary buildings. Neither fuel nor water is found on the island.

All communication, whether for the purpose of landing supplies or building material, must be made by means of steam vessels, the heavy tide rips and uncertain currents rendering the approach by sailing craft very dangerous. It should be borne in mind that access can be had only in the most favourable weather.

Having carefully weighed all the preceding considerations, we have arrived at the following conclusions:—1. That the islet only is accessible for the purpose required by the aid of expensive works and in tranquil weather. 2. That the erection of a lighthouse (if possible) on the sight indicated would exceed by several thousand pounds the means placed at the disposal of the Board. 3. That from its isolated position and difficulty of communication, as also the total absence of fuel and water, the maintenance of an establishment would be more costly than lighthouses in other situations. 4. That the site is doubtless good, being prominently visible in passing through the Strait either from the north or south, and if only one light be used, perhaps the best; but if two lights were substituted (one on Mana Island and a second in the vicinity of Wellington Head), they would afford the double advantage of directing vessels to the south entrance of Queen Charlotte Sound (now a great thoroughfare) and in our opinion render the dangerous part of the Strait more easy than though only one light was used. 5. The expense of erecting and maintaining two lights on Mana and Wellington Heads would not, from the comparative easy means of access, probably exceed that incurred for the one on the Brothers.

We have, &c.,

CHAS. SHARP, Master Warden.

R. JOHNSON, Warden.

The Hon. Postmaster-General, Auckland.