REPORT

ON THE

MARINE BOARD DEPARTMENT OF

NEW ZEALAND.

1864-5,

BY THE

POSTMASTER GENERAL.

PRESENTED TO BOTH HOUSES OF THE GENERAL ASSEMBLY BY COMMAND OF HIS EXCELLENCY.

WELLINGTON.

1865.

REPORT

ON THE

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BY THE

POSTMASTER GENERAL.

SIR,—

I have the honor to submit for the information of your Excellency, a report on the Lighthouse system of the Colony, and the inspection of steamers for the year 1864, together with second Report of the Marine Board, embracing the same period.

I have, &c.,

J. RICHARDSON.

Postmaster General.

To His Excellency Sir George Grey, K.C.B.,
Governor of New Zealand,
&c., &c.

The officers connected with the Marine Board and the Lighthouses may be classified in the following manner:—

		£
1	Master Warden and President, at a salary of	400
2	Wardens, being Inspectors of steam vessels at £375 each	750
1	,, (mail agent under Pearson-Coleman contract)	
	The above constitute the Marine Board of the Colony.	
2	Engineer Surveyors, for surveying machinery, at £250 each	500
15	Lighthouse-keepers, at an average of £160 each	2360
		£4010

In addition to these salaries there are expenses connected with officers travelling on duty, oil, stores, &c., which may probably demand an additional £1000, making a total of about £5000; but, as the Board, owing to a misapprehension, have not yet sent in their accounts in accordance with the provisions of the Marine Board Act, it is not possible to state the amount with accuracy. The approximate *Revenue*, including the receipt of about £430 for the survey of steam vessels and £70 for the examination of masters and engineers, may be regarded as about £4230.

Independently of the duties immediately connected with the Marine Board, 54 engineers have been examined by the staff, from the 5th of August, 1864, to the 18th May, 1865, of whom one has had his license cancelled; 47 masters have also been examined and have received certificates of competency between the 8th of August, 1864, and the 12th of May, 1865, four of whom have had their certificates cancelled.

The Board estimate the probable Revenue for the year 1865-6 as follows:—

	£
Light Dues from 8 lighthouses	8400
Fees for the survey of steamers	500
	£8900

They also give the following as the probable Expenditure :—

		£
1	President and Master (an addition of £200 per annum)	600
2	Wardens and Surveyor (an addition of £125 per annum, each) ..	1000
1	Inspector of steam vessels	300
2	Engineer Surveyors (an addition of £100 each)	700
1	Lighthouse Engineer	400
15	Lighthouse-keepers	2320
2	Assistant Lighthouse-keepers	200
		£5520

Oil and stores for 7 Lighthouses	£1500	
Incidental expenses	300	
Travelling expenses	500	
Boats, &c., &c.	400	
	——	2700
		£8220

Making a total, without including interest on money expended on the erection of lighthouses, of £8220 against a revenue of about £8900, but making no provision for surveys, buoys, beacons, or new lighthouses.

Complaints have been made of what are termed the high and unequal rates of lighthouse charges. In regard to the first of these complaints, it may be urged that the receipts from lighthouses fall far short of the expenditure incurred; and that when the decreased rates of insurance, the greater quickness of passage, and saving of fuel, are taken into consideration, it may be said that the charges made for lighthouse dues are amply re-paid to the ship owner, even in a pecuniary point of view. The observations of the President of the Marine Board on this subject, in reference to a remonstrance from the agent of the Panama, New Zealand, and Australian Royal Steam Packet Company, appear unanswerable.* The probability that the highest charge paid by any Company does not exceed one per cent. per annum on the value of the hull and equipment, to say nothing of the value of the cargo and freight, amply demonstrates that the charge is by no means out of proportion to the benefits received. With regard to the charge being unequal, it may be replied that vessels coming from beyond the Colony invariably pay higher at the first port, which is compensated for by a lower rate at the others.

Too much importance cannot be attached to the necessity of a scientific and efficient supervision and inspection of the coastal lighthouses. A stringent check is required to be imposed on the consumption of stores, on the careful selection of keepers, combined with a ceaseless vigilance with respect to their conduct, and the order in which the optical apparatus is kept. The report of the last lighthouse commission of Great Britain urged the inspection of each lighthouse at least once in each year, and strongly recommended the propriety of putting the scientific parts of all lighthouses under an optical Engineer.

It is proposed to introduce an Act during the present session of the General Assembly which will materially affect the constitution of the Board, and remove some of those inconveniences which exist in its practical working. It has been found that the independent position assumed by the Board is not conducive to efficiency, and it is proposed to re-model its construction by the appointment of a scientific Engineer capable of attending to the construction and maintenance of Lighthouses, and of conducting on a scientific basis the necessary survey of the coast. Such an officer would be assisted in his duties by two surveyors for the examination of steam vessels, who will have to undergo, before appointment, a thorough examination. The Board thus constituted should be attached to one of the Departments of Government, and subject to its control.

Appended hereto is a Report by the Marine Board which will be followed, as soon as received, by a statement of the accounts, drawn up by the Treasurer of the Board. There is also attached a Report on all the Lighthouses of the Colony, drawn up by Mr. Balfour, the Marine Engineer to the Provincial Government of Otago, whose valuable aid on many occasions, especially in superintending the erection of the Lighthouses at Tairoa Head and Dog Island, and the survey of Cape Saunders, and in correcting steering cards, and the survey of Cook Strait for the submarine cable, the Post-master General desires thankfully to acknowledge.

The system adopted in France of having a general chart of the coast delineating a system of Lighthouses is one that should be immediately adopted, and thus the points most urgently demanding attention could be first taken up. This system would avoid the evils which arise from the clustering of lights in dangerous proximity to each other without any very appreciable difference.

A Return is appended of the expenditure incurred in the erection of Lighthouses up to the 31st March last, charged on the Loan Appropriation Act, 1863; and also Returns of Wrecks for 1864, and for the half-year ending 30th June, 1865, reports of which have been transmitted to the Lords of the Committee of the Privy Council for Trade, under the provisions of the "Enquiry into Wrecks Act, 1863."

J. Richardson.

Postmaster General.

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* This correspondence is printed and attached to this Report—Appendix No. 3.

CORRESPONDENCE RESPECTING LIGHT DUES

PAID BY VESSELS OF THE PANAMA, NEW ZEALAND, AND AUSTRALIAN ROYAL MAIL STEAM COMPANY.

Panama, New Zealand, and Australian Royal Mail Company,
Otago, 14th March, 1865.

SIR,

I have the honor to enclose a memorandum showing the heavy expenditure which the recently imposed light dues will cause this Company.

Upon the Inter-Colonial vessels passing so frequently to and fro, the rates press particularly heavy, and there is also, in the case of the Cook Strait boat, this inconsistency, that for the use of the *Harbor* light at Nelson, she pays as much as she does on calling at five ports subsequently.

In the Australian Colonies the practice is to charge for steam vessels the higher rate only periodically—*not each voyage*. A moderate charge for light dues, sufficient for the maintenance of the lights, and that only, cannot be objected to, but I believe these dues are very generally considered excessive.

I, therefore, venture to hope that a considerable reduction of the present rates will have the early and favorable consideration of the Government.

I have, &c.,
JOHN VINE HALL,
General Manager P.N.Z. and A.R.M. Company.

The Honorable the Post-master General of New Zealand,
&c., &c., &c.

General Post Office,
Wellington, 30th March, 1865.

SIR,—

I am instructed to acknowledge the receipt of your letter, as per margin (14th March, 1865) on the subject of the heavy expenditure which the recently imposed Light Dues will cause to the Panama, New Zealand, and Australian R. M. Company.

In order to estimate whether this expenditure by the Company is out of proportion to the benefits derivable from the establishment of coastal lights, it is necessary that the Post-master General should be in possession of a statement exhibiting the value of the Company's vessels, and the gross receipts under the respective heads of subsidy, freight, passage money, &c.

If you will favour me with this necessary information, the subject of your communication will receive the earliest consideration.

I have, &c.,
G. ELIOTT ELIOTT,
Secretary.

Capt. J. Vine Hall,
General Manager,
P. N. Z. and A. R. M. Company,
Sydney.

MEMORANDUM OF PRESIDENT OF MARINE BOARD ON CAPTAIN VINE HALL'S LETTER.

THE first question to be considered is whether the expense of building and maintaining lighthouses is to be defrayed by means of a tax levied on shipping, for whose exclusive use they are placed, or from other sources of revenue? The present rate is only sufficient to pay interest on the outlay at 6 per cent. and the cost of stores, and salaries of establishments, without allowing anything for supervision.

The next point is, "That vessels from Sydney touching at Nelson pay as much for a Harbor Light as at the other five ports of call." It is usual to charge a higher rate on vessels arriving from without the colony; it matters not whether the ship's destination be Nelson, Auckland, or Otago, the tax is no heavier, as the smaller dues are paid at all subsequent ports of call.

If light dues be viewed as most other rates, "an assessment on the value of property," it

APPENDIX.

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will not exceed on the hull and machinery of *Foreign* going steam vessels one shilling per hundred pounds sterling, and on coasters three pence, supposing they pay the full rate of one penny per ton; add to this the value of cargo and freight, it will be still further reduced.

Lighthouses, by lessening risk from wreck, generally decrease the rate of insurance. They also, by enabling vessels to make their ports without delay, often save more in the expenditure of fuel than would pay the light dues for several trips, besides expediting the voyage, which, to owners of subsidised vessels, is of importance.

The I. C. Company's ships carry a large number of passengers, charging at a rate from £3 to £5 per day, for each having first-class accommodation; on the profits of this item alone, they could well afford to pay the tax in question. I believe one shilling per head on passengers of all classes, travelling by their ships, would more than cover the light dues, a sumso small that individuals would seldom object, supposing such to be a condition on wnich the lights were exhibited.

In these calculations I have not noticed the large properties that are lost by occasional wrecks, to which all vessels are more or less liable, especially where there are no lights to direct them into places of safety, or through intricate navigation. Judging from the benefits derived at the port of Wellington, I do not hesitate to say that many lives, and shipping to the value of more than the whole amount of light dues that will be collected for years, have been saved since the light on Pencarrow Head has been exhibited.

If Captain Hall had furnished a statement, showing the value of his vessels, and the gross receipts under the head of subsidy, freight, passage-money, &c., a more satisfactory answer might have been given; but I submit the foregoing is sufficient to convince an uninterested person that the tax, when compared with others of a similar character, and the great benefit derived, cannot be considered unreasonable.

Taking Captain Hall's figures, say £1500 for eight vessels, touching at sixty-two ports per month, the charge when levied in full will only amount to one per cent. per annum on the value of hull and equipment.

CHARLES SHARP,

President Marine Board.

Wellington, 27th March, 1865.

ACCOUNT OF LIGHT DUES PAYABLE AT THE UNDERMENTIONED PORTS.

PANAMA, NEW ZEALAND, AND AUSTRALIAN ROYAL MAIL COMPANY.

(ENCLOSURE TO CAPTAIN VINE HALL'S LETTER OF MARCH 14, 1865.)

SHIP AND VOYAGE.	Auckland or Manukau.	Nelson.	Havelock.	Picton.	Wellington.	Lyttelton.	Dunedin.	Bluff.	TOTALS.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
"Prince Alfred" down		11 14 4		1 9 3½	2 18 7	2 18 7	2 18 7		
Sydney up		2 18 7		1 9 3½	2 18 7	2 18 7			32 4 5
"Claud Hamilton" down	2 4 1	8 16 4		1 2 0	2 4 1				
Melbourne up									14 6 6
"Auckland" down	8 17 4	2 4 4		1 2 2	2 4 4				
Melbourne up									14 8 2
"Phœbe" down	1 14 8	1 14 8		0 17 4	1 14 8	1 14 8	1 14 8	1 14 8	
Manukau up	1 14 8	1 14 8		0 17 4	1 14 8	1 14 8	1 14 8		20 16 0
"Airedale" down	1 3 10	1 3 10		0 11 11	1 3 10	1 3 10	1 3 10	1 3 10	
Manukau up	1 3 10	1 3 10		0 11 11	1 3 10	1 3 10	1 3 10		14 6 0
"Otago" down	7 12 4								
Sydney and Auckland up									7 12 4
"Egmont" down	1 5 0	1 5 0	0 12 6	0 12 6	1 5 0	0 12 6			
(say 300 tons)	1 5 0								
Manukau up	1 5 0	1 5 0	0 12 6	0 12 6	1 5 0	0 12 6			12 10 0
"Lord Ashley" down	1 4 8				1 4 8	1 4 8	1 4 8		
Auckland up	1 4 8				1 4 8	1 4 8			8 12 8
									£124 16 1

£124 16s. 1d. per month = £1497 13s. 4d. per annum. Add for "Tararua" and "Rangitoto," if sent on the coast, £350 per annum = £1,847 13s. per annum.

APPENDIX.
(No. 4.)

EXPENDITURE on Account of LIGHTHOUSES charged on the Loan Appropriation Act, 1863, up to the 31st March, 1865.

	Cost of Plant, &c.	Expenses of Erection.	Dwellings, Stores, &c.	Engineer's Charges.	Freight, Lighterage, &c.	Miscellaneous.	Totals.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Tiritirimatangi ...	2508 0 0	1614 2 0	200 0 0	345 13 4	504 11 10	116 9 9	5288 16 11
Mana	2508 10 0	1405 0 9	220 0 0	295 0 0	358 15 3	274 13 0	5061 19 0
Godley Head ...	1427 7 7	1917 0 0	...	333 0 0	260 0 3	27 1 11	3964 9 9
Tairoa Head ...	940 17 2	3657 19 3	...	217 5 9	38 11 1	151 18 11	5006 12 2
Cape Saunders ...	1946 8 3	... ...	...	113 12 0	110 9 6	126 10 0	2296 19 9
Dog Island ...	2346 10 7	4220 11 6	14 10 0	339 15 6	84 2 7	106 6 3	7111 16 5
Totals ... £	11,667 13 7	12,814 13 6	434 10 0	1,644 6 7	1,356 10 6	802 19 10	28,730 14 0

NOTE.—Of this sum there was expended :—

In the year 1864,	£23,500 6 10
" 1865,	5,230 7 2
	£28,730 14 0

J. WOODWARD,
Assistant Treasurer.

RETURN OF WRECKS DURING THE YEAR, 1864.

Name of Vessel.	Tonnage.	Description.	Whether Insured.	Where lost.
Arthur McKenzie ...	229	Brig	Not stated	Waikato River
Australia	162	Brig	"	Akaroa
Scotia	not stated	Steamer	"	Bluff Harbor
Nile	"	Schooner	Insured	Taketu Point
Ballarat	"	Steamer	Not stated	Mahia
Yanutha	"	Schooner	Insured	Taranaki
Wee Tottie	"	Brig	Insured	Taranaki
Zephyr	"	Schooner	Not insured	Taranaki
Aphrasia	91	Steamer	Insured	Tako Bay
Queen of Perth	not stated	Schooner	Not stated	Taranaki
Planet	"	Cutter	Insured	Rangitoto
Osprey	"	Schooner	Insured	Blind Bay

G. ELIOTT ELIOTT,
Secretary General Post Office.

RETURN OF WRECKS DURING THE YEAR 1865—TO THE 30TH JUNE.

Name of Vessel.	Tonnage.	Description.	Whether Insured.	Where lost.
Choice	162	Brigantine	Insured.	Taranaki
Gazehound	383	Barque	Not stated	Oamaru
Black Diamond	not stated	Brigantine	„	Taranaki
Bombay	„	Ship		At sea
Fiery Star	1360	Ship	„	At sea
Surprise	not stated	Schooner	„	Wanganui
Daring	„	Schooner	„	Wanganui
Alpha	„	Cutter	„	Patea
William Miskin... ...	„	Steamer	Insured	Bluff Harbor
Thames	„	Brig	Not insured	Saltwater Creek
Adeona	„	Schooner	Not stated	Wanganui
Alliance	73	Schooner	„	Waikato
Success	not stated	Barque	„	Blind Bay
Kate	„	Brig	„	Waitara
Lady Denison	„	Brig	„	Wanganui
Eclipse	„	Schooner	Not known	Taranaki

G. ELIOTT ELIOTT,

Secretary, General Post Office.

STATEMENT OF LIGHT DUES COLLECTED AT THE UNDERMENTIONED PORTS IN NEW ZEALAND, FROM 1ST JANUARY TO 30TH JUNE, 1865.

	March Quarter.	June Quarter.	Total.	Remarks.
	£ s. d.	£ s. d.	£ s. d.	
Wellington	208 19 9	230 11 11	439 11 8	
Auckland	691 9 5	606 0 7	1,297 10 0	
Nelson..	149 15 6	225 13 5	375 8 11	
Otago	392 17 5	393 15 8	786 13 1	
Picton	15 5 6	25 16 5	41 1 11	Collected since February, 1865.
Havelock	3 2 4	3 2 5	6 4 9	Collected since February, 1865.
Wanganui	5 9 1		5 9 1	June quarter not rendered.
Lyttelton		234 18 7	234 18 7	Collected since 1st April 1865.
TOTALS ... ... £	1,466 19 0	1,719 19 0	3,186 18 0	

The next half-year's receipts will probably be in excess several hundreds of pounds, as the whole of the ports will be collecting dues after the 1st August, when Dog Island Light will be exhibited.

CHAS. SHARP,
President Marine Board.

Wellington, 20th July, 1865.

REPORT

OF

MR. BALFOUR.

NEW ZEALAND LIGHTHOUSES.

THE Lighthouses of Tiri Tiri, Mana, and Godley Head have been constructed mainly from the designs of Messrs. McLean & Stilman, C.E., Great George-street, London, though considerable modifications have been made in the dwelling-houses to suit the simplicity of Colonial ideas and adapt the designs to the several localities. They were ordered from England for the Marine Board of New Zealand on the formation of that body and have been completed under its superintendence.

The lanterns and optical apparatus for Tairoa's Head, Dog Island, and Cape Saunders, are from the designs of Messrs. Stevenson, C E., of Edinburgh, and were ordered from home by the Provincial Government of Otago; but the Marine Board having been established before the buildings were commenced, that body took over the whole, and under its auspices the Tairoa's Head Lighthouse has been satisfactorily completed, and that on Dog Island very nearly so; though the much required works at Cape Saunders have, for want of funds, been unfortunately delayed.

The Lighthouses at Tiri Tiri and Mana are identical in construction—the towers being of cast iron, 70 feet high from base to vane, 15½ feet in diameter over all above the base course, and 11 feet in diameter below the gallery. The lanterns are of the "English" construction, with inclined sash bars and are glazed with massive panes of plate glass of great size and half an inch thick.

The apparatus in each is a fixed dioptric apparatus, of the second order (or size) of the system invented by the celebrated French philosopher Augustin Fresnel; in which a cage as it might be termed) of accurately ground and highly polished refracting and reflecting lenticular and prismatic rings of glass surrounds a central flame of large size and great brilliancy, and so acts on the light as to bend down all the rays which would naturally be wasted on the sky, and to bend up those naturally falling on the earth and thus to send the whole light to seaward for the benefit of the mariner. The lamps in these Lighthouses are pressure or "moderator" lamps of a very simple construction, they work very satisfactorily and are not liable to go out of order; the only objection to them is their great weight, which would cause a very serious delay should it ever be necessary, from some unforeseen accident, to shift a lamp during the night. To meet this possible case, small "Liverpool Lamps" made to ship into the burner ring of the larger lamps, should be furnished to each station, and kept trimmed and ready for lighting; by adopting this precaution the large lamps could never require to be shifted at night. The burners of these second order lamps are made to carry three concentric wicks, with intermediate air spaces, the largest wick being 2¾ inches diameter, and they produce a very brilliant flame, which, when carefully tended, should be from 3 to 3½ inches high.

TIRI TIRI LIGHTHOUSE is erected on the south-east end of the Island, at an elevation of 300 feet above the sea, and the light can, consequently, be seen twenty-three nautical miles off in clear weather. It was first lighted on January 1st, 1865, and has since then been regularly exhibited. The total cost of this work, including cost in England, freight to the Colony, freight to the Island, cost of erection, timber dwelling houses, superintendence, &c., &c., has been about £5288

MANA LIGHTHOUSE is erected on the north west end of the Island, at an elevation of about 450 feet above the sea, and shews a fixed light all round (except where intercepted by land) for a distance in clear weather of about thirty miles. It was permanently lighted in the beginning of February, and its total cost, including stores, road, timber dwelling houses, cost of erection, superintendence, &c., &e., has been approximately £5061. It shews a very excellent light, which contrasts favorably with the adjacent light on Pencarrow Head.

GODLEY HEAD LIGHTHOUSE is optically identical with the others, but the tower and dwellings are of stone. It is erected on Godley or Cachelot Head, on the northern side of the entrance to Port Lyttelton, at an elevation of about 450 feet above the sea, and shews a fixed light to seawards over about 10½ points of the compass, and should be visible, in clear weather, about 30 miles. It was permanently lighted on April 1st, 1865; its total cost, including buildings, road, &c., being £3964. This light being erected on very high land, the tower is only 36 feet high over all from base to vane, and could not well have been made lower; at the same time, had an equally eligible lower site presented itself, it would have been preferable for a light which has to be approached so closely as this is by vessels entering the harbour. Should, however, it be found on further experience that the light has a tendency to show too much *over* vessels close at hand, the optical arrangements can so far be altered as to throw more light down (technically, to cause it to "dip" more) without, if the work be properly done, materially injuring its effect to seaward. The Lighthouse would be much more easily "picked up" by day were it and the dwellings painted white, and its power at night would be very greatly increased were the light on the land side, which is at present wasted (*nearly one half of the whole light from the lamp*) reflected seawards, as at Tairoa's Head, and as intended to be done at Cape Saunders.

TAIROA'S HEAD LIGHTHOUSE works and those at Dog Island have been carried out under my superintendance. At Tairoa's Head, the ground being tolerably high (170 feet), the tower is only 26 feet high to the top of the masonry, and it and the dwelling houses have been very substantially built of an excellent stone found close at hand, the whole being a credit to the contractor, Mr. Hugh Calder.

The apparatus and lantern are very similar to those already described, but the diagonal arrangement of the sash bars or astragals of the lantern (which is made on the "Scotch" system) is more fully carried out, and the increased rigidity thereby gained permits the use of thinner and lighter plate glass panes, thus obstructing less light and facilitating repairs. The arrangements for cleaning the outside of the lantern panes are also much more perfect. The apparatus is also made with inclined frames, so as to equalize more perfectly the distribution of the light—an improvement introduced many years ago by Mr. Alan Stevenson, engineer to the Scotch Lighthouse Board, but, strangely, scarcely yet adopted in England, though so obviously beneficial. The apparatus is of the third order, but the lamps, which are on the fountain principle, have three wick burners like those at Mana, &c. The light which at this station would naturally be wasted on the landward side, is reflected back again by a "Dioptric Spherical Mirror," an entirely new invention, by which the physical properties of glass are so skilfully taken advantage of as to cause it to reflect the light back to the point from which it emanated (and thence, of course, forward seaward) as perfectly as if it were an opaque substance; so that this combination of prisms, though apparently perfectly transparent, does not allow a single ray of light to pass through it which could be beneficially reflected, and actually casts a shadow on the wall behind. This kind of mirror was invented by Mr. Thomas Stevenson, C.E., Edinburgh, some years ago, and a small one exhibited in London in 1862 attracted great notice, but this and a larger one intended for Cape Saunders are the first which have ever been made for actual lighthouse work, and they were found on trial to give highly satisfactory results. I examined the whole apparatus optically after it was fixed in its place, and the result was very satisfactory, every prism being of good form and properly placed so as to contribute its due portion of light to the mariner. As Tairoa light will be of comparatively minor importance after the completion of that on Cape Saunders, it has been made of a blood red color by the use of ruby-colored lamp glasses, thus precludiug all risk of mistaking the one for the other. The power of the light is of course much diminished by this arrangement, but I believe it to be quite sufficient for the position—a subdued light at the entrance to a harbour being, in most cases, preferable, as not tending to dazzle the eyes and render other objects invisible. The lantern and apparatus cost £995 2s. 11d.; freight, buildings, road, &c., &c., £3939 1s. 8d., making the total cost when complete (so far as the accounts passed through my hands) £4937 4s. 7d. This light is erected on Tairoa's Head at the seaward side of the entrance to Otago Harbour, at an elevation of 196 feet above the sea, and should be seen, in clear weather, at a distance of 20 miles, though from its color absorbing so much of the light (a *red* glass merely stops or absorbs the *yellow* rays, which form both the largest and brightest portion of the spectrum) it will probably be very seldom seen so far. It shows over about 13 points of the compass to seaward, the land light being reflected as above described, and has been regularly exhibited since January, 1st, 1865.

Dog Island in Foveaux Strait being very low and quite in the track of shipping—especially of the Inter-colonial mail steamers—the establishment of a lighthouse there is obviously of much importance. It was necessary to make the tower 100 feet high in order to give the light sufficient range, and this, combined with the unworkable nature of the stone on the Island, and the great depth of foundation required for the dwellings, has made the undertaking comparatively a costly one; but I have, notwithstanding, been able to keep the cost within the average price of similar works in equally inaccessible situations at home. The tower is 21½ feet diameter at the base, 16½ feet diameter below the balcony, 100 feet high to the lantern, and 118 feet high over all. It is plain to a degree, economy having been looked upon as a paramount consideration, but its simple massiveness renders it a not unpleasing object. The external walls of the dwellings are also of stone, the interior partitions being of wood, and the whole has been satisfactorily completed by the contractor, Mr. Garside, in the face of very considerable difficulties. The lantern is of the first class, 12 feet internal diameter and 10 feet high in the clear of glazing, and the astragals are of gun metal, thus combining in the highest degree strength, lightness, and durability. The apparatus is catadioptric revolving of the first order on the independent burner system, there being sixteen small apparatus or Holophotes, each with a separate argand lamp and reflector behind, arranged on a large four sided frame of malleable iron, four on each side; the frame makes a complete revolution every two minutes, being driven by a clock work machine of the most massive kind, so that a distant observer will get the very powerful combined flash of the four holophotes on each face of the frame at intervals of 30 seconds. This arrangement, designed by Messrs. Stephenson, C.E., of Edinburgh, is peculiarly applicable to inaccsssible localities like Dog Island, from the simplicity and durability of the argand lamps, and from the ease with which they can be repaired, as well as from the fact that even should one or more of the lamps be temporarily disabled the light, though weakened, will not be totally extinguished; whereas the failure of the one lamp used in the central burner system would involve—temporarily at least—the total disappearance of the mariner's guide. The works should ere this have been entirely completed had they not been delayed by the remarkable inclemency of the winter in the Strait, and other causes over which I had no control, but the worst has now been got over, and there appears to be no doubt that the light will be ready for permanent exhibition not later than the first of August next. The lantern and apparatus cost £2483 6s. 1d., and freight, buildings, road, &c., &c., £6992 18s.; making the whole cost (so far as the accounts have passed through my hands) £9476 4s. or say £9600. The lighthouse is erected on a small island off the entrance to Bluff Harbor, Foveaux Strait, at an elevation of 150 feet above the sea, thus insuring a range in ordinary weather of at least 18 miles, and will shew a flash every half minute.

Cape Saunders next to Dog Island is certainly one of the most important sites for a lighthouse on the East Coast of the Middle Island, and it is to be regretted that that important work was not undertaken before Tairoa's Head, as being "par excellence" a *sea light*, while the other is more properly a harbor light. The optical apparatus for a first class dioptric fixed white light, including a glass spherical mirror, is now in Dunedin, and it is to hoped that the necessary funds for the completion of the work will be appropriated at the proximate meeting of the General Assembly. Were the site more

accessible the cost of the buildings would be but small; but after a careful survey, and taking everything into consideration, I estimate that the total cost of the works will not exceed say £6500, of which sum £2296 19s. 9d. is the cost of the apparatus and lantern in England, and their freight to Dunedin.

Pencarrow Head Lighthouse.—While engaged in the survey of the Strait to ascertain the best line for the Telegraph Cable I happened to pass this Lighthouse at night, and as the light seemed very poor, at Captain Kennedy's suggestion we landed to examine it. We found the keeper duly on watch, and everything beautifully clean and in good order, but the flame of the lamp though very white and clear was miserably low, being only 1½ inch from the burner to the top, whereas the standard height is from 3½ to 4 inches. This fully accounts for the poorness of the light, as if the lamp be in its proper position only the mere ragged upper edge of the flame is sent seaward through the central or lenticular part of the apparatus, all below being wasted on the sky, while if the lamp has been raised to remedy this defect the upper and lower prisms must from necessity by their construction be entirely useless. The whole of the optical arrangements, including the lamp, require a thorough examination and readjustment, and it would be very desirable to bring the trained Light-keeper, so wisely brought out by the Otago Government, to this station for a month at least to instruct the keepers in the really difficult art of maintaining a high but clear flame.

Tory Channel Light.—It having been suggested that a light might advantageously be established at the entrance to this narrow Sound I took a favourable opportunity for examining the locality, and in company with Captain Kennedy fixed upon a very good site on the South Head, at an elevation (guessed) of nearly 200 feet above the sea. There can be no doubt that a light at the entrance to Tory Channel would much facilitate the general navigation of Cook's Strait, and would be invaluable to the mail steamers—as it would not require to be seen to a very great distance, a third order fixed red light with a three wick burner fountain lamp, similar to Tairoa's Head would be sufficiently powerful and would run no risk of being mistaken for either Pencarrow or Mana light, while it would also almost entirely remove the danger of these latter being confounded.

There is an awkward low projecting rock just abreast of the site proposed for the Lighthouse on which it would be very advisable to erect at the same time a simple barrel beacon. Should it be decided to erect a Lighthouse on Tory Point, I would propose a timber framed tower 30 to 35 feet high, covered with galvanized iron, and timber dwellings, and the whole works could be completed in a few months so as to be ready to receive the optical parts immediately on their arrival, even if ordered at once. Without going into details it would be impossible to make a correct estimate of the cost of these works, but I should think that the whole establishment complete—including the proposed beacon would not exceed £4000, and would probably be considerably under that sum.

The Brothers.—During the survey of the Strait we steamed round these rocks as close as seemed prudent and examined them carefully. It seemed probable that a landing might be effected on the northernmost in very fine weather, but even with the moderate swell running when we were there, it would have been quite impossible. A lighthouse might certainly be erected on this rock, but the expense would be very great—probably not less than that of five or six ordinary lighthouses—and I am not quite certain that it would be wise to do so, even setting aside the question of cost; sailing craft should not be encouraged to work too much on that shore of the Strait, as it is full of dangers, while in any weather in which even a steamer could with propriety run close to the shore, the Brothers themselves, being bold rocks upwards of 230 feet high, can always be made out.

Under these circumstances, I consider that the Marine Board has shown wisdom in at least delaying to erect a lighthouse there, and the Mana light seems both useful and well placed, in as much as it is on the "clean" side of the Strait, is "steep to," and has good anchorage for north-west winds under its lee. The next light that should be established in the Strait is certainly that on Tory Point, and should another afterwards be called for, I incline to think that Cape Jackson would be the best place for it, though I am not at present prepared to express a decided opinion on the question. There can, however, be no doubt that the Colony would not at present be justified in undertaking expensive works at the Brothers—in after years and with greatly increased shipping traffic, it may be found necessary to re-open the question.

The nucleus of a lighthouse establishment having thus been formed, it is obvious that it must gradually increase *pari passu* with the prosperity of the Colony, and it becomes of the utmost importance that such discipline should be established in the service as shall ensure the due exhibition of the lights to the best advantage, combined with all proper economy of stores. With this view proper regulations should be drawn up and promulgated and in no case departed from, and it should especially be understood that instant dismissal is to follow drunkenness on duty, or the extinction of the light if arising from any neglect of the keeper on watch. A scientific inspection of every lighthouse should also be made at least once a year. This system was adopted by the Scotch Lighthouse Board when first established, in 1791, and the result has been that Scotland has ever been in the van in the adoption of all improvements, and that the Scotch lighthouses are stated in the Report of the last Commission of Investigation in 1861, to be the best in the Kingdom, and, as they also state British lights to be unsurpassed, by inference the best in the world.

Compass Correction.—During my examination of the various lighthouse sites referred to above, I had occasion to take from the "Sandfly" a number of compass bearings, and was surprised to find that, even when corrected by the steering cards, they differed very greatly from those measured on the Admiralty charts. In consequence, on our return to Port, I got the vessel "re-swung," but afterwards found that the corrected card did not agree with the readings taken at the time she was swung, and as this seemed a very palpable error, I investigated the whole subject with care, and collected a number of other steering cards, on most of which there were curious and, in some cases, very grave discrepancies, which seemed of such vital importance as to compel me, in the interest of the public, to bring the

matter very strongly under the notice of the Government, by whom it has been taken up with the promptitude which it certainly called for. As there seems no necessity for going into the past farther than is requisite to ensure safety at present, I would recommend that the Marine Board be requested to furnish a list of every vessel ever swung by them or under their superintendence with a correct copy of the last card furnished to each vessel; and it would probably be advisable that the attention of the commanders of steamers be called to the circumstances, in order that they may not lean too heavily on their "corrected cards," at least until they have been examined and checked.

As to the future, I would recommend that the cards of all vessels swung in New Zealand—should the operation not be performed by an officer of the Marine Board—should at all events be examined and countersigned by such officer, and a copy kept in a book for the purpose; and it might be advisable that such cards or the copies should be again examined and countersigned by a competent central officer. The knowledge that all these checks existed would go far in itself to render mistakes rare, if not impossible. I have also been able to devise a small instrument, which I have named a "Deviation and Corrected Course Indicator," by the use of which, if either the deviation or the corrected course for any given course be known, it can be converted to the other without possibility of mistake; and I should strongly recommend that a number of these instruments should be printed off on cardboard (the cost would be very trifling) and furnished to the Marine Board for use and sale; for, as they would enable shipmasters to check the accuracy of the corrections made when their vessels were swung, and would also greatly facilitate the taking of the correct bearings of objects at sea, a considerable number would probably be disposed of.

These precautions, and increased care and vigilance on the part of the officers swinging vessels will probably ensure accuracy for the future.

JAMES M. BALFOUR

Wellington, July 18th, 1865.

The Honorable Major Richardson,
Post-master General,
&c., &c., &c.

REPORT

OF

PRESIDENT OF MARINE BOARD.

Marine Board Office, Wellington,
14th June, 1865.

SIR,—

I have the honor to report, for the information of His Excellency's Government, the proceedings of the Marine Board since the last meeting of the General Assembly in October, 1864.

I have, &c.,

CHARLES SHARP,

President, Marine Board.

To the Honorable Major Richardson,
Post-master General, Wellington.

PILOTS AND PILOTAGE.

This indispensable department, which, under the most favorable circumstances, has seldom collected sufficient amount of dues to pay the necessary expenses of its maintainance, have, since the passing of the Marine Board Act of 1863, been a heavy burthen on the respective Provincial revenues. Clause XXXVII. of that Act leaves it optional with masters of vessels to engage the services of a pilot, which, owing to the great facilities now afforded, either by the aid of steam tugs or prominent harbour marks, can be dispensed with without incurring the risk of accident. The inevitable consequence has been a very large dimunition of receipts.

To obviate this undue pressure on the Provincial revenue the Board have, at its recent sittings, passed several resolutions which, if adopted, will enable the department to raise a sum sufficient to defray a large portion of the cost of its maintenance, without bearing heavily on the shipping frequenting the ports. The rate of pilotage might be varied at the different harbours according to the extent and nature of service required.

LIGHTHOUSES.

The Lighthouses in course of erection at the date of last report are now, with one exception (Dog Island), in operation. They are as follows:—

Tiri Tiri, Gulf of Houraki. The works comprise an iron tower forty-eight feet in height, having a lantern and 2nd order fixed white dioptric light, commodious dwellings for two keepers, and outhouses. The total cost, including foundation, road, carriage, freight, and optical apparatus is estimated at about five thousand six hundred pounds (£5600), a small portion of which is still unpaid.

The light is placed on the highest knoll of Tiri Tiri, and affords an excellent direction to vessels approaching Auckland from the northward or eastward. It is seen from a distance of eighteen to twenty miles.

The light was exhibited on the 1st January, 1865, from which date dues have beeu collected.

Mana Island, Cook Strait, is precisely the same character of light, tower, and dwellings as those on Tiri Tiri, having, in addition, a small store at the landing place, for the convenience of housing supplies until they can be removed to the lighthouse, a distance, over a difficult road, of about a mile. The total cost, including freight, carriage, road making, optical apparatus, &c., is estimated at £5500.

The light is placed at the north-west extremity of Mana Island, at an elevation of about 450 feet, and can be seen from a distance of thirty miles in clear weather.

The completion of this work was somewhat retarded, owing to the imperfect and unfinished state of the iron tower, many borings which should have been made at the manufactory having to be done here with great labor and expense. The light is spoken of very favorably, and must be of great assistance to navigators in passing through the dangerous and intricate part of Cook Strait. Established 1st February, 1865.

Godley Head, Bank's Peninsula, entrance to Port Lyttelton. The lantern and optical apparatus are of the same order and character as at Mana and Tiri Tiri. The tower (which is twenty feet in height), dwellings, and outhouses, are of masonry. From the difficulty of access to the site of lighthouse, and absence of available road, much labor was entailed in the carriage of materials necessary for the several buildings. Mr. Thornton, Provincial Engineer prepared the drawings and superintended the works. His unremitting assiduity is deserving of great praise. The total cost of all the works, including optical apparatus, is estimated at four thousand six hundred and twenty-four pounds (£4624).

This light is placed at the northern extremity of the Peninsula forming the entrance to Port Lyttelton, and is 450 feet above the sea level. It affords an excellent guide to vessels approaching the harbour from the northward or eastward, and has been seen from a distance of thirty miles. The light was exhibited on the 1st April, 1865.

Messrs. Aylmer and Rotton, lighthouse engineers, superintended the building of Tiri Tiri and Mana Lighthouses, and the fixing of the optical apparatus at Godley Head The manner in which these works have been executed is highly creditable to the gentlemen named.

Taroa's Head, entrance to Otago Harbour. The works are of a very substantial character, comprising tower about 30 feet and keepers' dwellings of stone found on the site. The light is of 3rd order dioptric fixed, colored to distinguish it from that intended for Cape Saunders. Mr. Balfour, Marine Engineer of Otago, designed and directed the execution of these works, which are in every respect most excellent. The total cost, including lantern, &c., imported by the Provincial Government, is five thousand one hundred and thirty-five pounds (£5135). From the position of this light it is seen only from the nortward and eastward, the projecting land intercepting a view of it to the southward. The elevation above the sea level is 196 feet, and 'tis seen from a distanee of eighteen to twenty miles in the direction named. It was exbibited on the 1st January, 1865.

Dog Island, Foveaux Strait. This is an undertaking of great magnitude, having a tower of stone one hundred feet in height (surmounted by a 1st order Holofhotal revolving light), and keepers' dwellings on a more extensive scale than at other places, also of a like material. Mr. Balfour designed and directed the performance of all the works under contract, and reports them to have been faithfully executed in accordance with the specification. Mr. Rotton is superintending the fitting of the lantern and optical apparatus, which, at the date of his last communication, was fast advancing towards completion It is expected to be in readiness for illumination by the 1st July, 1865. The total cost is estimated at about ten thousand pounds (£10,000.)

This light will be of the utmost service, and is perhaps the most important on the coast of New Zealand, being situated in the narrowest part of a strait much frequented by shipping, subject to uncertain currents and continuous stormy weather. Its elevation from the sea level is 150 feet, and it will be seen from eighteen to twenty miles.

Cape Saunders. The optical apparatus imported by the Provincial Government of Otago for placing on this headland has not been brought into use, the money voted by the Assembly for lighthouse purposes being insufficient to defray the cost of more works than the Board had already undertaken.

In addition to the foregoing, there are lights at Pencarrow Head (Wellington) and at Nelson. When Dog Island is in operation the coast will be rendered comparatively easy of navigation, and, 'tis to be hoped, tend to make casualties less frequent.

Light dues have been greatly reduced, in a proportion of one-third on vessels from beyond the Colony, and one-half on coasters. The present charge will not pay more than expense of maintenance and interest on outlay, leaving little (if any) to form a fund for the erection of *new lighthouses* still urgently required. Complaints have from time to time appeared in the public prints of the exorbitant rate levied, but a comparison with the various port charges collected in Tasmania, South Australia, and Port Philip (Victoria) will contrast favorably for New Zealand.

BUOYS AND BEACONS.

There are several buoys and beacons placed by the Provincial Governments beyond the limits of ports which require attention to keep them in a state of usefulness. If it is the intention of the Legislature that the Marine Board should perform the duties in this branch of their department, an outlay of from £200 to £500 will in all probability be necessary.

STEAM NAVIGATION ACT.

During the past year not less than fifty-nine steam vessels of various sizes have been plying on the coast and rivers of this Colony. They comprise forty-three having low pressure engines, and sixteen high pressure. Forty-six of the above number seldom leave our coast; the remaining thirteen are usually engaged trading between New Zealand and Australia. These do not include either vessels belonging to Government or those used exclusively on the Lakes.

It will be evident, while so large a number of steam vessels are constantly moving from port to port, that the duties of both Inspectors of Steam Vessels and Engineer Surveyor are by no means light or unimportant. The Act requires a thorough examination of hull and machinery two or three times a year, according to whether the vessels have high or low pressure engines, besides which, all vessels casually entering the ports at which officers of the Board are stationed are inspected, and when repairs are being made, their attention is required to see that they are properly executed. Any relaxation in this branch might lead to serious results. I am happy to say but one accident has occurred, the William Miskin, which was clearly attributable to neglect of the engineer, and caused by allowing a large accumulation of salt in the boiler. The unhappy fate of the City of Dunedin still remains a mystery, as also the causes which led to her loss.

At Hokitika several vessels have been stranded, a result which might have been anticipatedfrom the dangerous character of the rivers on the West Coast. Unless a more suitable class of steamboats be employed and very great caution observed, it is probable not one will run a year without meeting with disaster.

The Inspectors and Engineer Surveyor continue to exame masters and engineers, which has to a great extent secured a competent class of men for the duties required of them. More than one hundred certificates have been issued since May, 1864.

MARINE BOARD ACCOUNTS.

Clause XXVIII. requires that an annual account of all monies received and expended by the Marine Board, for the purposes of this Act, made up to the 31st day of December in each year, shall before the end of next January, be transmitted by the Board to the auditor of public accounts.

As the receipts consist almost entirely of light dues collected at the several Custom Houses throughout the Colony, some time must necessarily elapse before the provisions of Clause XXVII. can be complied with, viz.—"The Collector of Customs paying the amount so collected to the Colonial Treasurer, who from time to time shall make payment of the same to the Marine Board, under the warrant of the Governor." If this routine be observed, it is evident that the money cannot pass into the custody of the Board early enough to be included in the accounts of the preceding year. Some alteration in this particular is required, either that the accounts be rendered at a later date, or a different system introduced, in order that the intention of the Act may be complied with.

CHARLES SHARP,