

- (1) பக்கங்களின் எண்ணிக்கை 18
 (2) புதுக்கித் திருப்பிய நாள் 9/91
 (3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் [Signature]

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

PWD. துறை

அரசாணை எண். மு. கோப்புத் தாள் எண்.	2945	அச்சகம் பலவகை
நாள் :	25-10-1892	198 .

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9 sheets

ஆவண, கா-1-18,006-15-6-87.

[Signature]

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

READ—the following paper:—

From Captain H. A. STREET, R.I.M., Presidency Port Officer, Madras, to the Chief Secretary to Government, dated Madras, 17th September 1892, No. 1409—315-G.

I have the honour to forward herewith the annual report on the Lights and Lighthouses in the Madras Presidency for the official year 1891-92.

ENCLOSURE.

REPORT on the Lights and Lighthouses on the Coasts of the Madras Presidency for the official year 1891-92.

IMPROVEMENTS IN LIGHT APPARATUS.

Kundapur.—On the 1st November 1891, a 6th-order red dioptric port light, visible in clear weather from six to eight miles, was substituted for the apparatus hitherto in use.

Malpe.—On the 1st November 1891, a 6th-order white dioptric port light, visible in clear weather from six to eight miles, was substituted for the apparatus hitherto in use.

Cuddalore.—The country lantern at this port was replaced on 5th October 1891 by a 6th-order red dioptric port light, visible in clear weather from six to eight miles.

Gopdipur.—The country lantern at this port was replaced on 1st March 1892 by a 4th-order white dioptric port light, visible in clear weather at a distance of 12 miles.

REPAIRS TO MACHINERY.

Armeghon.—The revolving machinery of the Armeghon light having exhibited considerable signs of wear, the whole apparatus was removed on 1st October 1891 to the Presidency Public Works Workshops, where the necessary repairs were carried out and the apparatus was replaced in position on 1st December 1891. During the two months thus occupied in repairs no light was exhibited at Armeghon.

PROPOSED NEW LIGHT.

Tondi, Madura Coast, Palk's Strait.—The 6th-order red dioptric port light obtained for exhibition at this port arrived from England in November 1891, and the necessary arrangements for placing the apparatus in position were in progress at the close of the year.

PROPOSED SUBSTITUTION OF IMPROVED APPARATUS.

Arrangements were made for obtaining from England a pressure lamp with a three 2-wick Douglass burner for use at the lighthouse at each of the places marginally named and also a 4-wick Douglass burner with pressure lamp for the lighthouses at Muttum and Santopilly.

These lamps and burners, however, did not arrive from England till after the close of the year and further notice is reserved for the ensuing year's report.

HOPE ISLAND, COCANADA AND CALINGAPATAM.

An indent was submitted to the India Office for a 4th-order dioptric light to take the place of the 6th-order apparatus now in use at Hope Island, and it is intended, when the new apparatus has been placed in position, to transfer the existing light to Calingapatam, and the present 4th-order red dioptric port light at Calingapatam to the old lighthouse at Cocanada. The exhibition of a light at this lighthouse is required to assist vessels entering the port of Cocanada, at night, in taking up a safe position when about to anchor.

Madras.—In accordance with the recommendation of Mr. Douglass, arrangements have been made for obtaining from England a 3rd-order dioptric, double-flashing light of half-minute periods to take the place of the apparatus now in use. It is intended to exhibit the new light from the main tower of the new High Court buildings.

ALTERATION IN COLOUR OF BUILDING.

Muttum.—On the seaward face of the column of this light, black and white horizontal bands were painted to render it more distinguishable.

PROPOSALS ABANDONED.

Sacramento Shoal.—The question of a light to mark the Sacramento Shoal was considered, but as a special light for this purpose would involve great expense, it was decided to place a more powerful light on Hope Island Lighthouse with a red sector marking the direction of this shoal.

Point Divi.—A first-class revolving light was recommended for Point Divi, but as this involved the construction of a screw-pile lighthouse, the present column being unsuitable, and the cost of erecting a screw-pile lighthouse was prohibitive (Rs. 1,00,000 approximately), the proposal has been held in abeyance.

Santopilly Reef.—The question of placing a bell-buoy in the vicinity of this reef as a warning to mariners was considered, but in view of the heavy initial and recurring charges involved in the arrangement and the fact that the rocks lie in the track only of such vessels as are bound to or from Bimlipatam and could, with the ordinary precautions of navigation, be avoided, and that the better class of burner with pressure lamp to be obtained for Santopilly Lighthouse would increase the power of the light, the proposal as regards a bell-buoy was abandoned.

MINOR REPAIRS AND IMPROVEMENTS IN ACCORDANCE WITH THE SUGGESTIONS OF LOCAL OFFICERS AND OF MR. W. T. DOUGLASS.

Passing over periodical whitewashing, painting, petty repairs, &c., to both lighthouses and attached buildings, which have, as usual, been carried out, the following improvements may be noticed:—

Mangalore.—An estimate of Rs. 1,480 for the construction of quarters for the lightkeepers was sanctioned, and a suitable site for the same was selected and taken over by the Public Works Department from the Revenue Department.

Cannanore.—One of the lenses of the lantern being broken, arrangements were made for procuring a spare lens through the India Office.

Tellicherry.—Two wooden posts supporting the cover of the lantern, by which the light was partially obstructed, were removed.

Calicut.—The wooden flooring of the light-room at top of the column was removed and an iron grating fitted to the floor, thus securing additional ventilation to the light; further improvements towards the same end were also in progress. An estimate for a store-room was called for.

Cochin.—A dioptric mirror to strengthen the illuminated arc was obtained for the light through the India Office, and arrangements were in progress for fitting the same in position.

Muttum.—The work of fitting iron gratings to the floor of the lantern instead of the existing close planking, in order to secure additional ventilation to the light-room, was in progress at the close of the year.

Manapad.—The staircase of the lighthouse was improved and a wooden cover provided for the ladder. Two posts supporting the covering over the light and facing the sea were removed and iron stanchions of 1" diameter were placed instead; a kitchen was added to the Superintendent's quarters and a wall enclosure provided for cooking purposes for the lightkeepers.

Hare Island, Tuticorin.—The wooden floor of the lantern was removed, and an iron grating substituted which affords increased ventilation in the light-room.

Pamban.—A proposal to raise the lantern, so as to provide for a service-room below for the lightkeepers to remain in at night, was considered in the Public Works Department, but in view

of the difficulties involved in the operation and the inconvenience to shipping which would result by extinguishing the light for any long period, the question was allowed to stand over. The Collector was communicated with in view to arranging for the cutting down of certain cocoanut trees in the direction of Kundegalle Point which caused some obstruction to this light.

Negapatam.—An estimate for improvements in order to secure additional ventilation to the light-room was sanctioned at the close of the year.

Cuddalore.—A sum of Rs. 3,038 was placed at the disposal of the Public Works Department towards the close of the year for providing quarters for the lightkeepers at this station.

Seven Pagodas, Pulicat, and Arneghon.—The store-room of the Seven Pagodas lighthouse was provided with a large door, to admit of the oil-tank. Mr. Douglass' suggestions as regards the securing of increased ventilation to light-rooms were under consideration in the Public Works Department in connexion with these three lighthouses.

Hope Island.—A boat was provided for conveying water and stores for this lighthouse from Coringa and Cocanada. A wire fencing was erected round the compound of the lighthouse.

Vakalapudi.—Three ventilators were fixed to the roof of the lighthouse.

Calingapatam.—A new store-room was sanctioned and in course of construction at the end of the year.

LIGHTNING CONDUCTORS.

For remarks in connection with the lightning conductors of the several lighthouses, see Appendix C.

ESTABLISHMENT.

For particulars of the permanent establishment as it stood on 31st March of the year under report, see Appendix D. In addition thereto, a lighthouse mechanic was entertained from 5th August 1891, temporarily, for a period of 5 years. The person selected for the post has been a Foreman in the Madras Gun Carriage Factory, and was specially trained in lighthouse mechanism at the Barbeyn Lighthouse under the direction of the Board of Trade Engineer in charge of the Imperial Light Service, Ceylon. For details of expenditure see Appendix A and remarks under the head of "Accounts."

At Cuddalore, Negapatam and Tuticorin, the lighthouse and signalling establishments were amalgamated during the year.

DISTRIBUTION OF LIGHTS.

The lights, as they stood on 31st March 1892, were thirty in number—eight on the West Coast and twenty-two on the East Coast. Detailed particulars are furnished in Appendices A and B.

STORES AND SUPPLIES.

The supply of mineral oil from England was well maintained with a surplus stock of six months' requirements at each lighthouse. The consumption of oil has been carefully watched and kept as low as possible, but an increase is anticipated when the new Douglass burners and reservoirs are brought into use. Gallon measures of 1 gallon, $\frac{1}{2}$ gallon and $\frac{1}{4}$ gallon capacities and copper funnels of sizes were supplied to the several lighthouses to complete stores.

TEMPERATURE.

The improved type of burners and reservoirs (Douglass pattern) not having been brought into use till after the year under report, it is proposed in the next year's report to furnish a comparative statement of the temperature in the lighthouses as ascertained when the old and new lights were respectively in use.

INSPECTIONS.

The particulars furnished in Appendix C to this report will show that careful supervision was exercised over the several lights during the year under report.

SIGNALLING FROM LIGHTHOUSES.

A proposal for providing signalling arrangements at lighthouse stations on the Madras sea-board, where such arrangements do not already exist, received the sanction of Government. These stations are Manapad, Seven Pagodas, Pulicat, Arneghon, Point Divi, Hope Island and Santopilly, and the Presidency Port Officer was in further communication with the Public Works Department on the subject at the close of the year.

WARM CLOTHING TO LIGHTKEEPERS.

A proposal to provide each lightkeeper with warm clothing (one serge coat) once every two years to protect the men from exposure while engaged in wiping the glasses during rainy nights received the sanction of Government, and the clothing was duly supplied.

GENERAL REMARKS.

The lights on the coast were efficiently maintained during the year under report. The Kundapur and Malpe lights were exhibited, as usual, during eight months of the year only from 1st October to 31st May. The Armeghon light had to be extinguished for two months in the year as noticed elsewhere. With these exceptions, the rest of the lights were exhibited uninterruptedly throughout the year.

With the exception of the Madras light at which cocoanut oil is used, mineral oil was supplied to all the principal lights in this Presidency.

ACCOUNTS.

Particulars of charges incurred on account of the several lights and lighthouses of this Presidency during the year under review are furnished in Appendix A.

Charges for 1891-92, compared with those of the two previous years, stand as follows:—

	1889-90.	1890-91.	1891-92.
Establishment, stores and contingencies	Rs. 30,313	Rs. 27,605	Rs. 38,687
Public Works charges	10,768	6,860	5,463
Total ..	41,081	34,465	44,150

The total charges for 1891-92 are Rs. 9,685 in excess of those of the previous year, the increase arising chiefly under stores. The variations under each head of charge, as compared with charges on the same account incurred in the previous year, are as detailed below:—

	1890-91.	1891-92.	Difference.	
			More.	Less.
Superintendents	Rs. 10,573	Rs. 10,565	Rs. 8	
Lightkeepers	8,229	8,726	497	
Oil	2,523	4,294	1,771	
Stores	3,444	11,523	8,084	
Contingencies	2,836	3,574	738	
Public Works charges	6,860	5,463		1,397
Total ..	34,465	44,150	11,090	1,405
			+ 9,685	

Superintendents.—The difference is so very small that it hardly calls for any special remarks.

Lightkeepers.—The increase is due to the amalgamation during 1891-92 of the signalling and lighthouse establishments at Cuddalore, Tuticorin and Negapatam, and charges on account of additional lightkeepers sanctioned for Pamban, Malpe and Kundapur lights.

Oil.—The increase in charges on account of oil is due to cost of oil including freight received from England in the year under review for use in the first half of the year 1892-93, as sanctioned in G.O., No. 103, Marine, dated 26th March 1891, and debited in the accounts of 1891-92.

Stores.—The large excess under this head over the figures of the previous year is due to cost of new lights obtained from England for the Gopálpur, Cuddalore, Tondi, Malpe and Coondapoor lights at a total cost of about Rs. 9,737. There has, however, been a decrease of about Rs. 1,653 in charges on account of ordinary stores obtained in 1891-92 below charges under this head in the previous year, and the increase noticed above being partly met by this decrease, charges on account of stores for the year under review was Rs. 8,084 more than 1890-91.

Contingencies.—Under this head also there was an increase of Rs. 738 over the previous year's figures and is due to—

(1) charges on account of balance of freight paid in India on the extra oil received from England;

(2) freight and other charges paid for despatching oil from Bombay to the several lighthouses;

(3) cost of a boat—i.e., Rs. 150—supplied to the Hope Island Lighthouse, sanctioned in G.O., No. 276, Marine, dated 24th June 1891;

(4) supply of fresh water for drinking and cooking purposes for lightkeepers at Hare Island at Rs. 12-8-0 per mensem, sanctioned in G.O., No. 159, Marine, dated 22nd April 1891; and also

(5) to a small increase in the average ordinary contingencies of the several lighthouses.

Public Works Charges.—Original works and repairs during the year under review have not been carried out to such an extent as in the previous year, and hence the decrease.

Charges on account of pay and travelling allowance of the lighthouse mechanic and other expenses incurred on his account up to 31st March 1892, such as payment of fee and travelling allowance to the Engineer, Board of Trade Lights in Colombo, amount to Rs. 783-8-2.

The total lighthouse charges for the year 1891-92 would, therefore, amount to Rupees 44,933-11-10, as detailed in the statement.

APPENDIX A.

PARTICULARS relating to the different Lights.

Name.	Location.	Date of first exhibition.	Column or flagstaff.	Character, description, colour.	Description of illumination.	Height of centre of lantern above sea level.	Number of miles visible in clear weather.
Kandapur ..	Kandapur ..	1st October 1888	Steel mast	D., 6th order, port light, red, F.	Heavy mineral oil.	45	6 to 8
Malpe ..	Malpe ..	1st ..	Do.	D., 6th order, port light, white, F.	Do.	53	6 to 8
Mangalore ..	Mangalore ..	1842 ..	Column	D., 4th order, red, F.	Do.	240	14
Cannanore ..	Cannanore ..	1843 ..	Do.	D., 4th order, white, F.	Do.	64	6 to 8
Tellicherry ..	Tellicherry ..	1845 ..	Do.	D., 6th order, white, F.	Do.	70	8
Calicut ..	Calicut ..	1847 ..	Do.	D., 6th order, white, F.	Do.	102	14
Cochin ..	Cochin ..	1849 ..	Do.	C.D., 4th order, white, F.	Do.	160	15
Muttam ..	Muttam ..	1850 ..	Do.	D., 1st order, white, F.	Do.	142	12
Manapad ..	Manapad ..	1st June 1888	Tower on elevated ground.	D., 4th order, port light, red, F.	Do.	104	14
Tuticorin ..	Tuticorin ..	1845 ..	Column	D., 4th order, white, F.	Do.	85	14
Point Calimere ..	Point Calimere ..	1846 ..	Do.	C.D., 4th order, white, F.	Do.	97	14
Negapatam ..	Negapatam ..	1890 ..	Staff	D., 6th order, port light, pale red, F.	Heavy mineral oil.	49	6
Cuddalore ..	Cuddalore ..	1846 ..	Column	D., 6th order, white, F.	Do.	79	14
Seven Pagodas ..	Seven Pagodas ..	1st July 1889	Flagstaff cross trees	D., 6th order, port light, red, F.	Do.	119	17
Madras ..	Madras ..	1887 ..	Turret on a rock	C.D., white, flashing ..	Cocconut oil	138	20
Do. ..	Do. ..	1844 ..	Column	D., ship's side-light, red, F.	Corn-wax	30	5
Do. ..	Do. ..	18th October 1888	Staff	D., ship's side-light, green, F.	Do.	60	5
Do. ..	Do. ..	1889 ..	Column	D., 4th order, white, F.	Heavy mineral oil.	68	14
Point Diu ..	Point Diu ..	1853 ..	Do.	D., 4th order, white, Rev.	Do.	107	14
Masulipatam ..	Masulipatam ..	1851 ..	Flagstaff	D., 6th order, white, F.	Do.	48	14
Coringa ..	Coringa ..	1858 ..	Column	D., 6th order, white, F.	Do.	83	6
Cocanada ..	Cocanada ..	1817 ..	Staff	Ship's light, red, F.	Cocconut oil	10	2
Do. ..	Do. ..	1886 ..	Do.	Ship's light, red, F.	Do.	10	2
Do. ..	Do. ..	1879 ..	Column	D., 4th order, white, FL	Heavy mineral oil.	80	14
Kandapur ..	Kandapur ..	1849 ..	Basement on top of a hill.	D., 2nd order, white, F.	Do.	163	16
Callingspatam ..	Callingspatam ..	1876 ..	Flagstaff	D., 4th order, port light, red, F.	Do.	76	12
Do. ..	Do. ..	1871 ..	Staff on pier head	D., 4th order, port light, white, F.	Do.	64	12
Do. ..	Do. ..	1887 ..	Staff on pier head	Country lantern, red, F.	Kerosine oil	25	3

PARTICULARS relating to the different Lights—cont.

Names.	Cost of					Total cost in			Remarks.	
	Establishment.		Oil.	Stores.	Contingencies.	Construction and repairs.	1889-90.	1890-91.		1891-92.
	Superintendents.	Light-keepers.								
9	10	11	12	13	14	15	16	17	18	
Kandapur ..	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Light at end of pier.	
Malpe ..	100 0 0	49 2 4	2,565 2 8	174 9 6	50 2 0	92 4 1	311 11 7	2,979 0 6		
Mangalore ..	107 0 0	81 14 8	2,567 9 1	208 1 3	102 14 2	88 11 3	191 2 4	3,067 7 2		
Cannanore ..	313 3 2	73 11 6	21 12 3	83 7 10	71 9 8	602 7 6	545 0 0	501 2 9		
Tellicherry ..	228 0 0	90 1 8	15 5 0	71 9 8	74 7 6	705 10 8	589 11 0	404 15 4		
Calicut ..	322 9 7	81 14 7	38 8 1	74 7 6	73 11 7	445 11 3	576 1 0	496 0 9		
Do. ..	322 9 7	12 10 4	12 10 4	69 11 2	256 5 8	696 3 7	710 5 3	769 9 5		
Cochin ..	322 8 0	131 0 11	200 4 0	104 15 3	30 0 0	542 7 10	882 10 3	888 12 2		
Muttam ..	507 0 0	308 9 7	342 8 8	316 6 11	616 15 7	3,258 13 10	2,828 0 5	3,829 11 2		
Manapad ..	800 0 0	105 7 9	22 8 9	102 0 0	538 14 0	5,004 4 3	2,377 0 2	1,669 14 6		
Tuticorin ..	576 1 5	122 13 10	30 12 8	217 14 3	246 4 8	844 11 9	1,143 14 10	1,253 14 10		
Panjan ..	393 0 0	133 12 3	10 3 0	76 13 0	52 12 0	765 12 1	562 12 3	2,813 5 11		
Point Calimere ..	310 8 5	98 3 2	2,760 9 11	149 5 7	..	2,297 14 1	1,290 11 10	747 15 9		
Negapatam ..	548 10 0	160 6 11	9 6 8	72 14 1	..	1,319 12 8	781 15 2	581 6 8		
Cuddalore ..	228 11 10	111 5 4	554 13 2	73 4 10	191 11 0	238 8 4	238 8 4	999 1 6		
Seven Pagodas ..	840 0 0	431 8 6	138 0 0	51 6 5	..	2,376 9 3	1,567 10 3	1,725 14 9		
Madras ..	1,500 0 0	1,293 10 0	17 10 5	139 1 10	..	3,225 13 1	3,378 7 5	3,415 6 4	Two lights mark the entrance to the harbour and two lights show the fair way.	
Do. ..	840 0 0	120 3 7	76 7 2	132 15 11	916 6 0	2,433 7 1	2,632 14 2	2,518 0 8		
Do. ..	1,200 0 0	129 1 11	141 4 0	164 11 3	421 1 9	1,598 14 11	2,973 3 3	2,608 2 8		
Armenegon ..	840 0 0	132 12 3	174 9 9	151 11 3	105 8 5	2,777 5 3	2,115 9 5	1,921 10 2		
Point Diu ..	75 0 0	75 12 3	27 9 6	50 13 7	267 5 7	267 5 7	387 12 9	370 3 4		
Masulipatam ..	216 0 0	102 7 1	38 1 9	448 0 8	476 11 4	1,761 5 13	2,908 0 10	2,434 9 0		
Hope Island ..	840 0 0	529 4 11	..	..	..	..	..	..	Groynes lights.	
Cannanore ..	..	..	Expenditure met from Cochin port contingencies.	..	..	..	..	..		
Do. ..	..	..	Expenditure met from Ocanada port dues under Act III of 1858.	..	..	..	..	..		
Vakalapudi ..	1,200 0 0	428 0 0	22 8 8	140 11 3	377 3 10	2,622 11 4	1,950 11 9	2,215 9 3		
Santapally ..	845 2 7	473 11 6	240 7 2	47 11 9	168 4 10	132 15 0	2,277 4 11	2,468 10 5		
Chingapatam ..	181 6 10	228 0 0	129 1 11	39 15 0	107 15 3	833 4 6	2,565 3 5	1,616 3 3		
Gopálpur ..	..	216 0 0	120 3 7	1,448 15 9	90 12 4	..	536 4 10	336 2 6		
Do. ..	..	..	Expenditure met from Gopálpur port contingencies.	..	..	..	..	..		
Total Light-house charges ..	10,564 13 11	4,294 10 5	11,625 2 0	3,573 14 5	5,462 13 6	41,080 11 9	34,464 15 5	44,150 3 8	Light at end of pier.	
Light-house mechanic ..	..	..	..	..	..	..	..	..		
Grand Total ..	10,564 13 11	4,294 10 5	11,625 2 0	3,573 14 5	5,462 13 6	41,080 11 9	34,464 15 5	44,933 11 10		

* Pay
 Travelling allowance and other charges
 Total .. 783 8 2

Two lights mark the entrance to the harbour and two lights show the fair way.

Groynes lights.

Light at end of pier.

APPEN

List of Lights in the

Name of light.	Location.	Latitude, N.	Longitude, E.	Number and relative position of lights.	Colour of lights.	Fixed, flashing, intermitting, alternating or revolving.	Interval of revolution or flash or occultation.
Kundapur ..	On the beach at the entrance to the river.	13° 38' 20"	74° 39' 40"	1	Red ..	F.	....
Malpé ..	Do. ..	13 20 40	74 42 0	1	White.	F.	....
Mangalore ..	On a hill above the town, and near some high trees.	12 52 17	74 50 08	1	Do.	F.	....
Cannanore ..	On the fort rampart near the beach.	11 51 10	75 21 45	1	Red ..	F.	....
Tellicherry ..	On the fort wall near the beach.	11 44 50	75 23 30	1	White.	F.	....
Mahé (French territory).	On the south side of the entrance to the river, at the foot of the flag-staff.	11 42 10	75 31 10	1	Red ..	F.	....
Calicut ..	On the sandy beach.	11 15 05	75 45 35	1	White.	F.	....
Narakel (Cochin territory).	On the beach at mouth of creek, 5 miles to the northward of Cochin.	10 03 0	76 12 0	1	Do.	F.	....
Cochin ..	On a small mound which formed a bastion of the old fort to the south of the harbour.	9 57 47	76 13 45	1	Do.	F.	....
Alleppy or Alipée (Travancore territory).	On the beach, about one cable inland.	9 30 0	76 19 0	Only one light visible at a time. There are 9 lamps placed in three sets of three; as they revolve each set of three gives one stream of light.	Do.	Rev. ...	A flash every minute ..

DIX B.

Madras Presidency.

Miles visible in clear weather.	Are of illumination (bearings are magnetic and from seaward).	Nature of construction, colour, or any peculiarity of light-house.	Height in feet of centre of lantern above high water.	Height in feet of building from base to vane.	Character and order of illuminating apparatus.	Year lighted.	Remarks.
6 to 8	From N. thro' E. to S., shut in to the westward of N. by trees.	Steel mast ..	45	40	Dioptric, order light.	6th port 1st October 1888; present light, 1st Nov. 1891.	Intended as a guide to vessels making the port and is exhibited annually from 1st October to 31st May only.
6 to 8	From N. thro' E. to S., shut in between N. and N.E. by trees, N. 53 E. and N. 57 E. by St. Mary's Islands, N. 73 E. to N. 80 E. by St. Mary's Islands.	Do. ..	53	50	Do. ..	Do. ..	Do. do.
14	From N. by E. ½ E. thro' E. to S. by W. ½ W.	Small white masonry tower.	240	65	Dioptric, order.	4th 1st October 1842; improved 1870.	As a guide to the anchorage.
6 to 8	Between the bearings of N. W. by W. ½ W. and E. by S. ½ S.	Small masonry tower of a light yellow colour.	64	25 from the rampart.	Dioptric, order.	6th 17th Oct. 1843; improved 1879, transferred to tower 1880.	Do. do.
..	N. W. thro' E. to S. E.	Small masonry tower.	70	26	Do. ..	1835; improved 1870; transferred to tower 1881.	Do. do.
7	All round the compass.	Small white pyramid.	52	7	..	1885	Shown only during N.E. monsoon.
14	From N. 25 W. thro' E. to S. 14 E.	White column.	102	98	Dioptric, order.	4th 1847; improved 1881.	To guide vessels to the anchorage clear of the reef which lies about 1 mile S. 30° W. from the light. A small red light is exhibited from the head of the pier as a guide for small coasting craft when entering the roadstead.
10	180° from N.N. W. thro' E. to S.S.E.	Flagstaff ..	95	102	Country lantern, made	1865	Is exhibited only during the S.W. monsoon, viz., from 15th May to 30th September when Cochin port is avoided by shipping.
15	From N. by W. ½ W. thro' E. to S. by E.	White laterite column.	100	91	Catadioptric, 4th order.	1st April 1839; improved 1868.	....
17	All round the compass.	Masonry round white tower.	113	115	Catadioptric, 1st order (Holo-photal).	1862	To guide vessels to the smooth water anchorage during the S.W. monsoon.

List of Lights in the

Name of light.	Location.	Latitude, N.	Longitude, E.	Number and relative position of lights.	Colour of lights.	Fixed, flashing, intermittent, alternating or revolving.	Interval of revolution or flash or occultation.
Muttam	On a rocky promontory 300 yards from sea known as Muttam Point.	8° 07' 30"	77° 18' 10"	1	White.	F.	....
Manapad	On the Tinnevely coast.	8 22 30	78 6 30	1	Red ..	F.	....
Tuticorin	On the north extreme of Hare Island or Paundian-tiro, 2½ miles east of Tuticorin town.	8 47 10	78 11 20	1	White.	F.	....
Pámban or Pámban Pass.	On a sandhill about one mile east of northern channel.	9 17 14	79 12 38	1	Do.	F.	....
Point Calimere..	On the point about 30 miles south of Negapatam.	10 18 0	79 51 30	1	Red ..	F.	....
Negapatam	On the jetty near to the river mouth.	10 45 30	79 50 20	1	White.	F.	....
Karikal (French territory).	At the mouth of the Arasillár river.	10 55 0	79 50 35	1	Do.	F.	....
Cuddalore	On cross trees of flagstaff.	11 43 0	79 46 15	1	Red ..	F.	....
Pondicherry (French territory).	In square near the beach.	11 55 25	79 40 35	1	White.	F.	....
Do.	End of landing stage.	..	..	1	Red ..	F.	....
Seven Pagodas or Mahabalipuram.	On a rock half a mile inland marked on chart. "Ruined pagoda" on rock very conspicuous and about 6 miles northward of Sadras.	12 36 55	80 11 31	1	Do. ..	F.	....
Madras or Fort St. George.	On the Esplanade north of the Fort.	13 45 11	80 16 51	1	White.	Flash- ing. The motion is reciprocating and not rotatory.	There are 6 faces, and every minute one face flashes towards the same spot, but three faces are presented seaward at one time. The duration of the flashes to that of the eclipses or dark periods is in the ratio of 2 to 3, but as the

nature of the motion is reciprocating instead of rotatory, the above ratio merely expresses the average proportion of the light and dark intervals, which are themselves variable according to the position of the spectator. The rapidity of movement is so adjusted that the duration of the flashes will vary from 0° to 48° and that of the eclipses from 0° to 72°, the sums of the duration of light and darkness bearing, however, in every position the constant ratio of 2 to 3.

Madras Presidency—cont.

Miles visible in clear weather.	Arc of illumination (bearings are magnetic and from seaward).	Nature of construction, colour, or any peculiarity of light-house.	Height in feet of centre of lantern above high water.	Height in feet of building from base to vane.	Character and order of illuminating apparatus.	Year lighted.	Remarks.
16	From N. 65 W. through N. to S. 85 E.	Dark grey granite column, showing black and white horizontal stripes from seaward.	142	72	Dioptric, 1st order, with 6 duplex burn-ers.	1875; altered 1st January 1883.	This light, in the territory of Travancore, is intended to mark the vicinity of the Crocodile Rock, which lies 3 miles S.W. ¼ S. of Cadiapattam. Vessels, unless bound to Kolachel or Cadiapattam, should not pass in-shore of Kota and Adunda islands, as they are difficult to be distinguished from seaward and sometimes have the appearance of sunken rocks from the sea sweeping completely over them.
12	N.N.E. through E. to S.S.W.	White masonry tower.	104	27	Dioptric, 4th order, light.	June 1888; improved 1st May 1890.	Is intended to warn vessels of the dangerous shoal in the vicinity.
14	All round the compass.	Sandstone column coloured brown, lantern white.	85	91	Dioptric, 4th order.	15th May 1845; improved 1874.	As a guide for vessels to the anchorage.
14	Do. ..	Circular masonry column.	97	73	Catadioptric, 4th order.	21st April 1846; improved 1860.	As a guide to vessels making for the Pámban channel.
6	Do. ..	Steel mast, painted white.	49	..	Dioptric, 6th order, port light.	1st June 1890.	As a guide to vessels passing between Point Calimere and the shoals to the eastward.
14	From N. 5 W. through W. to S.S.E.	Masonry column painted white.	79	83	Dioptric, 4th order.	1st August 1846; improved 1870.	As a guide for vessels to the anchorage.
9	Visible from all directions seaward.	Do. ..	42	..	Lamp burning coconut oil.	1863 ..	Do. do.
6 to 8	N. through W. to S.	Flagstaff ..	130	31	Dioptric, 6th order, port light.	1st July 1880; present light, 5th October 1891.	As a guide to the anchorage.
4	Visible from all directions seaward.	Masonry column, painted light yellow.	89	76	Dioptric, 4th order.	1886 ..	Do. do.
4	Do. ..	..	31	..	..	1881 ..	When surf is heavy and approach to landing prohibited, a fixed green light is shown.
17	From N. through W. to South (180°).	Small grey turret.	119	26	Dioptric, 4th order.	10th July 1887.	Is intended to warn mariners of the dangerous outlying patches of rock composing the Tripatore reef and other reported dangers in its vicinity, to avoid which vessels navigating between Sadras and Covelong should not come into a less depth than 13 fathoms.
20	From N.N.E. through W. to S.S.E.	Granite column.	128	125	Catadioptric ..	1st Jan. 1844.	To guide vessels clear of the Pulicat shoal and into the roadstead. Mariners should not bring this light to southward of S.S.W. ¼ W. to avoid Pulicat shoal.

List of Lights in the

Name of Light.	Location.	Latitude, N.	Longitude, E.	Number and relative position of lights.	Colour of lights.	Fixed, flashing, intermittent, alternating or revolving.	Interval of revolution or flash or occultation.
Madras Leading Light.	Madras Pier Head.	13° 05' 44"	80° 17' 18"	1	Red.	F.	....
Do.	Port office, terrace...	13 05 47	80 17 05	1	Green.	F.	....
Pulicat.	Near the beach	13 25 15	80 19 06	1	White.	F.	....
Armagham or Armagh.	On the mainland village of Moona or Moona Pollum.	13 53 08	80 11 47	1	Do.	Revolving.	A flash every 20 seconds.
Point Divi or Divy.	About 2 miles N.W. of the point.	15 58 55	81 09 25	1	Do.	F.	....
Masulipatam	In the fort	16 09 15	81 09 23	1	Do.	F.	....
Coringa or Hope Island.	On the southern part of Coringa Island (Coringa Harbour) and distant about 2½ miles from the sea.	16 42 03	82 18 58	1	Do.	F.	....
Cocanada or Valaputhi.	4½ miles north of Cocanada river and about 500 yards from the shore.	17 0 40	82 16 30	1	Do.	Flashing.	A flash every 20 seconds.
Cocanada river	One on the end of the North Groyne and the other on the end of the South Groyne, entrance to the river.	..	..	2	Red	F.	....
Santipally	On a small detached hill some distance inland. This distance said to be ½ of a mile.	18 04 56	83 37 55	1	White.	F.	....
Calingapatam	On the point.	18 19 0	84 07 30	1	Red	F.	....
Gopalpur	On the mainland 60 yards from low water mark.	19 18 0	84 52 0	1	White.	F.	....
Do.	On the extreme end of the pier head, part of Gopalpur.	..	..	1	Red	F.	....

Madras Presidency—cont.

Miles visible in clear weather.	Arc of illumination (bearings are magnetic and from seaward).	Nature of construction, colour, or any peculiarity of light-house.	Height in feet of centre of lantern above high water.	Height in feet of building from base to vane.	Character and order of illuminating apparatus.	Year lighted.	Remarks.
5	From S. 51° 45' W. thro' W. to N. 17°	Wooden post	30	..	Ship's side light, Dioptric.	15th Oct. 1888.	To guide vessels leaving the harbour or making the anchorage at night.
5	From S. 51° 45' W. thro' W. to N. 17°	Do.	60	..	Do.	Do.	Do. do.
14	From N. by W. thro' W. to S. by E.	Masonry column with black bands.	68	57	Dioptric, order.	4th 1859; improved 1870, altered 1881.	To guide vessels clear of the Pulicat shoal. When the light bears W. ½ N., a vessel is to the north ward of all dangers.
14	From N. E. thro' W. to S. E.	White masonry column.	107	111	Do.	1st January 1853; improved 1870, present light 1881.	Warns vessels off the Armagham shoal, the shoalest part of which (1½ fathoms) lies 6 miles off shore.
14	N. E. thro' W. to S.	Do.	48	59	Do.	1st May 1851; improved 1870.	Is intended to point out the position of the dangerous sands in the vicinity.
6	From S. 26° W. thro' W. to N. 9° E.	Flagstaff	69	112	Dioptric, order.	6th 1858; improved 1870.	As a guide for vessels to the anchorage.
14	From N. 20° E. thro' W. to S. 20° W.	Masonry tower, horizontal alternate bands of black and white.	83	94	Do.	1817; improved 1886.	Intended to lead vessels clear of shoals off Godavari Point. A faint light is visible throughout the remainder of the arc.
11	All round the compass.	White column	80	76	Dioptric, order.	4th 15th Jan. 1879.	This light is intended to lead vessels clear of the shoals to the northward of Point Godavari when coming into the Cocanada anchorage from the southward and eastward.
2½	Do.	Wooden post	10	..	..	15th Sept. 1886.	Exhibited to serve as a guide to boats entering or leaving Cocanada river.
16	From N. E. thro' W. to S. W.	On a small basement on the top of a small hill with a small building by the side of the lantern on the west side.	163-77	31-15	Dioptric, 2nd order, with 5 duplex burners.	1st Nov. 1849; improved 1871; present light 1886; improved Aug. 16th, 1888.	Exhibited to warn mariners of the Santipally Rocks, from which this light bears N.W. ½ W., distant 6½ miles.
12	Do.	Obelisk of cut stone; column white; capital dark blue.	76	73	Dioptric, order, light.	4th port 15th Dec. 1876; improved 1st June 1890.	Intended to warn vessels off a small reef which projects from the point and which should not be passed in less than 8 fathoms when making the port at night.
12	From N. E. thro' N. W. to S. W.	Flagstaff, painted white.	54	33	Do.	1871; present light 1st March 1892.	As a guide to the anchorage.
3	All round the compass.	..	25	..	Country lantern.	1st April 1887.	Points out the sea end of the pier.

APPENDIX C.

STATEMENT furnishing (1) particulars of Inspections made of Lighthouses on the Madras Coast in 1891-92, and (2) remarks in connection with the Lightning Conductors.

(1)			(2)
Name of Lighthouse.	Designation of Officer by whom inspection was made.	Number of inspections made.	Remarks in connection with Lightning Conductors.
Kundapur ..	Port Officer, Mangalore ..	4	Conductivity of the lightning conductor of this lighthouse reported by Public Works Department to be weak.
Malpé ..	Presidency Port Officer ..	1	
Malpé ..	Port Officer, Mangalore ..	3	
Malpé ..	Presidency Port Officer ..	1	
Mangalore ..	Superintending Engineer, IV Circle.	1	Lightning conductor reported by Public Works Department to be effective.
Mangalore ..	Executive Engineer, West Coast Division.	1	
Mangalore ..	Presidency Port Officer ..	1	
Mangalore ..	Presidency Port Officer ..	1	
Tellicherry ..	Superintending Engineer, IV Circle.	1	Do. do.
Tellicherry ..	Presidency Port Officer ..	1	
Calicut ..	Superintending Engineer, IV Circle.	2	
Calicut ..	Presidency Port Officer ..	1	
Cochin ..	Superintending Engineer, IV Circle.	1	A new lightning conductor in course of erection.
Cochin ..	Presidency Port Officer ..	1	
Muttam ..	Superintending Engineer, VI Circle.	1	
Muttam ..	Executive Engineer of the division ..	1	
Manapad ..	Port Officer, Tuticorin ..	3	Lightning conductor tested by Public Works Department and reported to be effective.
Manapad ..	Do. do. ..	3	
Hare Island (Tuticorin).	Executive Engineer of the division ..	1	
Hare Island (Tuticorin).	Presidency Port Officer ..	1	
Pámban ..	Executive Engineer of the division ..	1	Lightning conductor tested by Public Works Department and orders passed in that department for certain suggestions for improving its efficiency to be considered by the Superintending Engineer, VI Circle.
Pámban ..	Presidency Port Officer ..	2	
Point Calimere ..	Port Officer, Negapatam ..	Once a month with a few exceptions.	
Negapatam ..	Superintending Engineer, V Circle ..	1	
Negapatam ..	Executive Engineer, Negapatam Division.	2	Lightning conductor tested in the previous year and found in good order.
Negapatam ..	Presidency Port Officer ..	2	
Cuddalore ..	Presidency Port Officer ..	2	
Cuddalore ..	Executive Engineer, Buckingham Canal Division.	2	
Seven Pagodas ..	Presidency Port Officer ..	1	Lightning conductor reported to be in good order but not tested since 1889-90.
Seven Pagodas ..	Personal Assistant to Port Officer ..	2	
Madras ..	Personal Assistant to the Presidency Port Officer.	12	
Madras ..	Personal Assistant to the Presidency Port Officer.	12	
Palicat ..	Presidency Port Officer ..	1	A new lightning conductor was put up in the year but not tested.
Palicat ..	Personal Assistant to Port Officer ..	2	
Armeghon ..	Executive Engineer, Buckingham Canal Division.	1	
Armeghon ..	Presidency Port Officer ..	1	
Point Devi ..	Personal Assistant to Port Officer ..	2	The lightning conductor of this lighthouse was put up in 1887, but has not been tested since then.
Point Devi ..	Port Officer, Masulipatam ..	12	
Masulipatam ..	Do. do. ..	See N.B. at foot.	
Masulipatam ..	Do. do. ..	See N.B. at foot.	
Hope Island ..	Port Officer, Cocanada ..	8	Lightning conductor reported by Port Officer, Masulipatam, to have been tested by a Public Works officer in December 1891 and condemned.
Hope Island ..	Superintending Engineer, I Circle ..	1	
Hope Island ..	Executive Engineer of the division ..	1	
Hope Island ..	Executive Engineer of the division ..	1	
Vakalapudi ..	Port Officer, Cocanada ..	9	Lightning conductor tested in the year by the Public Works Department and found to be in good order and effective.
Vakalapudi ..	Superintending Engineer, I Circle ..	1	
Vakalapudi ..	Executive Engineer of the division ..	1	
Vakalapudi ..	Executive Engineer of the division ..	1	
Santopilly ..	Port Officer, Bimlipatam ..	4	Lightning conductor tested by Public Works Department and found to be in good order.
Santopilly ..	Superintending Engineer, I Circle ..	1	
Calingapatam ..	Port Officer, Gopálpur ..	2	
Calingapatam ..	Superintending Engineer, I Circle ..	1	
Gopálpur ..	Port Officer, Gopálpur ..	See N.B. at foot.	A lightning conductor was put up and the work completed in May 1891.
Gopálpur ..	Port Officer, Gopálpur ..	See N.B. at foot.	
Gopálpur ..	Port Officer, Gopálpur ..	See N.B. at foot.	
Gopálpur ..	Port Officer, Gopálpur ..	See N.B. at foot.	

N.B.—At stations where there is a Port Officer or Conservator, such officers, in their capacity as *ex-officio* Superintendents, frequently inspected the lights during the year in addition to the outside inspection above recorded.

APPENDIX D.
STATEMENT showing the sanctioned establishments of Lighthouses on the Madras Coast as they stood on 31st March 1892.

Lights.	Superintendents.				Head Light-keepers.				Light-keepers.				Total staff of each light.	Remarks.	
	1st Class.		2nd Class.		3rd Class.		1st Class.		2nd Class.		3rd Class.				
	Rupces 100.	Rupces 70.	Rupces 60.	Rupces 50.	Rupces 10.	Rupces 12.	Rupces 10.	Rupces 9.	Rupces 8.	Rupces 8.	Rupces 7.				
Kundapur ..	..	..	..	..	1 (e)	..	..	..	..	..	1 (a)	2	(e) Temporary, from 1st October to 31st May of each year. (b) Plus charge allowance of Rs. 2. (c) Do. Re. 1. (d) Plus special allowance of Rs. 25 which is to cease on next incumbent.		
Malpe ..	..	..	..	..	1 (a)	..	..	..	..	..	1 (e)	2			
Mangalore ..	..	..	..	..	1 (a)	..	..	..	..	..	..	3			
Cannanore ..	..	..	..	..	1 (a)	..	..	..	..	..	..	2			
Tellicherry ..	..	..	..	..	1 (b)	..	..	..	..	..	..	2	Do. do.		
Calicut ..	..	..	..	..	1 (b)	..	..	..	..	..	..	2			
Cochin ..	..	..	..	..	1 (b)	..	..	..	..	..	..	3			
Mattam ..	..	..	..	..	..	..	..	..	..	..	..	3			
Manapad ..	..	..	..	..	..	..	..	..	..	..	..	6	(d) Plus house allowance of Rs. 25.		
Tuticorin (Hare Island)	..	..	..	..	..	..	..	..	..	..	..	2			
Pamban ..	..	..	..	..	..	..	..	..	..	..	..	3			
Tondi ..	..	..	..	..	..	..	..	..	..	..	..	2			
Point Calimere ..	..	..	..	..	..	..	..	..	..	..	..	3	The establishment for Tondi was sanctioned in the year, but is to be entertained only from 1st September 1892.		
Negapatam ..	..	..	..	..	..	..	..	..	..	..	..	2			
Cuddalore ..	..	..	..	..	..	..	..	..	..	..	..	2			
Seven Pagodas ..	..	..	..	..	..	..	..	..	..	..	..	2			
Madras ..	..	..	..	..	..	..	..	..	..	..	..	5	(f) Reduced to 2nd class on Rs. 70 from 1st April 1892, but retains an allowance of Rs. 10 for flag-signalling.		
Palicat ..	..	..	..	..	..	..	..	..	..	..	..	5			
Arnegoon ..	..	..	..	..	..	..	..	..	..	..	..	6			
Point Diwi ..	..	..	..	..	..	..	..	..	..	..	..	6			
Manupatnam ..	..	..	..	..	..	..	..	..	..	..	..	2	(f) Reduced to 2nd class on Rs. 70 from 1st April 1892, but retains an allowance of Rs. 10 for flag-signalling.		
Hope Island ..	..	..	..	..	..	..	..	..	..	..	..	2			
Vakalapudi ..	..	..	..	..	..	..	..	..	..	..	..	5			
Santapilly ..	..	..	..	..	..	..	..	..	..	..	..	5			
Calingapatnam ..	..	..	..	..	..	..	..	..	..	..	..	2	Do. do.		
Gopálpur ..	..	..	..	..	..	..	..	..	..	..	..	2			
Gopálpur ..	..	..	..	..	..	..	..	..	..	..	..	2			
Gopálpur ..	..	..	..	..	..	..	..	..	..	..	..	2			
AMALGAMATED establishments.															
Lighthouses.	Head Light-keeper and Head Signaller.				Light-keeper and Signaller.				Total staff.						
	Rupces 20.		Rupces 15.		Rupces 12.		Rupces 11.		Rupces 10.		Rupces 9.		Rupces 8.		
	Rupces 10.		Rupces 5.		Rupces 5.		Rupces 4.		Rupces 4.		Rupces 3.		Rupces 2.		
Tuticorin ..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	(b) To be reduced to Rs. 10 on next vacancy.
Negapatam ..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	
Cuddalore ..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	

Temporary.—Lighthouse Mechanic Rs. 80 per annum, raising by annual increments of Rs. 5 to Rs. 100.

ORDER—dated 10th October 1892, No. 361, Marine.

Recorded.

(True Extract.)

J. F. PRICE,
Chief Secretary.

To the Presidency Port Officer.
„ Public Works Department.

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Chief Secretary.

Gobt. of {1892} Madras.
MARINE.

Issued

Recd.

Encl.

G.O., &c., 10th October 1892,
Nos. 361-365.

OCTOBER.

Lights and Lighthouses.

Recording the report on the — in the Madras
Presidency for the year 1891-92, and forwarding
copies to certain Governments.

P 2945 Wd 25th October 1892

Communicated
to S. Gs concerned
for information.

(Dd) G. J. W.

A. J. W.

S. Gs (except III circle)