Marine

Public Works (1898) Department.

G.O., No. 612 Marine

DATED 15th July '98

[Despatch Abstract.]

Report on the Light-Houses & Light Vessels
N. the Coast of Burma : Endorsement
of the Post Port Officer forwarding two copies
of the — for the year 1897-98, recorded.

Indexed. 20/7/98

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Marine (1898) Department.

CURRENT No. 893

Order 612 mar & 15th July 1898.

Recorded

R.S. 16.7.98

From The Presdy Port Officer Madras.

No. 534 / 241 **Dated** 8th July 1898

Received 11-7-98

Enclosures 2 books

Spare copies –

SUBJECT.

Forwarding two copies of Report on Lighthouses and Light vessels in Burma for 1897-98.

Note that light dues are charged in Accounts.

Yes. This is noticed in para 7 of letter to India No. 317 Statistics a/29 Apr 98.

R.S.

To Sec. G. of I. Mar. & Ag. Dept.
" S.E. Circle
" W. —·—
" W. —··—
" W. —··—
" W. —···
C.A. to Govt.

To be sent back with
& returned
to the Secretariat
for the Govt
address

Circulated separately
Vide 3832
15/7/98

BACK PAPERS.

G.O.	No.	Department.	Date.
G.O. 917 & 10-11-97 Heads			
-	3832 Mar:	11-7-98	

FURTHER PAPERS.

G.O.	No.	Department.	Date.
-	4466 Mar.		24-8-98

Heading _____

No. 534/241 Gy

Presidency Port Office,

Madras, 8th July 1898.

From

The Presidency Port Officer, Madras.

To

The Secretary to Government,
Marine Department.

Sir,

I have the honor to forward, with reference to G.O., Financial, No.751, dated 6th November 1896, 2 Copies of Report on Lighthouses & Light vessels in Burma for 1897-98.

G.O. 815 Mar 24-8-98.

I have the honor to be,
Sir,
Your most obedient servant,

A. Hotchkis

Commander, R.I.M.,
Presidency Port Officer.

---oOo---

1 Per Packet Boat

GO

Marine CN°-843

SHW

Shall I make this order
for comm^n to

S. W. LH. &c
Sec's of all maritime
Districts

To be passed
on from one to the
other & returned
by the last addressee
to this office

SHW
18/7/98

Sec
Secretariat
18/7/98

THIRTY-FIRST ANNUAL

REPORT ON THE LIGHT-HOUSES AND LIGHT-VESSELS OFF THE COAST OF BURMA

FOR

The year 1897-98.

RANGOON:

PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRINTING, BURMA.

1898.

[Price,—Re. 0-12-0.]

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RESOLUTION

ON THE

REPORT ON THE LIGHT-HOUSES AND LIGHT-VESSELS OFF THE COAST OF BURMA

FOR

The year 1897-98.

Extract from the Proceedings of the Government of Burma, in the Marine and Commerce Department,—No. H.-12, dated the 18th June 1898.

READ—

The report on the Burma Light-houses for 1897-98.

RESOLUTION.—The R.I.M. steamships *Minto* and *Dalhousie* visited the Burma light-houses and light-vessels regularly throughout the year, and full inspection reports have been submitted by the Superintendent of Light-houses and the Public Works Department.

2. It appears from the reports that most of the improvements called for in the previous year have now been carried out, but the extension of the jetty towards the south-east at the Alguada reef, which was strongly urged in the report for 1896-97, and which was sanctioned a year ago, still remains to be done and should be taken in hand at the close of the south-west monsoon. There is a diversity of opinion as to the desirability of providing the Alguada with a new and more powerful light. The present Superintendent of Light-houses and the present Superintending Engineer both consider that if certain defects caused by wear and tear are remedied, the existing light will efficiently serve its purpose for about five years to come. The Chief Engineer, on the other hand, concurs in the recommendation made by the late Superintendent of Light-houses, that a first order 100,000 candle power flashing dioptric light, as recommended in Mr. Douglass' report in 1890, should be provided at once. It appears from the report that most of the necessary repairs to the present lighting apparatus have been effected. The Director-General of Stores has been asked to furnish particulars of the cost of a new light in consultation with the Trinity House. In the meantime the Lieutenant-Governor concurs with Commander Black in thinking that the views of ship-masters should be ascertained. They should be invited to state whether, in their opinion, the present light adequately fulfils its purpose, and their replies, with the Superintendent's further recommendation, should be submitted for His Honour's information at an early date. It was stated last year that the light at Double Island was constantly out of order, and that several complaints about its dimness had been made. The Lieutenant-Governor is now assured that the statements were exaggerated, but in view of the fact that both inspecting officers in 1896-97 made similar reports, it would seem that this lamp requires special watching. It has been decided to improve the water supply at Table Island by deepening the existing tank at a cost of about Rs. 4,000. The proposal to dig an additional reservoir was evidently based on an inaccurate estimate of the requirements of the light-house crew.

3. On the suggestion of the Port Officer, Moulmein, who was supported by the opinion of the local pilots and of shipmasters frequenting the port, it has been arranged to erect a fixed red light at Amherst Point, with a radius of about 5 miles. It will serve to mark the pilot station and as an anchor bearing light for ships waiting for a pilot at night. A more powerful 12-mile light was also exhibited on the Spit light-vessel from the 28th January last, the extra expense of Rs. 100 per month being borne by the Rangoon Port Fund.

4. A progress report has been submitted by the Superintendent shewing how far the various recommendations made by Mr. Douglass. in 1890 for the improvement of the Burma lights have been carried out. The report and the orders of the Local Government thereon are reproduced in the Appendices.

5. The new light-vessel *Kalagauk*, which was constructed and brought to Rangoon at a total cost of Rs. 1,32,642, arrived from Calcutta in November last. She has taken the place of the *Martaban* at the Krishna shoal, and the latter is now kept as a relief vessel. The unfounded report that the *Kalagauk* had sprung a leak caused unnecessary trouble and alarm, and reflects little credit on her commander.

6. There were four deaths from beri-beri among the crews of the light-vessels, and at the Double Island Light-house there were a few bad cases of malarial fever. Otherwise the health of the crews was good.

7. The receipts from light dues amounted to Rs. 3,06,820 as compared with Rs. 2,73,236 in the previous year. There was an increase in the collections at all the ports of the province, especially at Rangoon, and also in Calcutta and Chittagong. The Calcutta receipts rose by nearly Rs. 9,000. On the other hand the expenditure on light-houses and light-vessels fell off considerably during the year. It is presumed that the large expenditure on stores and contingencies on the *Kalagauk* consists chiefly of non-recurrent expenditure necessary for the equipment of this new light-vessel.

8. The Austro-Hungarian steamer *Medusa* was wrecked off Table Island in February 1898. Her crew were landed there, and were subsequently taken off by the R.I.M.S. *Minto*. No lives were lost. The duties of Superintendent of Light-houses were carried out by Commander Barwick, R.I.M., until November 1897, when Commander Black, R.I.M., returned from furlough and held charge for the rest of the year. Both officers discharged their duties in a thoroughly efficient manner.

By order of the Lieutenant-Governor of Burma,

D. H. R. TWOMEY,

Officiating Secretary.

THIRTY-FIRST ANNUAL

REPORT ON THE LIGHT-HOUSES AND LIGHT-VESSELS OFF THE COAST OF BURMA

FOR

The year 1897-98.

From Commander H. S. BLACK, R.I.M., Superintendent of Light-houses and Port Officer, Rangoon, to the Secretary to the Government of Burma,—No. 2547-10R.—L. H., dated the 14th May 1898.

I HAVE the honour to submit herewith the Annual Inspection Report of the Light-houses and Light-vessels on the coast of Burma for the year ending the 31st March 1898.

2. The inspection of all lights was carried out in company with the Superintending Engineer, South-Western Circle, Mr. A. B. Gatherer, whose report is attached.

3. The R. I. M. steamers *Dalhousie* and *Minto*, commanded respectively by Commanders Beaumont and Piffard, regularly visited all the light stations during the year, and these officers carried out the duties of *Ex-officio* Inspector of Light-houses to my entire satisfaction.

4. The new light-vessel *Kalagauk* arrived from Calcutta on the 23rd November 1897 and, after acting as the spit light-vessel during the short period the light-vessel *Martaban* was required to relieve the *Kemmendine*, was fitted with the *Kemmendine's* light at a cost of Rs. 950-8-0 and placed at the Krishna shoal on the 16th February 1898.

A few minor but necessary alterations and additions were made to her at a cost of Rs. 139.

5. The *Kemmendine* was then stripped of her old copper, wood sheathing repaired where necessary, bottom tarred and re-coppered, also other minor defects made good on the Irrawaddy Flotilla Company's patent slip at a cost of Rs. 8,756, and, after being fitted with the 12-mile light formerly exhibited at the Krishna shoal (which work was undertaken by the Public Works Department at a cost of Rs. 925-5-0), took up the spit station permanently on the 28th January 1898, where she now lies.

6. On the *Kalagauk* taking up her station at the Krishna shoal the *Martaban* relieved the *Danidaw* at Baragua flats on the 18th February 1898 for her annual overhaul and was afterwards relieved by that vessel on the 11th March 1898, the repairs, which were of a minor nature including docking, amounting to Rs. 630, were carried out to her.

7. These vessels are at last on their proper stations and the *Martaban* is kept at Rangoon as the relieving vessel for all three whenever occasion arises. The *Martaban* will be docked in the course of a few days.

8. Owing to a report made by the Commander of the *Kalagauk* through the Commander of the B.I.S.N. Company's steamer *Huzara* on the morning of the 16th March 1898 that the *Kalagauk* had sprung a leak and wanted immediate assistance, I despatched the R.I.M.S. *Minto* with the *Martaban* in tow the same day, but she returned on the afternoon of the 17th March 1898, the Officer Commanding the *Minto* reporting that the leak was caused by the non-return valves of the Downton pump having become choked up with some chips of wood, and consequently, when these were cleared, the vessel was as tight as ever.

9. Mr. Hunter, the Commander, is a very careful and good officer, but I was obliged to reprimand him for not having at an early date, after taking over command of his new vessel, overhauled the pumps and sea connections with a view to understanding them.

10. On the 21st February 1898, owing to a telegram having been received from the Port Officer, Moulmein, that the light-keepers at Double Island were sick and in need of assistance, I took that station first on my annual inspection and found that three of the light-keepers were suffering from malarial fever; they were removed and placed under the care of the Assistant Surgeon of the *Minto* for treatment.

11. The Austro-Hungarian S.S. *Medusa* was wrecked off the north-west point of Table Island on the 12th February 1898, which necessitated the R.I.M.S. *Minto* proceeding to the island for the purpose of bringing in the crew to Rangoon.

12. The Commander of the *Medusa* reported that the vessel had struck a rock not marked on the chart, and his statement was foolishly corroborated by Mr. Jackson, the light-keeper, who declared he had verbally reported the existence of this rock to the last Superintendent of Light-houses and also the *Ex-officio* Inspector of Light-houses in 1895.

This necessitated the Director of the Royal Indian Marine despatching the surveying vessel *Investigator* to search for this alleged rock, the Commander of which vessel has proved it to be none other than the one already shown on the chart. I have been obliged to caution Mr. Jackson, who is an energetic and good light-keeper, to be more careful in future regarding the reports he makes on matters about which he does not understand.

13. Throughout the year the health of the crews of the light-vessels and the light-keepers at the light stations has been good, there being only four deaths from beriberi.

SPIT LIGHT-VESSEL "KEMMENDINE."

Spit Station.

This vessel only left her for station on the 28th January 1898 after a thorough overhaul on the Irrawaddy Flotilla Company's patent slip at Rangoon. She has been fitted with the 12-mile cata-dioptric light that used to be exhibited formerly in this vessel on the Krishna shoal.

The *Martaban* was the spit light-vessel till the 25th November 1897, when she was temporarily relieved by the *Kalagauk*. On the 28th January 1898 the *Kemmendine* relieved the *Kalagauk*.

Stores, provisions, and water complete.

The health of the establishments on these vessels throughout the year has been good, with the exception of one death from beriberi.

CHINA BAKIR LIGHT-HOUSE.

Inspected on the 22nd February 1898.

The light-house, lamp, and machinery were clean and all repairs, &c., noted in column 10, page 7, of Superintending Engineer's Report for 1896-97, with the exception of the wrought-iron clasps and braces below first level (which are in progress) and the alteration to the vertical ladders, have been completed. The ladders will remain as they are, it not being considered advisable to fit ladders of the ship gangway style to a structure like this where the current is so strong.

On testing the machinery to time it was found that the sprocket wheel and chain for the winding gear were both very much worn. They will have to be renewed at once. The regulator gear also requires an overhaul.

When the lamp was at first lit at sunset the timing was out some 10 seconds, but very shortly after this the interval between the flashes varied from 59 to 61 seconds, which is allowable.

Found the lamp in centre, level, and in focus.

Stock of oil, water, provisions, &c., complete.

The health of the establishment throughout the year has been good.

DOUBLE ISLAND LIGHT-HOUSE.

Inspected on 23rd February 1898.

The light-house, lamp, and machinery were clean and in good order.

All repairs, &c., as per column 10 of Superintending Engineer's Report, with the exception of items 3 and 9 (3 not necessary, 9 not obtainable in England; will be made locally), have been completed.

Found the lamp in centre, level, and in focus.

Consequent upon Commander Barwick's report in paragraph 2 of the Light-house Report for 1896-97, I accompanied by Mr. A. B. Gatherer, Superintending Engineer, Commander Piffard, R. I. M., Mr. Johnstone, Engineer, R. I. M., and Mr. Reilly, Sub-Engineer, Public Works Department, made a careful examination of the pedestal in the lens and found that there are three horizontal screws for centring the burner and also three vertical screws for focussing it, all of which on being tried were found to be in thorough working order; in fact the centring screws were only added in 1895, as prior to that the apparatus could not be centred so satisfactorily. We all agreed that the arrangements now in force are absolutely efficient.

I am informed by Mr. Reilly that, after the inspection last year, the outcome of which was Commander Barwick's remarks, the conclusion come to by Engineer Pickard, R. I. M., and himself was that nothing more could be done to increase the efficiency of the light. Moreover, with regard to the alleged trouble that the lamp has given for a number of years, I cannot find any allusion to it in any of the reports by the Superintendent of Light-houses and Superintending Engineer, Public Works Department, for the past 10 years, nor can Mr. Reilly, who has been in charge of the lights for the past four years, quote any complaints. He merely states that on the day in question the burner was being changed and had not been centred and adjusted in time for the inspection.

The landing-place or dock is much clearer of boulders than when I inspected it in 1896; the entrance to it should, however, be marked by two beacons (*i.e.*, one on either side of it) of sufficient strength to withstand the very strong tides which run there.

The Europeans' quarters will receive improved ventilation and a ceiling will be added.

Cradles for chimneys have been supplied and all the water-tanks will be properly raised on skids.

The distance and arc of visibility of the light has been checked from time to time throughout the year and found correct.

Provisions, water, and light-house stores complete.

The health of the establishment throughout the year has been good, with the exception of three native light-keepers, who contracted malarial fever and had to be removed from the station for medical treatment.

ALGUADA REEF LIGHT-HOUSE.

Inspected on 24th February 1898.

The light-house, lamps, machinery, and buildings were clean and in good order. The works and repairs as per column 10 of Superintending Engineer's report have been, with the following exception, completed—Jetty extension towards the south-east to be constructed. This work could not be done owing to the somewhat large repairs at Double Island, but as it will be a great improvement in the shape of facilitating landing during the north-east monsoon especially, it will be proceeded with, if sanctioned, next cold season.

The cooking stove now used by Europeans and natives in the platform-room should be supplemented by another small one for the use of the Europeans, and both shifted to outside this room, for which a suitable corrugated-iron building should be provided.

The reserve cooking-stove in the light-house is worn out and too small; it should be replaced by a larger new one.

More galvanized steel bins are required for the storage of rations, and the exact number required will be communicated to the Public Works Department when this is ascertained.

With reference to Commander Barwick's letter to the Secretary to the Government of Burma, No. 2023-13L.H.G., dated the 27th August 1897, in which

he reported that the Superintending Engineer (the late Mr. Nelson), the *Ex-officio* Inspector of Light-houses (Commander Beaumont), and himself were, in reference to paragraph 3 of the Resolution on the Report on the Light-houses of Burma for 1896-97, unanimously of opinion that the selection of the new light should be left with the Trinity House, also the late Mr. Nelson's remark regarding the light in the above mentioned report, page 2, I would submit that, after a very careful examination of the light machinery, the Superintending Engineer, Mr. Gatherer, Commander Piffard, R. I. M., *Ex-officio* Inspector of Light-houses, Engineer Johnston, and myself are of opinion that, providing the work found necessary at the inspection made in 1896-97 (*vide* Alguada Reef Light-house, page 5) is carried out, this light will be efficient.

This light is visible 18 miles at a height of only 15 feet above the sea and is visible from the bridge of a small vessel like the *Minto* (height 23 feet), 19·3 miles. The consumption of oil (cocoanut) is about 3 gallons per night.

Doubtless a light of 100,000 candle units would be welcome to the mariner, but in the absence of any complaints from that most interested body I am of opinion that the time is not yet ripe for the present light to be condemned. At any rate, before ordering the lamp the opinions of those ship masters who are in the habit of navigating these waters at all times of the year should be obtained.

Stock of oil and provisions complete. Water, 1½ months.

Examined the chasm and, so far as could be ascertained, found it normal.

Timed the revolution of the light and found it to be correct.

Tested lightning-conductor for continuity and found it correct.

Range of light has been frequently checked by the *Ex-officio* Inspector of Light-houses throughout the year.

The health of the establishment has been good.

SAVAGE ISLAND LIGHT-HOUSE.

Inspected on 27th February 1898.

The light-house, lamp, machinery, and building were clean and in good order.

The racks for storing the spare panes of glass are being altered and will be supplied shortly.

The ends of beam under floor of light-house show signs of dry rot and should be seen to.

The small workman's store and shelter shed is worn out and should be reconstructed, also the fowl-house.

Found the lamp in centre, level, and in focus. The same jerky motion of the pedestal as on former occasions was observed, and it is now proposed to fit a new steel feather to the clutch shaft to counteract this as much as possible. The time and visibility of this light has been checked frequently and found correct.

Stores, provisions, and water in plenty.

Health of establishment during the year has been good.

OYSTER ISLAND LIGHT-HOUSE.

Inspected on 28th February 1898.

The light-house, lamp, machinery, and out-houses were all clean and in good order.

All repairs, &c., as per column 10 have been made good, with the exception of the cooking ranges, which have arrived in Rangoon and will be sent out next trip.

The new clock-work works satisfactorily and to time. The original set is being repaired in England and is shortly expected.

Found lamp in centre, level, and in focus.

Stores, provisions, and water in plenty.

Night signalling with Savage Island has been carried on regularly.

The garden has been supplied with new earth well manured to a depth of 18 inches, and it is hoped, with the aid of the present fencing of corrugated iron, that it will be a success in the future. The chief anxiety appears to be the possible scarcity of water for it during the dry season.

This station necessarily requires a number of water-tanks kept up, and they should now be numbered consecutively and raised at least 1 foot high on wooden skids. Several of them apparently are beyond repair, but they will be more thoroughly examined on the next trip of the station steamer.

The health of the establishment throughout the year has been good.

LIGHT-VESSEL "MARTABAN"—BARAGUA FLATS.

Inspected this vessel on 3rd March 1898.

She was at the time doing the duty of the *Danidaw*, which vessel was at Rangoon for her annual overhaul.

Found everything in order. Stores, provisions, and water in plenty.

The vessel was fairly clean.

Clock-work machinery tested to time and found perfect.

The health of the crew has been good, with the exception of two deaths from beri-beri.

LIGHT-VESSEL "KALAGAUK"—KRISHNA SHOAL.

Inspected this vessel on the night of the 3rd March. I had already been daily on board of her in Rangoon and inspected her before she left for her station.

As I came alongside the Officer in command, Mr. Hunter, reported to me that some of the pins in the couplings of the driving shaft had worked loose, causing a jerky motion; this was at once rectified and the light timed and found correct.

This vessel only arrived from Calcutta dockyard on the 23rd November 1897, and, after serving for about two months at the spit as a temporary measure, was as early as practicable fitted with the *Kemmendine's* light and despatched to the Krishna shoal, her proper station.

Found her clean and in good order.

Stores, provisions, and water in plenty.

The health of the crew on this station throughout the year has been good there being only one death from beri-beri.

TABLE ISLAND LIGHT-HOUSE.

Inspected on 4th March 1898.

Found the lantern, lamp, machinery, and all buildings clean and in good order, Lamp was in focus, level, and in centre.

Distance of visibility of the light has been frequently checked throughout the year.

Provisions, light-house stores, and water in plenty.

All works as contained in column 10, with the following exceptions, have been completed—Water-supply improvement; scaling of light-house inside only partially done as it was not afterwards considered necessary to disturb the paint where there was no scale; decayed uprights to cemetery railing and split and other pins indented for from England; these latter are to be made locally.

The poultry and tame cattle are in sufficient numbers, especially the former, but the cattle look a poor lot and give but little milk.

The gardens, paths, &c., are well kept, and credit for this is due to the care bestowed on them, as indeed upon everything else, by Mr. Jackson, the light-keeper, who has been in charge here for the past eleven months. If his successor landing here a month hence does likewise, there will not be much to complain of.

With regard to the question of the necessity for improving the water-supply at this station, I am of opinion that, as the water in the wells sunk from time to

time are for at least a portion of the dry season is brackish, the case would be met by improving the existing tank, whose bottom dimensions are 40′ × 40′ and depth 10′, as follows: increasing two sides by 20′ and deepening it by 2′, the slopes to be 1 in 2 and pitched with stone, also a strong fence to be erected around it; such a tank could at least be tried before going to the expense of cutting one to the size of that proposed in last year's report.

The reports regarding the number of wild cattle and deer on this island are conflicting, and I am of opinion that they are not so plentiful as is supposed.

It would be a difficult job to catch the wild cattle for transportation to Rangoon; a keddah would have to be made and a large number of men employed to drive them into it from the jungle. That a few wild cattle are a boon was proved only a few weeks ago when the light-keeper shot one for the use of the S.S. *Medusa's* crew after the wreck of that vessel; and as the officers of the station steamer as well as the light-keeper in charge can shoot these animals for their own use (*i.e.*, the ship's company) as well as that of the European light-keepers on the Alguada reef, there should not, in my opinion, be any difficulty in keeping the numbers down.

The following should be supplied during next official year:—

Six troughs for watering the animals.
One new set lantern purdahs.
Set of new hoses for filling water-tanks.
New cemetery railing.
Water-tanks to be numbered and placed on skids.
Provision bins for rice and dhall to hold six months' supply.
Joists in visitors' room to be renewed where found necessary.

The health of the establishment throughout the year has been good.

REEF ISLAND.

Inspected on 6th March 1898.
Found everything clean and in order; lamp level.
All works as per column 10 complete.
The lower mast of flagstaff is perished and should be renewed at an early date.
Set of new lantern purdahs required; also two zinc troughs for filling water-tanks.
Stores, provisions, and water complete.
The health of the establishment throughout the year has been good.

AMHERST POINT LIGHT-HOUSE (PROPOSED).

Landed in company with Mr. A. B. Gatherer, Superintending Engineer, on 7th March 1898 and inspected site. Found the work of alteration to the existing pilot look-out house had not been commenced. The light and apparatus are all ready at Rangoon and have been for some time past; they leave by the R. I. M. S. *Minto* on the 20th March 1898.

EASTERN GROVE LIGHT-HOUSE.

Inspected on 10th March 1898.
Found the lamp and building clean and in good order. Lamp in centre, level, and in focus; flow of oil satisfactory.
Tested the occulting apparatus and found it exact. Two spare sprocket wheels, two spare brass chains, and two spare pieces of copper wire for the occulting machinery required and should be obtained from the makers. A new vegetable locker is required.
The water-tanks, several of which are old, require light scaling and painting with red lead.
They should be cement-washed inside.
Health of the establishment throughout the year has been good.

TABLE A.

No.	Name of light.	Location.	Latitude North.	Longitude East.	Number and relative position of lights.	Colour of lights.	Fixed, flashing, intermitting, alternating, or revolving.	Interval of revolution or flash.	Miles visible in clear weather.	Arc of illumination (bearings are magnetic and from seaward).
			Degs. M. S.	Degs. M. S.						
1	Oyster Island ...	On the centre of Oyster Island, off the entrance to the Myôn river. It is 8½ miles N. W. ½ N. from the Oyster Reef (the site of the old light-house).	20 12 50	92 32 51*	1	White and red.	Occulting ...	Every 28 seconds, occults for two seconds.	17·3	The apparatus illuminates all round the horizon 345° of white light, 15° of red, covering Oyster Reef between bearing of N. 54° W. and N. 39° W.
2	Savage Island ...	On island, entrance to Akyab harbour ...	20 05 07	92 54 09	1	White ...	Fixed and flashing.	Every one minute.	16·8	247½° or from S. 45½° W. through S. and E. to N. 22½ W.
3	Alguada Reef ...	On the Alguada Reef. The light-house lies south-south-west 10¾ miles from Diamond Island flagstaff.	15 42 14	94 12 35	1	Do. ...	Revolving ...	Attains its greatest brilliancy every minute.	18·2	All round the compass.
4	Baragua Flats light-vessel	Off south-east end of Baragua flats in 6 fathoms ...	15 28 46	95 11 14	1	Red and white.	Group flashing	Every 45 seconds; duration of flash 5 seconds.	12	Ditto.
5	Krishna Shoal light-vessel	In 5½ fathoms off the south-east side of the Krishna shoal.	15 37 26	95 37 32	1	White ...	Do. ...	Half a minute	12·4	Ditto.
6	Great Cocos Group or Table Island, Andaman Islands.	On the south-west end of Table Island, 2 miles, Great Cocos Island.	14 11 30	93 21 15	1	Do. ...	Fixed ...	.....	20·3	All round the compass, except where screened by the Great Cocos or between the bearings from N. by W. ¾ W. to N. by E. and by the Little Cocos between the bearings from N.N.E. ⅝ E. to N. E. ⅜ N. nearly.
7	China Bakir or Thôngwa ...	In 4 feet at low-water spring tides, on the edge of the flats extending off the entrance to the China Bakir or Thôngwa river.	16 17 33	96 11 09	1	Do. ...	Fixed and flashing.	Every one minute.	14·0	From the bearings N. E. by E. ¾ E. through N. and W. to S. W. ⅜ S.
8	Spit Channel light (entrance Rangoon river).	In the fair way off the spit of sand 2 $\frac{8\cdot5}{10}$ miles south, 53° east from Elephant Point obelisk.	16 26 53	96 22 5	1	Do. ...	Fixed ...	*.....	12·0	All round the compass.
9	Eastern Grove (Rangoon river).	One hundred yards below high-water mark on Grove Point, east side of entrance to river.	16 30 01	96 23 4	1	Do. ...	Occulting ...	Ten seconds ...	15·4	67° 30′ or between the bearings from N. E. by N. to N. W. by N.
10	Elephant Point light ...	On Elephant Point	16 29 03	96 19 50	2 about E.S.E. by W. N. W.	Do. ...	Fixed ...	.....	5 & 4	230° or from N. 45 E. through N. and W. to S. W.
10(a)	Monkey Point ...	On Monkey Point	16 46 0	96 12 0	5	White, red and green.	Do. ...	.....	6	Leading lights into Monkey Point channel.
11	Double Island ...	On the island	15 53 30	97 35 36†	1	White ...	Do. ...	.....	19·0	165° or between the bearings from S. S. E. through E. to N. ¼ W. An isolated strip of light shows from the Patch buoy eastward as far as Amherst Point.
12	Reef Island or Tavoy river	On the north-east point of New Reef Island, west entrance to Tavoy river.	13 36 40	98 13 0	1	Do. ...	Do. ...	.....	12·0	202½ or from N. 5½° E. through W. to S. 17° E.

* Great Trigonometrical Survey determinations, Madras Observatory being in 80° 14′ 15″ East.

† By Navigating Lieutenant Jarrad, 1877.

TABLE A—concluded.

No.	Name of light.	Nature of construction, colour, or any peculiarity of light-house.	Height in feet of centre of lantern above high-water.	Height in feet of top of building from base to vane.	Character and order of illuminating apparatus.	Year	Remarks.
1	Oyster Island ...	Iron tower; alternate black and white bands, decreasing in diameter gradually and evenly from base to top.	130	147	Dioptric, first order	1885; altered 1892. ...	To render safe the northern and western approaches to Akyab harbour.
2	Savage Island ...	Sand-stone masonry. The tower is round with red lantern.	118	70	Ditto ...	1844; improved in 1871 and again in 1891.	To facilitate entering Akyab harbour.
3	Alguada Reef ...	Granite masonry; alternate black and white bands 18 feet wide; black at base.	144	160	Catadioptric, first order.	1865 ...	To keep vessels clear of the Alguada reef. Vessels should not approach to within 3 miles of the light-house on a northerly bearing.
4	Baragua Flats light-vessel	Floating light-vessel, painted red. During the day two red balls are carried at main mast head.	48	...	Catoptric ...	2nd November 1896 ...	"Baragua" marked on sides.
5	Krishna Shoal light-vessel	Floating light-vessel, painted red; during the day a red ball is shown from the main mast head.	50	...	Ditto ...	27th September 1877; altered May 1893 ...	"Krishna" marked on sides. The light-vessel shows a bine light every half hour from 7 P.M. to 5 A.M. The eclipses are—flash 1¼ seconds, eclipse 4 seconds, flash 1¼ seconds, eclipse 22½ seconds.
6	Great Cocos Group or Table Island, Andaman Islands.	Cast-iron circular tower, with alternate red and white bands.	195	91	Dioptric, first order	15th February 1867 ...	To facilitate the navigation of Preparis Channel.
7	China Bakir or Thôngwa ...	Iron screw piles, painted red, with white lantern ...	74	...	Ditto ...	1868; removed to present position in 1876.	Land-fall light for Rangoon river.
8	Spit Channel light (entrance, Rangoon river).	Floating light-vessel; she carries a light at the main mast head.	54	...	Catadioptric ...	1898 ...	"Spit" marked on sides; temporary floating light-vessel to enable vessels to keep clear of the spit of sand at the entrance to the Western spit channel.
9	Eastern Grove (Rangoon river).	Iron screw piles, painted red, with white lantern ...	93	105	Dioptric, third order	1860; altered 1881; improved again 1890.	A faint light is visible between north-west by north and north-west by west, modern pressure lamp, Douglass" three-wick burners for heavy mineral oil.
10	Elephant Point light ...	Steamer's masthead light on posts	...	Western light 33 feet, eastern light 15 feet	Steamer's masthead lights.	1890 ...	Leading-lights north, 60° west, 108 yards apart. To facilitate vessels clearing the spit below Elephant Point. Electric telegraph to Rangoon.
10a	Monkey Point	Posts on pontoon and shore	.....	...	Lanterns ...	1894 ...	Two leading-lights white, 32 feet and 16 feet, bearing N. 69 W.
11	Double Island ...	Masonry tower. The foundation and 14 feet of the tower is of rubble granite; remainder of the building is of Singapore brick with copings of cut stone.	164	75	Dioptric, first order	1865 ...	Is a guide to vessels making for the port of Moulmein.
12	Reef Island or Tavoy river	Masonry tower, painted white	309	25	Dioptric, fifth order	1883 ...	Intended for vessels approaching the port of Tavoy.

TABLE B.—*Statement showing the names, classes, and pay of Light-keepers employed in the several Light-houses and Light-vessels off the coast of Burma during the year 1897-98.*

Station.	Name.	Class.	Pay per mensem.	Remarks.
	Europeans.		Rs.	
Alguada Reef	J. Jackson ...	1st class ...	150—200	
	C. Gard ...	2nd class ...	120—150	
	J. Kirby ...	3rd class ...	100—120	
Relief (Provincial) ...	F. Stanley ...	1st class ...	150	
Table Island ...	R. R. Eales ...	1st class ...	150	
Oyster Island ...	T Cox ...	2nd class	130—150	
	C. Pratt ...		120—150	
	Natives.			
Alguada Reef ...	Ramiah ...	1st class ...	30	
	Cormiah ...	2nd class ...	25	
	Jagganaikloo ...	3rd class	20	
	Poliah ...		20	
	Adienaran ...		20	
	Yenkiah ...		20	
	Ramiah ...	4th class	15	
	Ahbhai ...		15	
	Lutchea ...		15	
	Gooriah ...		15	
	Ramasawmy ...	Cook ...	20	
	Swamy ...	Topaz ...	15	
Diamond Island ...	One constable ...	3rd class ...	6	
Oyster Island ...	Appaswamy ...	1st class ...	30	
	Karamut Ally ...	2nd class ...	25	
	Pantoo ...	3rd class	20	
	Ebrahim ...		20	
	Meeriah ...	4th class	15	
	Syed Hossain ...		15	
	Gunniah ...	Servant ...	12	
	Yankraswamy ...	Cook ...	20	
	Yenkareddy ...	Topaz ...	15	
Table Island ...	Corban Ally ...	1st class ...	30	
	Cormiah ...	3rd class	20	
	Sarthy ...		20	
	Atchiah ...	4th class	15	
	Jumpiah ...		15	
	Ramswamy ...	Cook ...	20	
	Nakiah ...	Topaz ...	15	
	.....	Five coolies at Rs. 12 each.	60	
Reef Island ...	Guntiah ...	1st class ...	30	
	Abdul ...	3rd class ...	20	
	Ahbhai ...	4th class	15	
	Ramiah ...		15	
Eastern Grove ...	Nassir Mahomed ...	1st class ...	30	With Rs. 30 as charge allowance.
	Appaswamy ...	2nd class ...	25	
	Eman ...	3rd class	20	
	Akbar Ally ...		20	
	Appasawmy ...	4th class	15	
	Ahniah ...		15	
	Jagganaikloo ...	Servant ...	12	
China Bakir ...	Appiah ...	1st class ...	30	With Rs. 30 as charge allowance.
	Ramchundra ...	2nd class ...	25	
	Musolaya ...	3rd class	20	
	Gooriah ...		20	
	Nursimloo ...	4th class	15	
	Apalswamy ...		15	
	Daniah ...	Servant ...	12	
	Yariah ...	Peon ...	10	
	Camiah ...	1st class ...	30	With Rs. 30 as charge allowance.
Double Island ...	Dewallee ...	2nd class ...	25	
	Rajiah ...	3rd class	20	
	Rudriah ...		20	
	Appaswamy ...	4th class	15	
	Ramiah ...		15	
	Ramaswamy ...	Servant ...	12	

TABLE B.—*Statement showing the names, classes, and pay of Light-keepers employed in the several Light-houses and Light-vessels off the coast of Burma during the year 1897-98*—continued.

Station.	Name.	Class.	Pay per mensem.	Remarks.
	Natives—concluded.		Rs.	
Savage Island ...	Yankraswamy ...	1st class ...	30	With Rs. 30 as charge allowance.
	Ramiah ...	2nd class ...	25	
	Sobriedoo ...	3rd class	20	
	Meera Saib ...		20	
	Neazamuth Ally ...	4th class	15	
	Appaswamy ...		15	
	Rajiah ...	Servant ...	12	
Relief (Provincial) ...	Balagyee ...	1st class ...	30	
	Yariah ...	2nd class ...	25	
	Chinniah ...	3rd class	20	
	Casuridoo ...		20	
	Daniah ...	4th class	15	
	Appanah ...		15	
	Thateah ...	Servant ...	12	
Relief (Oyster) ...	Shaik Hossain ...	1st class ...	30	
	Yankareddy ...	2nd class ...	25	
	Ramiah ...	3rd class	20	
	Nursimlu ...		20	
	Madar Sah ...	4th class	15	
	Papiah ...		15	
	Babiah ...	Servant ...	12	
	Europeans.			
Krishna Shoal light-vessel *Kalagauk*.	A. Hunter ...	Commander ...	300	With mess allowance of Rs. 200.
	J. Anderson ...	1st officer ...	150	
	J. Calvert ...	2nd officer ...	100	
	Natives.			
	Daniah ...	Serang ..	30	
	One carpenter ...	.....	45	
	One tindal ...	.....	20	
	Two seakunnies at Rs. 25 each.	.....	50	
	Two lamp-trimmers at Rs. 17-8-0 each.	.....	35	
	One cook ...	.....	20	
	One butler ...	.....	15	
	One bhandary ...	.....	15	
	One cassub ...	.....	15	
	One topaz ...	.....	12	
	Eight lascars at Rs. 16 each.	.....	128	
	Europeans.			
Baragua Flats light-vessel *Danidaw*.	J. Bragg ...	Commander ...	300	With mess allowance of Rs. 200.
	H. Wessels ...	1st officer	150	
	H. Babonau ...	2nd officer ...	100	
	Natives.			
	Ramiah ...	Serang ...	30	
	One carpenter ...	.....	45	
	One tindal ...	.....	20	
	Two seakunnies at Rs. 25 each.	.....	50	
	Two lamp-trimmers at Rs. 17-8-0 each.	.....	35	
	One cook ...	.....	20	
	One butler ...	.....	15	
	One bhandary ...	.....	15	
	One cassub ...	.....	15	
	One topaz ...	.....	12	
	Eight lascars at Rs. 16 each.	.....	128	

TABLE B.—*Statement showing the names, classes, and pay of Light-keepers employed in the several Light-houses and Light-vessels off the coast of Burma during the year 1897-98*—concluded.

Station.	Name.	Class.	Pay per mensem.	Remarks.
	Natives—concluded.		Rs.	
Spit light-vessel *Kemmendine*.	Bundiah ...	Serang	45	
	One seakunnie ...	.....	25	
	One lamp-trimmer...	.....	20	
	One lamp-trimmer...	.....	15	
	One bhandary ...	.....	15	
	One topaz ...	.....	12	
	Four lascars at Rs. 16 each	.....	64	
Relief light-vessel *Martaban*.	Poliah ...	Tindal	20	
	Three lascars at Rs. 16 each.	.....	48	
	One topaz ...	.....	12	

TABLE C.—*Statement of months, dates, and names of officers or steamers that visited the light-houses and light-vessels off the coast of Burma during the year 1897-98.*

Name of light-house or light-vessel.	Month and name of officer or steamer.											
	April 1897.	May 1897.	June 1897.	July 1897.	August 1897.	September 1897.	October 1897.	November 1897.	December 1897.	January 1898.	February 1898.	March 1898.
Krishna Shoal light-vessel.	*Dalhousie*, 25th.	*Dalhousie*, 19th.	*Dalhousie*, 25th.	*Dalhousie*, 24th.	*Minto*, 28th	*Minto*, 24th.	...	*Minto*, 3rd...	*Minto*, 13th	*Minto*, 14th	.....	*Minto*, 3rd with Superintendent of Light-houses.
Baragua Flats light-vessel.	*Dalhousie*, 25th.	*Dalhousie*, 19th.	*Dalhousie*, 25th.	*Dalhousie*, 24th.	*Minto*, 28th	*Minto*, 24th.	...	*Minto*, 3rd...	*Minto*, 13th	*Minto*, 14th	.....	*Minto*, 3rd with Superintendent of Light-houses.
Alguada Reef light-house.	*Dalhousie*, 27th.	*Dalhousie*, 20th.	...	*Dalhousie*, 2nd and 26th.	*Minto*, 29th	*Minto*, 25th.	...	*Minto*, 9th...	*Minto*, 14th	*Minto*, 15th	*Minto*, 24th, with Superintendent of Light-houses.	*Minto*, 25th.
Table Island light-house.	*Dalhousie*, 26th.	*Dalhousie*, 27th.	...	*Dalhousie*, 4th (by signal), and 25th.	...	*Minto*, 3rd	*Minto*, 2nd (by signal).	*Minto*, 8th...	*Minto*, 19th	*Minto*, 17th	.....	*Minto*, 4th with Superintendent of Light-houses, and 24th.
Double Island light-house.	*Dalhousie*, 22nd.	*Dalhousie*, 30th.	...	*Dalhousie*, 7th.	*Dalhousie*, 1st.	*Minto*, 6th	*Minto*, 7th	*Minto*, 4th...	*Minto*, 12th	*Minto*, 12th	*Minto*, 23rd, with Superintendent of Light-houses.	*Minto*, 22nd.
Savage Island light-house.	Port Officer, Akyab, *Dalhousie*, 30th.	Port Officer, Akyab *Dalhousie*, 22nd.	Port Officer, Akyab, *Dalhousie*, 30th.	Port Officer, Akyab, *Dalhousie*, 29th.	Port Officer, Akyab. *Minto*, 30th.	Port Officer, Akyab, *Minto*, 27th.	Port Officer, Akyab.	Port Officer Akyab, *Minto*, 12th	Port Officer Akyab, *Minto*, 15th	Port Officer, Akyab, *Minto*, 19th	Port Officer, Akyab, *Minto*, 27th with Superintendent of Light-houses.	Port Officer, Akyab, *Minto*, 27th.
Reef Island light-house.	*Dalhousie*, 23rd.	*Dalhousie*, 29th.	...	*Dalhousie*, 5th and 31st.	...	*Minto*, 5th	*Minto*, 6th	*Minto* 5th...	*Minto*, 21st	*Minto*, 13th	.....	*Minto*, 6th with Superintendent of Light-houses, and 23rd.
Oyster Island light-house.	...	*Dalhousie*, 3rd and 23rd.	*Dalhousie*, 29th.	*Dalhousie*, 28th.	*Minto*, 31st	*Minto*, 28th.	...	*Minto*, 11th	*Minto*, 16th	*Minto*, 20th	*Minto*, 28th with Superintendent of Light-houses.	*Minto*, 28th.
Eastern Grove light-house.	Boat, 6th, 17th, and 27th.	...	*Myanaung*, 12th.	Boat, 15th and 23rd.	Boat, 27th	Boat, 1st	Boat, 19th and 30th	Boat, 13th...	Boat, 8th, 20th, and 26th.	...	Boat, 1st and 16th;	Boat, 7th; *Cameo*, 10th with Superintendent of Light-houses.
China Bakir light-house.	...	*Alert*, 28th.	*Alert*, 3rd	...	*Alert*, 3rd...	Boat, 17th and 27th	Boat, 14th	Boat, 10th and 30th.	...	Boat, 6th and 29th.	*Minto*, 22nd with Superintendent of Light-houses.	Boat, 14th; *Alert*, 24th.
Spit light-vessel ...	...	...	...	...	...	Weekly by *Alert*.						

TABLE D.—*Statement showing the amount of Provincial and Imperial Light-dues collected by the Port Commissioners during the year 1897-98.*

Description of light-dues.	1897-98.		1896-97.		Increase.		Decrease.		Remarks.
	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	
Burma Coast Light dues ...	1,75,194	9 0	1,54,918	10 0	20,275	15 0	.....		
Little and Great Basses dues ...	7,880	4 0	9,085	13 11	.....		1,205	9 11	
Minicoy Light dues ...	1,330	0 9	1,801	4 1	.....		471	3 4	
Straits Light dues ...	3,461	13 6	1,405	5 6	2,056	8 0	.....		
Total ...	1,87,866	11 3	1,67,211	1 6	20,655	9 9	.....		
By the Port Officer—									
Sale of unserviceable stores ...	2,917	7 6	756	5 3	2,161	2 3	.....		
Miscellaneous ...	.....		69	12 4	.....		69	12 4	
Contribution by Port Commissioners towards the Spit Light vessel.	3,112	14 5	3,000	0 0	112	14 5	.....		
Total ...	6,030	5 11	3,826	1 7	2,204	4 4	.....		

TABLE E.—*Valuation of Light-house Stores received from the Director-General of Stores, London, during the year 1897-98.*

Name of steamers imported by.	Name of light-houses received on account of.	Description of stores.	Value of each article.	Total of each.	Total cost at Rangoon at 1s. 2¾d.
			£ s. d.	£ s. d.	Rs. A. P.
S. S. Shropshire.	Alguada Reef light-house.	40 gross wicks for argand lamp, 1¼, at 1s. 5d.	2 16 8		
		8 sets spiral tubes, lifters, and wick-holders at 11s.	4 8 0		
		5 chamois skins, at 9 1/16d. 5 lbs. rouge powder at 1s. 9d.	0 4 1 3/16 0 8 9		
		Packing ...	1 12 3		
		Share of freight ...	0 13 10		
				10 3 7 3/16	168 8 4
	Cocos Island light-house.	88 yards wicks of four sizes	2 7 6		
		5 chamois skins ...	0 4 1 3/16		
		5 lbs. rouge powder ...	0 8 9		
		Packing ...	1 12 3		
		Share of freight ...	0 13 10		
				5 6 5 3/16	88 1 9
	Double Island light-house.	88 yards wicks of four sizes	2 10 0		
		5 chamois skins ...	0 4 1 3/16		
		5 lbs. rouge powder ...	0 8 9		
		Packing ...	1 12 3		
		Share of freight ...	0 13 10		
				5 8 11 3/16	90 2 10
	China Bakir light-house.	88 yards wicks of 4 sizes ...	2 10 0		
		50 four-wick pressure cylinders or chimneys.	5 4 2		
		5 chamois skins ...	0 4 1 3/16		
		5 lbs. rouge powder ...	0 8 9		
		Packing ...	1 12 3		
		Share of freight ...	0 13 11		
				10 13 2 3/16	176 7 3
	Savage Island light-house.	5 chamois skins ...	0 4 1 3/16		
		5 lbs. rouge powder ...	0 8 9		
		Packing ...	0 3 3		
		Share of freight ...	0 5 3 7/16		
				1 1 5 1/8	17 11 9
		Carried over ...	.....	32 13 8 1/16	540 15 11

TABLE E.—*Valuation of Light-house Stores received from the Director-General of Stores, London, during the year 1897-98*—concluded.

Name of steamers imported by.	Name of light-houses received on account of.	Description of stores.	Value of each article.	Total of each.	Total cost at Rangoon at 1s. 2½d.
			£ s. d.	£ s. d.	Rs. A. P.
		Brought forward ...	.....	32 13 8 19/56	540 15 11
S. S. Shropshire—concluded.	Eastern Grove light-house.	5 chamois skins ...	0 4 1 31/56		
		5 lbs. rouge powder ...	0 8 9		
		Packing	0 3 2		
		Share of freight ...	0 5 3¼		
				1 1 4⅛	17 10 7
	Oyster Island light-house.	5 chamois skins ...	0 4 1 31/56		
		5 lbs. rouge powder ...	0 8 9		
		Packing	0 3 2		
		Share of freight ...	0 5 3¼		
				1 1 4⅛	17 10 7
	Reef Island light-house.	5 chamois skins ...	0 4 1 31/56		
		5 lbs. rouge powder ...	0 8 9		
		Packing	0 3 2		
		Share of freight ...	0 5 3¼		
				1 1 4⅛	17 10 7
	Krishna Shoal light-vessel.	6 chamois skins ...	0 4 11		
		6 lbs. rouge powder ...	0 10 6		
		Packing	0 3 3		
		Share of freight ...	0 5 3¼		
				1 3 11¼	19 11 1
	Baragua Flats light-vessel.	5 chamois skins ...	0 4 1 31/56		
		5 lbs. rouge powder ...	0 8 9		
		Packing	0 3 3		
		Share of freight ...	0 5 3¼		
				1 1 5⅛	17 11 9
	Spit light-vessel	5 chamois skins ...	0 4 1 31/56		
		5 lbs. rouge powder ...	0 8 9		
		Packing	0 3 1		
		Share of freight ...	0 5 3¼		
				1 1 3⅛	17 9 6
S. S. Derbyshire.	Savage Island light-house.	2,500 gallons heavy mineral oil at 5d.	52 1 8		
		Packing, &c.	78 14 2		
		Share of freight ...	25 15 9		
				156 11 7	2,591 10 6
	Oyster Island light-house.	2,500 gallons heavy mineral oil at 5d.	52 1 8		
		Packing, &c.	78 14 2		
		Share of freight ...	25 15 9		
				156 11 7	2,591 10 6
	Krishna Shoal light-vessel.	1,250 gallons heavy mineral oil at 5d.	26 0 10		
		Packing, &c.	39 7 1		
		Share of freight ...	12 17 10½		
				78 5 9½	1,295 13 3
	Baragua Flats light-vessel.	1,250 gallons heavy mineral oil at 5d.	26 0 10		
		Packing, &c.	39 7 1		
		Share of freight ...	12 17 10½		
				78 5 9½	1,295 13 3
		Total ...		508 19 1 3/8	8,423 15 6

TABLE F.—*Detailed Statement showing the receipts from Light-dues and expenditure on Coast Lights in Burma during the year 1897-98.*

Receipts.	Amount.	Expenditure.	Amount.	Total.
BURMA COAST LIGHT DUES.	Rs. A. P.	ALGUADA REEF.	Rs. A. P.	Rs. A. P.
Provincial.		Establishment	6,583 10 11	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	1,979 7 4	
		Provisions	3,108 7 10	
		Oil	2,150 0 0	
		Stores and contingencies	586 5 4	
Rangoon ...	1,75,194 9 0	Public Works Department expenditure other than capital.	1,449 0 0	
Moulmein ...	28,412 13 0	Total ...	.....	16,044 7 5
Bassein ...	13,124 11 6			
Akyab ...	14,556 9 0	Capital expenditure during the year 1897-98...	3,917 0 0	
		Capital expenditure to end of the year 1897-98	11,14,131 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	44,565 0 0
Total ...	2,31,288 10 6			
Calcutta ...	74,034 2 6	GRAND TOTAL ...	.....	60,609 7 5
Chittagong	1,497 4 6			
		OYSTER REEF (*a*).		
GRAND TOTAL...	3,06,820 1 6			
Refunds ...	430 3 6	Capital expenditure during the year 1897-98.	.....	
		Capital expenditure to end of the year 1897-98	7,01,833 0 0	
Net receipts	3,06,389 14 0	Interest at 4 per cent. on capital expenditure to date.	.....	28,073 0 0
		GRAND TOTAL ...	.....	28,073 0 0
Other items credited to this head.				
		KRISHNA SHOAL (*b*).		
Sale-proceeds of condemned stores.	2,917 7 6	Capital expenditure during the year 1897-98...	.....	
		Capital expenditure to end of the year 1897-98	1,83,195 0 0	
Fines and forfeitures of pay, &c.	.....	Interest at 4 per cent. on capital expenditure to date.	.....	7,328 0 0
Contribution by Port Commissioners towards Spit light-vessel	3,112 14 5	GRAND TOTAL ...	.....	7,328 0 0
		DOUBLE ISLAND.		
		Establishment	2,639 11 10	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	987 6 11	
		Provisions	1,244 2 7	
		Oil	1,505 0 0	
		Stores and contingencies	216 11 9	
		Public Works Department expenditure other than capital.	1,194 0 0	
		Total ...	.....	7,974 9 1
		Capital expenditure during the year 1897-98...	8,548 0 0	
		Capital expenditure to end of the year 1897-98	1,41,350 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	5,654 0 0
		GRAND TOTAL ...	.....	13,628 9 1

(*a*) This light-house was destroyed by a storm in May 1884.
(*b*) This light-house was destroyed by a storm in August 1877.

TABLE F.—*Detailed Statement showing the receipts from Light-dues and expenditure on Coast Lights in Burma during the year 1897-98*—continued.

Receipts.	Amount.	Expenditure.	Amount.	Total.
		CHINA BAKIR.	Rs. A. P.	Rs. A. P.
		Establishment	2,021 3 1	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	941 1 4	
		Provisions	1,462 9 5	
		Oil	1,343 2 0	
		Stores and contingencies	332 5 8	
		Public Works Department expenditure other than capital.	2,070 0 0	
		Total ...	.....	8,357 13 6
		Capital expenditure during the year 1897-98...	447 0 0	
		Capital expenditure to end of the year 1897-98	1,49,347 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	5,974 0 0
		GRAND TOTAL ...	.....	14,331 13 6
		EASTERN GROVE.		
		Establishment	2,109 1 7	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	814 10 7	
		Provisions	1,067 10 6	
		Oil	22 0 0	
		Stores and contingencies	134 5 0	
		Public Works Department expenditure other than capital.	845 0 0	
		Total ...	.....	5,180 3 8
		Capital expenditure during the year 1897-98	1,847 0 0	
		Capital expenditure to end of the year 1897-98	62,738 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	2,510 0 0
		GRAND TOTAL ...	.....	7,690 3 8
		TERRIBLES.*		
		Capital expenditure during the year 1897-98...	.....	
		Capital expenditure to end of the year 1897-98	3,648 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	146 0 0
		GRAND TOTAL ...	.....	146 0 0
		REEF ISLAND.		
		Establishment	877 0 0	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	889 4 11	
		Provisions	779 10 6	
		Oil	359 6 0	
		Stores and contingencies	57 7 7	
		Public Works Department expenditure other than capital.	869 0 0	
		Total ...	.....	4,019 5 0
		Capital expenditure during the year 1897-98	2,124 0 0	
		Capital expenditure to end of the year 1897-98	20,880 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	835 0 0
		GRAND TOTAL ...	.....	4,854 5 0

* No such light-house was ever built, and the expenditure shown here represents only the initial amount spent on account of the light-house which it was proposed to build.

TABLE F.—*Detailed Statement showing the receipts from Light-dues and expenditure on Coast Lights in Burma during the year 1897-98*—continued.

Receipts.	Amount.	Expenditure.	Amount.	Total.
		SAVAGE ISLAND.	Rs. A. P.	Rs. A. P.
		Establishment	1,654 0 0	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	967 1 6	
		Provisions	1,129 5 0	
		Oil	2,763 0 6	
		Stores and contingencies	216 0 3	
		Public Works Department expenditure other than capital.	1,058 0 0	
		Total ...	...	7,974 15 3
		Capital expenditure during the year 1897-98...	3,200 0 0	
		Capital expenditure to end of the year 1897-98	1,00,109 0 0	
		Interest at 4 per cent. on capital expenditure to date.	...	4,004 0 0
		GRAND TOTAL ...	...	11,978 15 3
		TABLE ISLAND.		
		Establishment	4,111 13 5	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	931 3 3	
		Provisions	2,714 4 2	
		Oil	1,855 0 0	
		Stores and contingencies	464 12 4	
		Public Works Department expenditure other than capital.	1,256 0 0	
		Total ...	...	11,520 9 2
		Capital expenditure during the year 1897-98...	3,845 0 0	
		Capital expenditure to end of the year 1897-98	1,37,025 0 0	
		Interest at 4 per cent. on capital expenditure to date.	...	5,481 0 0
		GRAND TOTAL ...	...	17,001 9 2
		OYSTER ISLAND.		
		Establishment	6,774 13 7	
		Allowance to Inspector	150 0 0	
		Allowance to Medical Officer	37 8 0	
		Cost of relief establishment	1,537 2 10	
		Provisions	2,731 0 6	
		Oil	2,778 14 6	
		Stores and contingencies	199 13 0	
		Public Works Department expenditure other than capital.	1,612 0 0	
		Total ...	...	15,821 4 5
		Capital expenditure during the year 1897-98...	3,773 0 0	
		Capital expenditure to end of the year 1897-98	2,76,612 0 0	
		Interest at 4 per cent. on capital expenditure to date.	...	11,065 0 0
		GRAND TOTAL ...	...	26,886 4 5
		KRISHNA SHOAL LIGHT-VESSEL.		
		Establishment	15,759 12 1	
		Allowance to Inspector	...	
		Allowance to Medical Officer	...	
		Cost of relief establishment	...	
		Provisions	4,517 12 3	
		Oil	1,460 5 2	
		Stores and contingencies	10,258 0 7	
		Public Works Department expenditure other than capital.	...	
		Total ...	...	31,995 14 1
		Capital expenditure during the year 1897-98...	9,250 5 8	
		Capital expenditure to end of the year 1897-98	1,41,351 5 8	
		Interest at 4 per cent. on capital expenditure to date.	...	5,654 0 0
		GRAND TOTAL ...	...	37,649 14 1

TABLE F.—*Detailed Statement showing the receipts from Light-dues and expenditure on Coast Lights in Burma during the year 1897-98*—continued.

Receipts.	Amount.	Expenditure.	Amount.	Total.
		SPIT LIGHT-VESSEL.	Rs. A P.	Rs. A. P.
		Establishment	1,794 0 0	
		Allowance to Inspector	.....	
		Allowance to Medical Officer	.....	
		Cost of relief establishment	.....	
		Provisions	1,023 0 11	
		Oil	181 14 0	
		Stores and contingencies	384 14 3	
		Public Works Department expenditure other than capital.	.....	
		Total ...	...	3,383 13 2
		Capital expenditure during the year 1897-98...	950 8 1	
		Capital expenditure to end of the year 1897-98.	1,50,258 8 1	
		Interest at 4 per cent. on capital expenditure to date.	.....	6,010 0 0
		GRAND TOTAL ...	...	9,393 13 2
		BARAGUA FLATS LIGHT-VESSEL.		
		Establishment	15,245 11 1	
		Allowance to Inspector	.....	
		Allowance to Medical Officer	.....	
		Cost of relief establishment	.....	
		Provisions	4,342 6 11	
		Oil	1,393 12 8	
		Stores and contingencies	959 12 3	
		Public Works Department expenditure other than capital.	.....	
		Total ...	...	21,941 10 11
		Capital expenditure during the year 1897-98 ...	834 2 0	
		Capital expenditure to end of the year 1897-98	1,46,955 2 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	5,878 0 0
		GRAND TOTAL ...	...	27,819 10 11
		LIGHT-VESSEL "COLOMBO." (*c*)		
		Capital expenditure to end of the year 1897-98	83,387 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	3,335 0 0
		GRAND TOTAL ...	...	3,335 0 0
		RELIEF LIGHT-VESSEL.		
		Establishment	476 8 10	
		Allowance to Inspector	.....	
		Allowance to Medical Officer	.....	
		Cost of relief establishment	.....	
		Provisions	600 13 3	
		Oil	225 5 0	
		Stores and contingencies	1,816 6 5	
		Public Works Department expenditure other than capital.	.....	
		Total ...	...	3,119 1 6
		Capital expenditure during the year 1897-98...	29,274 15 5	
		Capital expenditure to end of the year 1897-98	1,14,336 15 5	
		Interest at 4 per cent. on capital expenditure to date.	.....	4,574 15 9
		GRAND TOTAL ...	...	7,693 1 6

(*c*) Condemned in December 1893 and sold by auction.

TABLE F.—*Detailed Statement showing the receipts from Light-dues and expenditure on Coast Lights in Burma during the year 1897-98*—concluded.

Receipts.	Amount.	Expenditure.	Amount.	Total.
		AMHERST POINT LIGHT.	Rs. A. P.	Rs. A. P.
		Capital expenditure during the year 1897-98...	2,399 0 0	
		Capital expenditure to end of the year 1897-98	2,399 0 0	
		Interest at 4 per cent. on capital expenditure to date.	.....	96 0 0
		Total ...	.....	96 0 0
		GRAND TOTAL ..	.....	...

	Rs. A. P.
(1) Grand total, current expenditure	1,37,333 11 2
(2) Grand total, capital expenditure during the year 1897-98	70,409 15 2
(3) Grand total, capital expenditure to end of the year 1897-98	35,29,555 15 2
(4) Grand total, interest at 4 per cent. on capital expenditure to date	1,41,182 0 0
(5) Grand total, expenditure other than capital account ...	2,78,515 11 2

			Rs. A. P.
Note.—Total (1) and (2) above			2,07,743 10 4
	Rs. A. P.		
Deduct (*a*) P. W. D. current expenditure ...	10,353 0 0		
(*b*) P. W. D. capital expenditure ...	30,100 0 0		
Total		40,453 0 0	
			1,67,290 10 4
Disbursements as per Accountant-General's books ...		1,58,642 9 3	
			8,648 1 1*

* Will be adjusted by the Accountant-General in his final accounts for March 1898.

ANNUAL REPORT ON LIGHT-HOUSES ON THE BURMA COAST FOR THE YEAR 1897-98.

From E. G. STANLEY, Esq., Assistant to the Chief Engineer, and Under Secretary to the Government of Burma, Public Works Department, for Lower Burma, to the Superintendent of Light-houses, Burma, —No. 4347-9C.I., dated the 23rd April 1898.

IN compliance with the request contained in your letter No. 1611-10R.L.H., dated the 26th ultimo, I am directed to forward herewith for disposal the Annual Report by the Superintending Engineer, South-Western Circle, on the Burma Light-houses for the year 1897-98.

In doing so, I am to invite your attention to the remarks contained in the report regarding the proposal to provide a new light for the Alguada Reef light-house, and to say that the Chief Engineer is inclined to the opinion that no time should be lost in providing this important locality with a light of high efficiency as recommended in Mr. Douglass' report of 1890, and to suggest that a few of the principal Commanders of vessels who use that light be consulted on the subject.

Inspection Report by A. B. GATHERER, Esq., Superintending Engineer, South-Western Circle, on the Burma Light-houses for the year 1897-98.

1. The annual inspection was made by Captain H. S. Black, R.I.M., Superintendent of Light-houses and Port Officer, Rangoon; Mr. A. B. Gatherer, Superintending Engineer, South-Western Circle; and Captain Piffard, Commander, and Mr. Johnstone, Chief Engineer, of R.I.M.S. *Minto*.

Mr. Reilly, Sub-Engineer, Public Works Department, and Mr. Evans, Telegraph Department, were also present.

The S. S. *Minto* left Rangoon on the morning of the 22nd February 1898 and returned on the afternoon of the 8th March 1898.

2. CHINA BAKIR.—This light-house was inspected on the 22nd February 1898. The structure was found in good order. The improvements and repairs considered necessary during last annual inspection, with the exception of alteration of bracing rods, have been satisfactorily carried out. The alteration of bracing rods is now in hand. It takes time and cannot be completed before the end of April next. The work is being done in accordance with Executive Engineer, Rangoon Division's report No. 1417-6C., of the 23rd March 1897 (accompaniment to last annual inspection report).

Soundings were taken with result as below.

Number of pile.	DEPTH OF GROUND BELOW UPPER SURFACE OF FIRST FLOOR GIRDER.	
	On 22nd February 1898.	In April 1895.
	Ft. in.	Ft. in.
No. 1	33 4½	33 8
„ 2	34 8	34 7
„ 3	34 3	34 8
„ 4	33 10	33 4
„ 5	32 9½	31 10
„ 6	32 8	33 9

A comparison between the soundings taken this year and those nearly three years ago shows there is no scour to speak of. This is satisfactory. The machinery was inspected and tested. Through wear and tear the pitch chain does not fit properly into the sprocket wheel. A new chain and wheel are necessary. These will have to be obtained from England. The regulating gear requires to be thoroughly overhauled and will now be seen to. The burner was found to be

in centre and in focus. The oil pump was tested and found in order. The revolution of the light was found to be out of order, taking 49 to 50 seconds in place of a minute. On adjustment the revolution took 59 seconds. When the regulating gear has been adjusted there should be little variation to speak of. The order to convert the existing fixed up-right iron ladder into ship's gangway ladder has been cancelled. The latter is unsuited and would soon be knocked to pieces. The present arrangement meets all requirements. There was a strong current running at time of inspection, rendering access from and to the boat difficult.

The lightning-conductor was tested and found to be perfect.

A statement is attached showing work which should be carried out to this and other light-houses during 1898-99.

3. DOUBLE ISLAND.—This light-house was inspected on the 23rd February 1898. During the past working season the approach or harbour has been cleared of rocks and boulders.

The entrance will now be defined by two iron beacons projecting well above high-water level. When these have been erected, nothing more is wanted to the landing. The crane and platform are in good order. The light-house building is in good order and calls for no special remarks. The machinery was also found to be in order. The burner on being tested was in centre and in focus. The defect reported last year, namely, "that the centring and focussing of the "lamp was constantly getting out of order owing to the weakness of the pedestal "supporting the platform," was carefully considered. The four Inspecting Officers were of opinion that any defect was not due to the cause mentioned. The pedestal is, in their opinion, perfectly firm and does not require strengthening. The light is a fixed one and is secured to the pedestal by three brackets with adjusting horizontal screws, while the lamp is levelled by means of three vertical screws. These have to be adjusted each time the burner is changed, and it is presumed that in changing the lamp immediately prior to previous annual inspection the screws had not been properly adjusted. Mr. Reilly, Sub-Engineer, who has been in charge of the Light-houses subdivision for four years, never heard any previous or subsequent complaint regarding the weakness of the platform and ascribes the defect noted to want of previous adjustment. The Inspecting Officers are quite satisfied with the present pedestal and machinery and consider the remarks in the previous report misleading. The out-buildings are now in good order. The light-keeper's quarters and cook-house have been re-roofed. The old terrace roof has been removed and one of corrugated iron substitued. The work has been satisfactorily completed at a cost of Rs. 6,396. Next season the two inner or centre rooms should be provided with a ceiling. The joists of terrace roof were left by order of the Executive Engineer with a view to a ceiling being put up. Four ventilators will be required in the ceiling and the ventilator at apex of roof should be enlarged. Two iron water-tanks were condemned and should be written off the returns. The remaining 12 tanks containing 400 gallons each are considered sufficient with the supply obtainable from the well on the island. The Superintendent of Light-houses is issuing an order that the bottoms of all tanks at this and other light-houses will, when possible, be exanined at least once in six months. The Subdivisional Officer will now arrange to have all tanks numbered and note those examined in his monthly inspection reports. The lightning-conductor was tested and found in order.

4. ALGUADA.—Inspected on the 24th February 1898. The light-house building and out-houses were found in good order. The landing pier and platform have been well looked after, all necessary repairs for their upkeep having had attention. The existing arrangements for cooking for both Europeans and Natives in the house on the platform is certainly unsatisfactory. A separate building for cooking purposes will be constructed in line of bath-rooms and will be partitioned off for Europeans and Natives. This will add greatly to the comfort of the light-keepers. An estimate amounting to Rs. 799 has now been sanctioned for the work and will at once be put in hand.

The proposed landing-stage on the south-east side of the platform is much wanted. An estimate (Rs. 8,532) with plan has been prepared and submitted for

sanction. The work was not put in hand before owing to available funds being more urgently required for re-roofing the light-keeper's quarters on Double Island. The position of proposed landing-stage is shown on the accompanying plan of Alguada reef.

The existing landing basin on the western side of the reef admits, in my opinion, of considerable improvement. A few projecting rocks at the entrance and loose boulders in the basin should be removed.

As far as could be ascertained, the state of the chasm was found to be normal. The positions of the three test holes sunk in rock immediately to the west of the light-house are shown on the plan as A, B, C. These are said to have been sunk 18 feet or 1 foot below the level of the foundations of the light-house. The rock to the north-east of the building at C, D on the plan was being eroded and the hole recently filled up with concrete cement by order of the Executive Engineer. Erosion has taken place at E to the south of the building. I gave orders to have this cavity also filled up.

The machinery in the light-house was carefully examined and found in working order. The question of renewing the light as suggested by Mr. Douglass was fully gone into, and the four Inspecting Officers were unanimously of opinion that, while admitting the advantages which a light of 100,000 candle units would have over the existing one, they do not consider that the time has yet arrived for the substitution of an improved light and that the question may be safely deferred for some five years to come. The repairs to machinery noted in Superintendent of Light-houses' Annual Report for 1896-97 have had attention, with the exception of the tell-tale gear.

The delay has been unavoidable owing to the repairs having had to be carried out in Calcutta.

With the exception of an earth-plate, the lightning-conductor was found in order. This plate will now be supplied.

5. SAVAGE ISLAND.—Inspected on the 27th February 1898. The main building, with the exception of beams in basement, is in good order. The beams will be examined and renewed where necessary. The store-shed and fowl-house require re-construction. This will be seen to. The masonry water-tanks have now been closed with wooden coverings with sufficient ventilation and are in good order.

The machinery was examined and found in working order. The centring of the lamp was correct, as also the level and focus. Oil pump in good order.

The lightning-conductor was examined. The portion which was damaged during last monsoon has been made good and the conductor is now in good order.

6. OYSTER ISLAND.—Inspected on the 28th February 1898. The light-house and subsidiary buildings are in good order. All necessary repairs have been carried out during the past year. The landing-pier has been overhauled and re-painted. The new light with machinery has been put up since last annual inspection. It works well. The lamp was found in centre, level, and in focus, and oil pump in order. The light works to time. The old machinery has been sent to England for repairs.

Lightning-conductor tested and in order.

During the past season good garden soil has been sent from Akyab and put on garden to a depth of 18 inches. The garden has been protected by corrugated iron sheets sunk 18 inches into the ground as a protection from crabs. With attention the garden should prove successful. An expenditure of Rs. 1,825 has been incurred on the work.

7. TABLE ISLAND.—Inspected on the 4th March 1898. The light-house building, which is of iron, has recently received a coat of red paint inside. The whole building is clean and neat. The machinery is in good order. The lamp was found in centre, level, and in focus, and the oil pump in order. The white-ants have again made their appearance in the Europeans' quarters. The joists in the visitors' room and adjoining end room should be carefully examined and renewed where necessary. The roof of the store-house has been repaired. The other subsidiary buildings were inspected and found in good order.

The lightning-conductor was tested and found to be perfect. The landing-stage on the south-western side of the island has now been improved. The dock has been deepened and a sea wall constructed and the approach to the wharf made good. The crane is in order. Nothing more is now required.

Inspected the cemetery. The posts of the existing fence are entirely gone and a new fence is necessary. An estimate for the work will now be sanctioned. The question of water-supply was carefully gone into. The Superintendent of Light-houses and I are of opinion that it will be sufficient to enlarge and improve the existing reservoir in the valley to the east of the light-house buildings, and that it is unnecessary to go to the expense of constructing a new reservoir. The proposal to construct a bund across the stream in the valley is not recommended. It would be costly and its upkeep a matter of anxiety. A breach in the bund would mean the loss of supply for the season, while the water in the reservoir would soon be polluted by the wild cattle on the island. An estimate for enlarging and improving the existing tank will now be prepared and submitted for orders so that the work may be carried out this season. The Superintendent of Light-houses is submitting his proposal regarding the wild cattle on the island. I agree with him that they should be restricted in numbers. As the water in existing wells becomes brackish in the dry season, I do not recommend the sinking of additional wells. We have to content ourselves with storing the rainfall in sufficient quantity, and it is believed the above proposals will meet all requirements.

8. REEF ISLAND.—Inspected on the 6th March 1898. The light-house and out-buildings are all in good order, all necessary works having been satisfactorily carried out. The light is a lamp placed on a table. It is in working order and properly looked after. The approach from landing to light-house has been repaired. The work of continuing the conductor down to the sea has been carried out, but earth resistance is still complained of. It may be necessary to supply two earth-plates.

9. EASTERN GROVE.—This light-house was visited on the 10th March 1898 in company with Captain Black, R.I.M., Superintendent of Light-houses. The building is in excellent order and also the machinery; neither calls for special remarks.

Statements showing works which should be carried out to the light-houses off the coast of Burma during 1898-99.

CHINA BAKIR.

1. Completing the re-bracing of piles below first floor.
2. Repairs to water-tanks.
3. New sprocket wheel with pitch chain to be indented for from England.
4. Regulating gear to be thoroughly overhauled.

Estimates for the above work will now be prepared and submitted for sanction.

DOUBLE ISLAND.

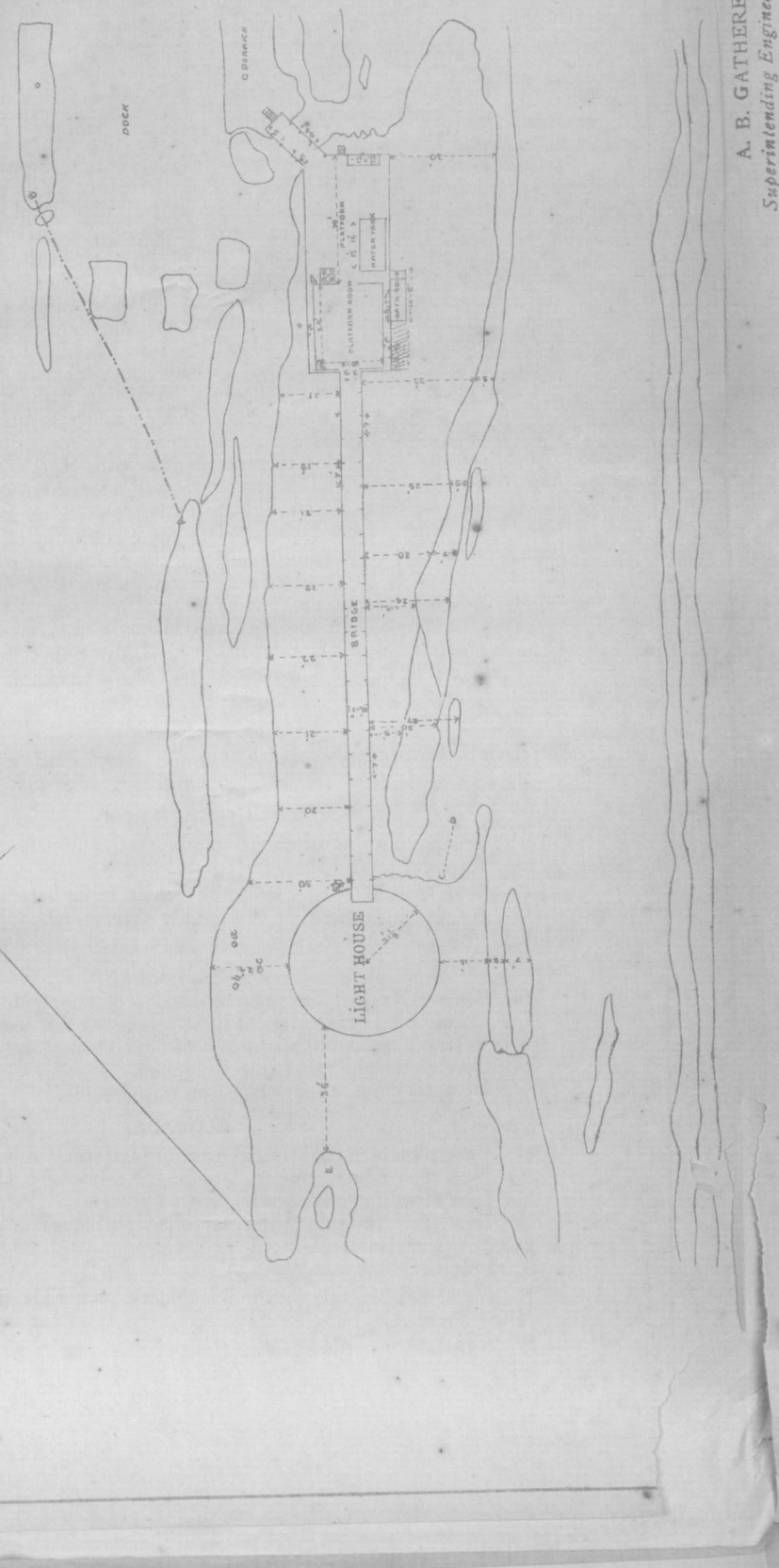
(*a*) Beacons to mark entrance to dock to be supplied.
(*b*) Ceiling of centre rooms of light-keeper's quarters.
(*c*) Enlargening ventilator in roof of light-keeper's quarters.
(*d*) Cradles for chimneys to be supplied.
(*e*) All water-tanks to be placed on raised skids.

ALGUADA.

1. Extension of jetty at south-east of platform.
2. New cook-house.
3. New stove for cook-house.
4. New stove to be kept in reserve in light-house.
5. New meat-safe.
6. Provision bins.
7. Necessary repairs to the machinery, materials for which are now at hand.
8. Repairs to tell-tale gear.

Block Plan
OF THE
ALGUADA LIGHT-HOUSE.

SCALE: 40 FEET = 1 INCH.



A. B. GATHERER, M.I.C.E.,
Superintending Engineer, S. W. Circle.

9. Earth-plate for lightning-conductor.
10. Gap in the rock to the south-west of the light-house to be filled with cement concrete.
11. Two easy-chairs for Europeans.
12. New water-tanks now at Rangoon to be fitted as required.

SAVAGE ISLAND.

1. Renew beams in the basement of light house.
2. Reconstruct store-shed.
3. Reconstruct fowl-house.
4. Renew feather in clutch gearing.
5. All water-tanks to be placed on raised skids.

OYSTER ISLAND.

1. Renew stays in T head of jetty.
2. Renew certain water-tanks.
3. Water-tanks to be placed on raised skids.
4. Two easy-chairs to be supplied.

TABLE ISLAND.

1. Joists in Europeans' quarters to be renewed where necessary.
2. Canvas hose for drain pipes.
3. Purdahs for lantern room.
4. Cemetery to be re-fenced.
5. Six water-troughs for cattle.
6. Water-tanks to be placed on raised skids.
7. Bins for storing provisions.

REEF ISLAND.

1. New purdahs for lantern.
2. Zinc troughs for filling water-troughs.
3. Lower mast of flag-staff to be removed. Spare masts from F. L. V. *Martaban* to be substituted.

EASTERN GROVE.

1. Vegetable locker to be supplied.
2. Two spare sprocket wheels for occulting machine.
3. Two spare chains for above.
4. Two spare lengths of copper wire for fusee of machine.

Annual Report of Light-houses along the Coast of Burma for the year

Light-house.	Locality.	Description of light.	Description of light-house.	New works, additions, alterations, and improvements.
1	2	3	4	5
Eastern Grove ...	On Grove Point, east side of entrance to Rangoon river. Latitude, N. 16° 30′ 01″ Longitude, E. 96° 23′ 4″.	Dioptric, second order, white, occulting once every 10 seconds. Focal plane 93 feet above H. W. L. Visible between the bearings N. E. by N. to N. W. by N. Three-inch concentric Douglass burners consuming heavy mineral oil used.	Braced iron screw-piled structure, painted red with white dome; built in 1860.	(1) Entrance ladder altered ... ... (2) Stone-pitching under light-house adjusted. (3) Shelf provided in lieu of packing case. (4) Burner, machine and draft-pipe brushes supplied. (5) Hand signal lamp supplied. (6) Studs fitted to burners in lieu of screws. (7) Yard-arm with goose-neck arrangement for signalling purposes fixed. (8) Brass swivels of halyard supplied.
Double Island ...	On the north point of Double Island. Latitude, N. 15° 53′ 30″ Longitude, E. 97° 35′ 36″	Dioptric, first order, white, fixed. Focal plane 164 feet above H. W. L. Visible between bearings S. S. E. through E. to N. ¾ W. An isolated strip of light shows from the Patch Buoy eastward as far as Amherst Point Four wick concentric Trinity pattern burners consuming cocoanut oil used.	Round masonry tower built in 1865. Foundations and 14 feet of tower built of rubble granite, the rest of Singapore cut stone with coping. Painted white with red dome.	(1) Corrugated-iron roof put over European quarters. (2) Boulders in dock removed and blasted where necessary. (3) Corrugated-iron roof put over cook-house. (4) Gutters to European and Native quarters supplied. (5) Parapets to subsidiary buildings removed. (6) Burner, machine and draft-pipe brushes supplied. (7) Axes and rules supplied. (8) Lightning-conductor extended towards the sea. (9) Studs fitted to burners in lieu of screws. (10) Yard-arm with goose-neck arrangement for signalling purposes fixed. (11) Brass swivels for halyards supplied. (12) Lantern purdahs supplied. (13) Calf and kid leather supplied for pumping-gear.
Reef Island ...	On north-east point of Reef Island, west entrance to Tavoy river. Latitude, N. 13° 36′ 40″ Longitude, E. 98° 13′...	Dioptric, fifth order, white, fixed focal plane 300 feet above H. W. L. Visible from N. 34° E. through W. to S. 12 E. One wick (circular) Argand burner consuming cocoanut oil used	Square masonry tower, painted white with white dome.	(1) Eave purlins secured by wrought-iron clamps ... (2) Water-tank skid placed on concrete blocks. (3) Masonry plinth built around light-keeper's quarters. (4) Conductor extended towards the sea. (5) Apparatus oil-trays supplied. (6) Easy and arm chairs supplied. (7) Brass swivels for halyards supplied. (8) Tarpaulins for south-west monsoon supplied
Table Island ...	On the summit of south-west end of Table Island, two miles from Great Cocos Island. Latitude, N. 14° 11′ 30″ Longitude, E. 93° 21′ 15″	Dioptric, first order, white, fixed. Focal plane 195 feet above H.W.L. Visible all round the compass, except where screened by the Great Cocos or between the bearings N. by W. ¼ W. to N. by E., and by the Little Cocos between the bearings from N. N. E. ¾ E. to N. E. ¾ N. nearly. Four concentric wick Trinity pattern (old) burners consuming cocoanut oil used.	Round tower of cast-iron in segments, painted red and white alternate bands, red at base with red dome.	(1) Sea-wall completed ... ... (2) Dock deepened two feet. ... ... (3) West slope of groyne made up of cement concrete in lieu of the boulders. (4) Beacon rails supplied. (5) Parts of roof of cowshed spliced. (6) Inlets to rain-pipes in European and Native quarters improved and larger pipes inserted. (7) Butterfly nuts for port-holes supplied. (8) Burner, machine and draft-pipe brushes supplied. (9) Yardarm blocks supplied. (10) Racks for storing glass supplied. (11) New tools supplied. (12) Brass swivels for halyards supplied. (13) Meat safe supplied.
Alguada Reef ...	On the Alguada Reef, 10½ miles from Diamond Island. Latitude, N. 15° 42′ 14″ Longitude, E. 94° 12′ 35″	Catadioptric, first order, revolving, attains its maximum intensity every minute. Focal plane 141 feet above H.W.L. Visible all round the compass. One wick (circular) Argand burner consuming cocoanut oil used.	Granite tower, alternate black and white bands 18 feet wide, black at base with white dome, landing-stage 65′ × 21′ and footway 150′ both on braced wrought-iron piles. The former has a corrugated-iron roof which serves as a room for the crew in fine weather.	(1) Cleats for leading blocks fixed on the platform. (2) Skids for water-tanks fixed with wrought-iron knees. (3) Water-tanks on platform secured by wrought iron bands to prevent them being washed away. (4) Extra braces put into walling of platform room. (5) One line of shelves put in platform room. (6) Bright wrought-iron stanchions and rails fixed at all landings in light-house to make them secure. (7) Two iron bedsteads for use of Europeans supplied. (8) Spare panes of glass supplied. (9) Burner and machine brushes supplied. (10) Handy bill-blocks and new tools supplied. (11) Racks for storing glass supplied. (12) Lantern purdahs supplied. (13) Hasps and staples fixed to all lockers. (14) Provision bins supplied. (15) Brass swivels for halyards supplied. (16) Regulator screws supplied.
Oyster Island ...	Centre of Oyster Island, off entrance to Myôn River. Latitude, N. 20° 12′ 50″ Longitude, E. 92° 32′ 51″	Dioptric, first order, white and red, occulting at intervals of 30 seconds. Focal plane 118 ft. above H.W.L., shows red from N. 39 W. to N. 54 W. over Oyster Reef, and white in other directions, six wick concentric Douglas burners consuming heavy mineral oil used.	Tower of cast-iron in segments founded on 16 cylinders sunk 12 feet into the rock, cement concrete within the foundations and in 40 feet of the tower with well and spiral staircase. Tower painted black and white in alternate bands, black at base with white dome. Landing jetty with T. head on braced iron piles.	(1) New occulting clockwork fixed. (2) Eave purlins of quarters secured by wrought-iron clamps. (3) Garden soil improved. (4) Spare panes of glass supplied. (5) Lantern purdahs to be supplied. (6) Light wooden ladders supplied. (7) Burner, machine and draft-pipe brushes supplied. (8) New tools supplied. (9) Bulkhead lamps for the light-house supplied. (10) Racks for storing glass supplied. (11) Cleats fixed at base of light-house for painting purposes. (12) Flame-spreaders supplied. (13) Studs fixed to burners. (14) Brass swivels for halyards to be supplied. (15) Leathers for burners supplied. (16) Occulting shade-screws supplied.

ending 1897-98, Rangoon Division, Public Works Department, Burma.

Special repairs.	Ordinary repairs.	Inspections.	Lightning-conductors.	New works and repairs ordered for 1898-99.
6	7	8	9	10
Decayed floor planks renewed, tanks for storing heavy mineral oils supplied, wrought-iron work scraped of coal-tar, racks for storing glass supplied, purdahs for lantern supplied, spare fusee wire supplied.	All painting and white-washing, also coal tarring completed; all repairs to tools, machine and lamp gear executed where found necessary.	12th June 1897, by Mr. Reilly. 21st October 1897, by Mr. Reilly. 22nd November 1897, by Mr. Reilly. 29th November 1797, by Mr. Reilly. 30th November 1897, by Mr. Reilly. 7th January 1898, by Executive Engineer and Mr. Reilly. 5th March 1898, by Mr. Lyddy. 10th March 1898, by Superintending Engineer and Mr. Reilly.	Copper rod terminating 3 feet above dome-end and lashed on to the first line of braces below gallery level. Tested and found perfect— (1) 12th April 1897. (2) 10th March 1898.	(1) Cooking-range to be supplied. (2) All water-tanks to be numbered. (3) Vegetable-locker to be supplied. (4) Two spare sprocket-wheels for machine to be supplied. (5) Two spare chains for above to be supplied. (6) Two pieces of copper wire for fusee of machine to be supplied.
Conductor localized ... High tree that was dangerous to the building removed. New dock chain supplied. Broken panes of glass in lantern renewed. Conductor joint at Dome cornice renewed.	All painting colour and white-washing, plaster and coal-tarring completed; all repairs to tools, machines, pumps and lamp-gear executed where found necessary.	22nd April 1897, by Mr. Reilly ... 2nd August 1897, by Mr. Reilly. 6th September 1897, by Mr. Reilly. 7th October 1897, by Mr. Reilly. 19th October 1897, by Mr. Reilly. 4th November 1897, by Mr. Reilly. 11th December 1897, by Executive Engineer and Mr. Reilly. 22nd December 1897, by Mr. Reilly. 12th January 1898, by Mr. Reilly. 24th January 1898, by Mr. Reilly. 11th December 1897 to 24th January 1898, by Mr. Simeons. 23rd February 1898, by the Superintending Engineer and Mr. Reilly.	A ½-inch diameter copper rod running down from below the wind-vane socket along the building and over the rocks, and then into the sea. The earth is formed by coiling this copper rod and is placed so that it is covered at all stages of the tide. Tested and found perfect on 23rd February 1898.	(1) Beacons for marking the dock entrance to be fixed. (2) More ventilation to be put in new corrugated-iron roof over European quarters. (3) Ceiling to be put into rooms in European quarters. (4) Cradles for glass cylinders to be supplied. (5) All water-tanks to be numbered. (6) All water tanks to be placed on skids.
Missing bolts renewed, trap-door for light-room fixed, ladders provided with iron hand-rails. Yard-arm blocks renewed.	All painting, earth-oiling, coal-tarring and white-washing completed; all repairs to lamp-gear completed where found necessary.	23rd April 1897, by Mr. Reilly ... 1st August 1897, by Mr. Reilly. 5th September 1897, by Mr. Reilly. 5th October 1897, by Mr. Reilly. 5th November 1897, by Mr. Reilly. 21st December 1897, by the Executive Engineer and Mr. Reilly. 5th November to 21st December 1897, by Mr. Thompson. 13th January 1898, by Mr. Reilly. 6th March 1898, by Superintending Engineer and Mr. Reilly.	Copper rod ½-inch diameter projecting 6 feet above dome; copper earthplate 4′ × 3′ × ¼″ placed in pit vertically below ground and connected with terminal with 1½″ copper tape; a ¼″ circular galvanized iron wire-rope is joined on to the copper tape just before it enters the ground and runs over the rocks and is eventually buried below low water. The earth is formed by coiling this wire rope. Tested and found perfect on 6th March 1898.	(1) All tanks to be numbered. (2) Lantern purdahs to be supplied. (3) Zinc troughs for filling water-tanks to be supplied. (4) The lower mast of the present flagstaff to be renewed.
Groyne extended towards the North, fire-places done up with fire-clay. Inside of light-house partly scaled. Lantern and port-hole glasses renewed. Auxiliary earth provided. Observatory-shed re-thatched.	All painting, coal-tarring, white and colour-washing, also plaster work completed, all repairs to tools, machines, and lamp-gear repaired where found necessary.	26th April 1897, by Mr. Reilly ... 25th July 1897, by Mr. Reilly. 3rd September 1897, by Mr. Reilly. 8th November 1897, by Mr. Reilly. 19th December 1897, by Mr. Reilly and Executive Engineer. 16th and 17th January 1898, by Mr. Reilly. 4th March 1898, by the Superintending Engineer and Mr. Reilly. 16th January to 4th March 1898, by Mr. Thompson.	No conductor at this light-house, being of iron. The continuity of light-house tested on 4th March 1898 and found perfect.	(1) Water-supply tank for cattle to be improved. (2) Cemetery rails or uprights to be renewed. (3) Joists in visitors' room to be renewed where necessary. (4) Canvas hose for filling water-tanks to be supplied. (5) Lantern purdahs to be supplied. (6) Six wooden troughs for cattle-well to be supplied. (7) All tanks to be numbered. (8) All tanks to be placed on proper skids. (9) Bins for storing the monsoon supply of rations to be supplied.
All wrought-iron work scaled of tar and painted, whip-falls renewed. Derrick falls renewed. Lift and force-pump repaired. Bottle thumb-screws renewed, washers for oil-tanks supplied. Cable case for electric bell fixed.	All painting and white-washing completed; all repairs to machines and lamp-gear executed where found necessary.	27th April 1897, by Mr. Reilly ... 26th July 1897, by Mr. Reilly. 29th August 1897, by Mr. Reilly. 23th September 1897, by Mr. Reilly. 9th November 1897, by Mr. Reilly. 14th December 1897, by Executive Engineer and Mr. Reilly. 18th January 1898, by Mr. Reilly. 24th February 1898, by Superintending Engineer and Mr. Reilly. 24th February to 3rd March 1898, by Mr. Simeons. 3rd March 1898, by Mr. Reilly.	Conductor from dome to gallery a copper rod, from here to base of light-house a copper wire rope which is attached to a copper rod leading into the sea. Tested and found perfect— (1) 2nd April 1897. (2) 24th February 1898.	(1) Jetty extension towards south-east to be completed. (2) Gallery arrangements to be improved. (3) One stove suitable for two Europeans to be supplied for new gallery when improved. (4) One stove suitable for nine men to be supplied and kept in the kitchen-room in light-house. (5) Meat safe to be supplied. (6) Main bearings, winding shaft bushes, steel pins for pinions and tell-tale gear of machine to be overhauled and completed at an early date. (7) Earth-plate for conductor to be supplied. (8) Gap in rock on west side of light-house to be filled up with cement concrete. (9) Two easy and four armed chairs to be supplied. (10) New water-tanks to be fitted where required. (11) Water-tanks to be numbered.
Wrought-iron work of jetty scaled of coal-tar and painted. Damages caused by heavy weather renewed. Lantern and door glass panes renewed. Oil-tanks repaired by soldering joints. No. 3 burner repaired in England.	All painting, coal-tarring, earth-oiling, white-washing and plaster work completed; all repairs to machine, burner and other gear executed where found necessary.	25th May 1897, by Mr. Reilly ... 28th July 1897, by Mr. Reilly. 31st August 1897, by Mr. Reilly. 28th September 1897, by Mr. Reilly. 11th November 1897, by Mr. Reilly. 16th December 1897, by Executive Engineer and Mr. Reilly. 28th January 1898, by Mr. Reilly. 28th February 1898, by the Superintending Engineer and Mr. Reilly.	This is an iron light-house and has no conductor from the top. It is connected to the earth-plate buried in the sand by a 1-inch diameter copper rod fixed at the base of the light-house. Tested and found perfect on 28th February 1898.	(1) Stays of derrick on T. head of jetty to be renewed. (2) Water-tanks to be renewed. (3) All water-tanks to be numbered. (4) All tanks to be placed on proper skids. (5) Two easy chairs to be supplied. (6) Cooking-ranges to be fixed.

Annual Report of Light-houses along the Coast of Burma for the year ending 1897-98, Rangoon Division, Public Works Department, Burma,—concluded.

Light-house.	Locality.	Description of light.	Description of light-house.	New works, additions, alterations and improvements.
1	2	3	4	5
Savage Island ...	On Island at entrance to Akyab Harbour. Latitude, N. 20° 05′ 07″. Longitude, E. 92°54′ 09″.	Dioptric, first order, white, fixed and flashing at one minute interval. Focal plane 118 feet above H. W. L. Visible from S. 45½° W. through S. and E. to N. 22½° W. 6 wick concentric Douglass burners consuming heavy mineral oil used.	Masonry round tower, painted white with white dome; built in 1844, remodelled in 1891.	(1) Racks for storing spare glass supplied. (2) Studs fitted to all burners. (3) Burner, machine and draft-pipe brushes supplied. (4) Brass swivels for halyards supplied. (5) Spare clockwork received from England. (6) Flame-spreaders supplied. (7) Snuffing scissors for lamp-gear supplied. (8) Provision bins supplied. (9) New tools supplied.
China Bakir ...	On the edge of the flats extending off the entrance to the China Bakir or Thôngwa river. Latitude, N. 16° 17′ 33″. Longitude, E. 96°11′ 09″.	Dioptric, first order, white, fixed and flashing at one minute interval. Focal plane 74 feet above H. W. L. Visible from N. E. by E. ½° E. through N. and W. to S. W. ½° S. Four wick concentric Trinity pattern burners consuming cocoanut oil used.	Braced iron screw-piled structure, painted red with white dome; built in 1868 and removed to its present site in 1876.	(1) Flagstaff with goose-neck arrangement for signalling fixed. (2) Braces on first landing secured by cotters. (3) Almirah shelf altered to suit burners. (4) Racks for storing spare glasses supplied. (5) Mandrills for burner tips supplied. (6) Wrought-iron work scraped, scaled and painted. (7) Studs fitted to all burners. (8) Burner, machine and draft-pipe brushes supplied. (9) Derrick-falls renewed. (10) Chimney locker supplied. (11) New set of tools supplied. (12) New draft-pipe with fittings supplied. (13) Lantern purdahs renewed. (14) Cases oil supplied. (15) Wash-tub supplied. (16) Canvas-hose supplied.

RANGOON:
The 16th March 1898.

Special repairs.	Ordinary repairs.	Inspections.	Lightning-conductors.	New works and repairs ordered for 1898-99.
6	7	8	9	10
Girder end opened out for ventilation; moderator valve overhauled; overflow glasses supplied; conductor-wire spliced; lantern astragals repaired; footslip re-bushed.	All painting, colour and white-washing and coal-tarring completed; all repairs to burners, machine and lamp-gear completed where found necessary.	30th April 1897, by Mr. Reilly ... 29th July 1897, by Mr. Reilly. 30th August 1897, by Mr. Reilly. 27th September 1897, by Mr. Reilly. 10th November 1897, by Mr. Reilly. 12th November 1897, by Mr. Reilly. 15th December 1897, by Executive Engineer and Mr. Reilly. 19th January 1898, by Mr. Reilly. 27th February 1898, by Superintending Engineer and Mr. Reilly.	Conductor of 1¼-inch copper wire-rope the terminal of which is a 1-inch copper-rod extending 3 feet above dome. The copper wire runs down the light-house and over the rocks and into the sea. The earth is formed of the wire coiled and placed below lowest water. Tested and found perfect, 27th February 1898.	(1) Beams in basement of light-house to be renewed. (2) Store-room to be re-constructed. (3) Fowl-house to be be re-constructed. (4) Leather in clutch-gearing to be renewed. (5) Tanks to be numbered. (6) All water-tanks to be placed on raised skids.
Weight chain re-fixed in its original position; steel pins and bushes renewed.	All painting, white-washing and coal-tarring completed; all repairs to burners, lamp-gear and tools repaired where found necessary.	27th May to 3rd June 1897, by Mr. Reilly. 9th February 1898, by Executive Engineer and Mr. Reilly. 22nd February 1898, by Superintending Engineer and Mr. Reilly. 7th to 9th March 1898, by Mr. Lyddy. 22nd to 25th March 1898, by Mr. Reilly.	Copper wire 1¼-inch rivetted to base of dome and running down the piles. It is attached to an earth-plate which is buried 5 feet below water-level. Tested and found perfect on (1) 4th April 1897, (2) 22nd February 1898.	(1) Hen-coop to be supplied. (2) All W. I. clasps below first floor level to be renewed, to be placed 12 inches above their present position, to be made of 6 inch by ½ inch W. I. double-bolted. (3) All W. I. braces below first floor level to be altered to suit the new position of the W. I. clasps. (4) New sprocket-wheel with pitch chain to be supplied. (5) The regulator-gear to be thoroughly overhauled. (6) Repairs to water-tanks.

W. G. NEWTON,
Executive Engineer, Rangoon Division.

APPENDICES.

From Commander F. M. BARWICK, R.I.M., Officiating Superintendent of Light-houses and Port Officer, Rangoon, to the Secretary to the Government of Burma,—No. 2218-13L.H.G., dated the 9th September 1897.

WITH reference to paragrah 3 of the Resolution on the report on the light-houses and light-vessels off the coast of Burma for the year 1896-97, I have the honour to forward for the information of His Honour the Lieutenant-Governor two statements giving information concerning the lights and light-vessels as called for therein.

The statements, which have been prepared in consultation with the Superintending Engineer, South-Western Circle, describe in detail Mr. Douglass' suggestions; also what have been carried out, and those not undertaken or held over are printed in red ink.

Burma Public Works Department.

Name of light-house.	Mr. Douglass' suggestion.	Action taken.
Oyster Island ...	Constructing a cast-iron tower light-house, having a first order dioptric, occulting light, burning heavy mineral oil, with red sector covering the Oyster Reef.	The new light was completed and exhibited in May 1892.
Savage Island ...	Remodelling and raising old tower and substituting a first order, fixed, and flashing dioptric light, burning heavy mineral oil, with improved dome ventilator, in lieu of the third order fixed and flashing light, burning vegetable oil.	The old tower was remodelled. It was raised 20 feet according to the designs of Lieutenant-Colonel Cummings, R.E., Superintending Engineer, Lower Burma, and a new light was exhibited in January 1891, with improved dome ventilator.
Alguada Reef ...	The undermining of the rock on the north-west side of the light-house: Mr. Douglass considered this was dangerous and that it should be attended to.	The existence of this chasm was first reported by Lieutenant Warden, late (I. N.) Superintendent of Light-houses, British Burma, in his inspection report for Alguada Reef in 1881-82; but its existence was well known to Captain Fraser, the designer and builder of the light-house. In January 1883 Colonel Moncrieff, R.E., Chief Engineer, and Mr. Tilly, Executive Engineer, worked at the chasm, *vide* paragraph 5 of the Inspection of Light-houses by Captain A. Campbell, for Alguada Reef in 1882-83. On the 14th October 1883 Captain Lloyd, R.E., Executive Engineer, inspected the chasm and suggested bore or test-holes being made (*vide* enclosure J on the Public Works Department Annual Inspection of Light-houses). These bore-holes were bored at a distance of 10 and 13 feet from edge of light-house and 7 and 4 feet from inner edge of cleft. The bottom of the bore-holes is about 11½ and 11 feet below bottom of foundation of light-house, 17½ and 17 feet below surface of reef. In the report for 1883-84 Captain Campbell, Superintendent of Light-houses, British Burma, reports under Alguada Reef that "the stability of the structure with reference to the chasm has been satisfactorily disposed of." In enclosure K (proceedings of the Chief Commissioner, British Burma, Public Works Department, No. 2125-1C.S., dated the 21st March 1884), it is reported that practically no cutting away has taken place since the light-house was built and that it is considered unwise to put any more stone into the chasm. In the report for 1889-90 the test-holes were sounded and found normal, and it was then reported that the chasm was not in communication with the bore-holes. In the report for 1890-91 test-holes again sounded and found normal. In the report for 1891-92 it is reported that there is not such a proximate danger owing to the chasm.

Burma Public Works Department—continued.

Name of light-house.	Mr. Douglass' suggestions.	Action taken.
Alguada Reef—*concluded.*	.....	In the report for 1892-93 test-holes sounded and found normal. In the report for 1893-94 Captain Wilson, R.I.M., Superintendent of Light-houses, reports that no perceptible alteration appears to have taken place in the chasm since 1881. In the report for 1895-96 it is reported that the chasm appears to be in the same state as it has been for years. In the report for 1896-97 it is reported that there seems no sign of denudation of the rock or of increase in the chasm. There appears, therefore, no necessity at present of going to the large expenditure which would be involved in carrying out the suggestion of Mr. Douglass of closing the chasm.
	Making floors, beams, and ladder stringers of iron or of some other uninflammable material.	There is no mention made of this suggestion in any of the reports on the light-houses. It is not considered necessary to take up this suggestion till the time comes for renewing the timber, which, under ordinary circumstances, will not be long in approaching.
	The chimney of the cooking-stove in the light-house to be carried through the lantern.	Before the platform-room was completed all the cooking used to be done in the light-house. In report on light-houses for 1889-90 it is stated that the stove-pipe in the light-house was provided with an elbow and bowl piece to prevent smoke being driven into the chambers above. These parts are still in the light-house. Since the completion of the platform-room in 1889, the cooking has always been done there and not in the light-house. It is under consideration to shift the cooking-stove from its present site to one adjoining the platform-room. This disposes of Mr. Douglass' suggestion.
	To cement-point the internal and external surface of the light-house.	The whole of the light-house externally was pointed with cement in 1891-92 (*vide* report). In the report on light-houses for 1892-93 it is reported that the cement-pointing for the inside of the light-house was not necessary, the cement-pointing outside having turned out a thoroughly satisfactory job.
	A first order dioptric flashing light of 100,000 candle power.	In the report for 1892-93 the subject of altering the light is mentioned for the first time. In the report for 1896-97 the subject was again brought up and proposals are being submitted to the Government of Burma, as it is now considered that the machinery of the present light has now, through ordinary wear, approached a state which will necessitate its renewal in a very few
	Deficiency of ventilation in the light-room.	The new and improved style of dome ventilation, as recommended by Mr. Douglass, was put up in January 1896.
Table Island ...	Deficiency of ventilation in the light-room.	The new and improved dome ventilator, as recommended by Mr. Douglass, was put up in November 1895 and holes were bored in the timber floor. In 1892-93 the new ventilating pipes at base of light-room were also fixed.
	To convert the present first order (vegetable) dioptric fixed light into a first order dioptric occulting light, burning heavy mineral oil.	Mention is made of this suggestion in the report on light-houses for 1892-93, namely, of converting the first order dioptric fixed (vegetable) light into a first order dioptric occulting burning heavy mineral oil, but it has not been considered absolutely necessary to carry out this suggestion up to the present, and nothing has been done.
China Bakir ...	Want of stability in the structure.	Since 1883 regular and periodical soundings are taken round the light-house and recorded. In the report on light-houses for 1896-97 it is stated that the height from the sand to platform was

Burma Public Works Department—continued.

Name of light-vessel.	Mr. Douglass' suggestions.	Action taken.
China Bakir—*concluded.*		measured and found normal, and no signs of foundation scouring. Vibration in the light-house appears to be diminishing. There are fewer panes of glass broken than formerly. It is under consideration to renew the bottom clasps by using a heavier section of wrought-iron The broken panes of lantern glass were renewed in 1893-94.
	Damaged prisms	There is no mention made about renewing these damaged prisms in the reports. They were renewed and the old ones brought into Rangoon and destroyed in 1891-92.
	Deficiency of ventilation in light room.	The new improved dome ventilator, as recommended by Mr. Douglass, was put up in 1896 and the timber floors were pierced with holes.
	The present fixed and flashing first order, dioptric light, burning vegetable oil, to be substituted by a first order, dioptric, fixed, and flashing, having six wick burners and pressure lamps, burning heavy mineral oil.	In the report on light-houses for 1892-93 mention is made about supplying suitable burners for burning heavy mineral oil. Since then nothing has been done. It was not considered absolutely necessary to make any alteration.
Eastern Grove ...	Want of stability in the structure.	In the report for 1889-90 it is reported that there has been no scour at the piles. In the report for 1890-91 it is reported that the foundations of the piles seemed sound, no scour round the piles having taken place. In the report for 1891-92 it is reported that the rock ballast round piles was stable. In the report for 1893-94 it is reported that the foundations of the building appear to be as formerly, the brace collars being about 1 foot above the ballast originally placed to prevent the mud from shifting It is proposed to take up the stone ballast and relay it, and to take and record the height from ground to platform level as is done at China Bakir during the working season 1897-98. During current year the ballast was observed to be about normal, but slightly timbled about. This has now been rearranged. The foundations appear at the present time to be as efficient as they were when the light-house was first constructed.
	Pressure lamps burning heavy mineral oil suggested in lieu of the vegetable lighting gear.	The new pressure lamps with three-wick Douglass burners for mineral oil were fitted up in May 1893.
	Fixed, second order, dioptric light, to be converted into a second order, dioptric, occulting light, having a coloured sector to mark the dangerous approach.	The light was converted from a second order, fixed dioptric into a second dioptric, occulting, in May 1896. The placing of a red sector was deferred and approved of by Local Government in Commerce Department letter No. 500H.-9, dated 20th November 1894.
	Deficiency of ventilation in light-room.	In the report for 1891-92 it is remarked that more floor ventilation is given to the light-room. Ventilation has been improved by boring holes in the hole. The ventilation, as at present, appears to be efficient.
Double Island ...	Lantern gallery too light in construction and lantern pedestal coping not of sufficient weight.	In report for 1889-90 it is stated that the corrugated iron gratings round the balcony of the light-house were strengthened with wrought-iron brackets. In the report, 1893-94, mention is made of the lantern gallery having been strengthened Six corrugated iron brackets have been placed under the timber girders of the light-room, and the pedestal coping has been tied by an iron band. During the working season of 1897-98 it is proposed to strengthen the top by inserting wrought-iron brackets.
	Trinity burners of improved type to be supplied.	Three new Trinity burners for colza oil were supplied in 1896.
	Steps in landing to be cut ...	This was completed in 1895.
	Deficiency of ventilation in light-room.	A new and improved dome ventilator as recommended by Mr. Douglass was fitted up in 1895.

Burma Public Works Department—concluded.

Name of light-house.	Mr. Douglass' suggestions.	Action taken.
Reef Island ...	Altering character of light and substituting six-wick burners for heavy mineral oil.	Mention is made of this suggestion in the report for 1892-93. In the report for 1893-94 it is stated that the improvement to the light is not considered to be necessary at present.
	Ventilation in light-room defective.	This was rectified in 1894.
	Lightning-conductor for light-house.	Conductor fitted in 1891. It is under consideration to extend the conductor towards the sea as good earth cannot be obtained on land. This will be done during the present working season, and it is hoped that the result will be entirely satisfactory.

Light-vessels.

Name of light-vessel.	Mr. Douglass' suggestions.	Action taken.
Kemmendine, late *Krishna*, Krishna Shoal station.	The name of the vessel to be painted on both sides of the vessel.	This has been done.
	The lantern is inefficient in size and ventilation for the proper manipulation of the flame; light is deficient in character and intensity suggests a flashing light using mineral oil.	Improved group flashing white light exhibited from April 1893.
Danidaw Baragua Flat station.	A light-vessel, powerful flashing light.	This vessel was placed in position in November 1896, exhibiting a red and white flashing light.
Martaban spit station	Leading light at Elephant Point	This has been done by the Port Commissioners, Rangoon.
	Coloured sector from Eastern Grove.	*See* remarks on Eastern Grove light.
	Light inefficient in power and character.	It is proposed to exhibit a 12-mile light about the end of November 1897 or as soon after the arrival of the new light-vessel from Calcutta.

From the Secretary to the Government of Burma to the Port Officer, Rangoon,—No. 130-H.—29, dated the 6th October 1897.

WITH reference to your letter No. 2218-13L.H.G., dated the 9th September 1897, I am directed to communicate the following remarks and orders.

2. *Alguada Reef Light-house.*—The chasm below this light-house seems not to be a source of danger. A report on its state should be embodied in the light-house report each year. The cement pointing of the inside of this light-house also does not appear to be of vital importance and may be left alone.

Table Island Light-house.—Mr. Douglass' recommendations were made on the principle that fixed lights were liable to be mistaken for others, such as ships' masthead lights. There is no other objection to the apparatus of this light-house which has been reported to be in good order in the annual reports. Under these circumstances the Lieutenant-Governor is of opinion that as the light is isolated no present action is necessary.

China Bakir Light-house.—I am to ask whether you consider any alteration of the light necessary.

Reef Island Light-house.—As regards this light I am to ask whether, as was contemplated in 1891, the old Savage Island light cannot be placed there with advantage.

From Commander H. S. BLACK, R.I.M., Port Officer, Rangoon, to the Secretary to the Government of Burma,—No. 3606-13L.H.G., dated the 15th December 1897.

IN reply to your Commerce Department letter No. 130-H.—29, dated the 6th October last, I have the honour to submit the following remarks for the information of His Honour the Lieutenant-Governor.

Alguada Reef Light-house.—The report on the chasm will be embodied in the light-house report annually.

China Bakir Light-house.—The present light is in good order and no complaints have been made by masters of vessels visiting Rangoon regarding its power of visibility ; there is therefore no necessity at present for substituting six wick-burners and pressure lamps for heavy mineral oil.

Reef Island Light-house.—The placing of the old Savage Island light at this station would be expensive to maintain, necessitating an increase in establishment, provisions, oil, and stores, besides outlay in replacing the damaged prisms which will be considerable, and the small number of vessels calling at Tavoy does not warrant the increased expenditure to Government.

The present light is quite sufficient for the present requirements of the port.

G. B. C. P. O.—No. 2468, B. S., 21-6-98—230.

THIRTY-FIRST ANNUAL

REPORT ON THE LIGHT-HOUSES AND LIGHT-VESSELS OFF THE COAST OF BURMA

FOR

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