

(1) பக்கங்களின் எண்ணிக்கை

(2) புதுக்கித் திருப்பிய நாள்

(3) ஆதாரம் குறிப்பவர் கருக்கம்

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

ச. வ. 2

துறை

அரசாணை எண். 3164
மு. கோப்புத் தாள் எண்.

அச்சகம்
பலன்கை

நாள் : 6.12.1883

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மடிக்கவேண்டிய கையாள்வோ கட்டாகு.

ஆவண. கா. 1-18,006-6-9-90.

16TH NOVEMBER 1893, No. 329, MARINE.

GOVERNMENT OF MADRAS.
MARINE DEPARTMENT.

READ—the following paper:—

From Lieutenant-Colonel R. R. E. DRAKE-BROCKMAN, R.E., Chief Engineer for Irrigation, to the Chief Secretary to Government, dated Madras, 25th October 1893, No. 58-W.

I have the honour to forward the accompanying report on experiments with the new optical apparatus for the Madras Lighthouse submitted by Mr. Ashpittel with reference to G.O., No. 435, dated 3rd May 1893, Financial Department.

ENCLOSURE.

REPORT ON EXPERIMENTS WITH THE NEW OPTICAL APPARATUS FOR THE MADRAS LIGHTHOUSE.

Object of the Experiments.—The experiments were sanctioned in G.O.,* No. 1381 W., of 20th May 1893, and were undertaken for the purpose of determining the intensity of the beam from the new optical apparatus for the Madras Lighthouse burning full and half power. This determination was considered necessary to fix approximately the power which should be given to lights on the coast of this Presidency and also to classify them according to the system now being introduced by the British Lighthouse Boards in the event of that system being introduced into India. In this system lights will be classified according to the candle-power instead of the diameter of the apparatus, which latter gives no indication of the real power of the light or distance at which it is likely to be visible.

* G.O., No. 435, dated 3rd May 1893, Financial Department.

2. *Optical Apparatus.*—The optical apparatus for the new Madras Lighthouse is a 3rd order, double-flashing, 8-sided apparatus of 80° vertical angle with a 4-wick, new-pattern, Douglass burner in the focus. It was set up in its lantern as nearly as possible under service conditions and a shed was erected 300 feet distant, in which the photometrical observations were made.

3. *Photometers.*—The photometers used were an ordinary bar photometer with a star disc and a Foucault shadow photometer. The former was used to compare the standard lamp with the Parliamentary candle, and the latter the beam from the optical apparatus with the standard lamp. The Foucault photometer was also used to check the value of the standard obtained by means of the bar photometer.

4. *Standard.*—The standard used was an ordinary Argand lamp.

5. *Oil.*—The oil used was heavy mineral oil obtained from the Presidency Port Officer.

6. Throughout the proceedings much assistance was rendered by Mr. Stephens, Assistant Engineer, Public Works Department, and Mr. Plumer, Overseer, Public Works Department, in fixing the apparatus and constructing the photometrical shed, and by Mr. Cotterell, the Lighthouse Mechanic attached to the Presidency Port Office, who gave up a portion of his leave to assist in the experiments.

7. *Observations.*—The observations were made on 4th May 1893 and the following days:—

4th May.—On this and the succeeding evenings the observations were mainly undertaken in order to familiarize the operators with the various instruments and apparatus.

8th May.—The lighthouse apparatus was compared with the standard lamp with the result that the intensity of the beam was determined to be 18,638 candles when burning full power. It was, however, evident that one of the lantern astragals intervened between the photometer and the focus and consequently it was decided to move the shed so as to avoid this obstruction.

10th May.—The photometer shed had since the trials of the 8th been moved, and the beam from the main light carefully directed on to the photometer. The trials commenced at 9-40 P.M. with a comparison between the lighthouse apparatus burning full power and the standard lamp, and a mean result of comparisons made between 9-40 and 11-30 was an intensity of 23,370 candles. The next trial from 12-30 to 1-15 was between the lighthouse apparatus burning half power and the standard lamp, and a mean intensity of 7,375 candles was obtained. As it was thought that the standard had varied during the first set of readings, it was decided to repeat the comparison between the lighthouse apparatus burning full power and standard lamp. The result of these further trials was a mean intensity of 22,538 candles, making the mean intensity of the beam from the lighthouse apparatus for both sets of experiments 22,954 candles.

8. *Service Intensity.*—The flame throughout the evening was maintained as nearly as possible according to the height shown on the Trinity House diagram of flames and there was no attempt to obtain a maximum result. The Trinity House flame is, however, higher than is likely to be maintained in any lighthouse especially when the burner is in charge of native keepers, and therefore, allowing for contingencies and the gradual deterioration of the apparatus, it will probably be better to fix the service intensity of the light at 18,000 candles when burning full power and at 5,500 candles when burning half power.

Half power will probably be sufficient.—The focal plane of the new Madras light is said to be 166 feet above H.W.L. and the corresponding geographical range, assuming a co-efficient of refraction of 0.08 and that the observer's eye is 15 feet above water level, will be (say) 19 miles. The luminous range should also be 19 (marine) miles. Assuming that the atmosphere on the coasts of Madras is not more impaired by fog and mist than that of the Mediterranean coast of France, the range of 9.6 candles (one carcel) will exceed 6.5, 7.5, 8.6 kilometers during $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ of the year, and the range of the new Madras light burning full power should exceed 20, 29, 48 miles, respectively, for those fractions of the year. Burning half power of 5,500 candles, these ranges become $16\frac{1}{2}$, $23\frac{1}{2}$ and $37\frac{1}{2}$ miles, and it therefore appears to be perfectly safe to assume that full power will not be required for six months in the year and possibly will never be required at all. This question can, however, only be settled by actual observation and experience after the light has been exhibited for some time, but is worth investigation as, if half power proves to be sufficient for all practical purposes throughout the year, a saving of more than 50 per cent. in the consumption of oil can be effected and the temperature in the lantern much reduced. The temperature inside the lantern is of considerable importance as, if it can be kept comparatively low, the light is likely to be much more carefully tended by the keepers.

(Signed) F. W. ASHPITEL,
Asst. Ch. Engr. and Under Secy.
to Govt., P.W.D., Irrign. Br.
(") C. MICHIE SMITH,
Ag. Govt. Astronomer.
(") R. LI. JONES,
Professor of Physics, Presy. College.

MADRAS,

16th October 1893.

To the Chief Engineer for Irrigation.

ORDER—dated 16th November 1893, No. 399, Marine.

Recorded.

2. The gentlemen who conducted the experiments will be thanked for their interesting report.

3. A copy will be forwarded to the Director-General of Stores, India Office.

(True Extract.)

Hedderley
Chief Secretary.

To the Presidency Port Officer.
" the Public Works Department.
" F. W. Ashpitel, Esq.
" C. Michie Smith, Esq.
" R. Li. Jones, Esq.

Document No. 10274

Gobt. of {1893} Madras.
MARINE.

27.4-93. 1882 C

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Issued

105 C

Recd.

4-12-93

Encl.

G.O., 16th Nov. 1893, No. 399.

NOVEMBER.

New Optical Apparatus for the
Madras Lighthouse.

Recording letter from the Chief Engineer for
Irrigation forwarding report on the experiments
with the — directing that the gentlemen who
conducted them be thanked for their report, and
that a copy of it be forwarded to the Director-
General of Stores

C.S.

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