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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 3174-75 Press / Mis.

132-133-134

Dated 5-10- 1886.

Not to be folded or roughly handled

No. 132. Read the following Endorsement of the Superintending Engineer of the 4th Division, dated Madras, 24th September 1866, No. 2,302.

Read the following :—

Notes on the "Pharos Lamp."

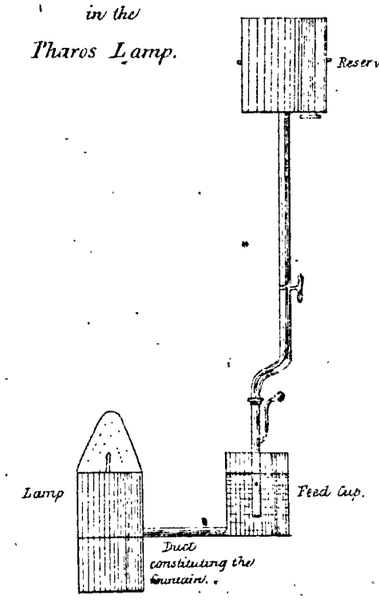
1. The orders of Government direct that the "Pharos Lamp" should be set up within the Barrack Square; on enquiry, however, it was ascertained that the Parade Square was the intended site; it has accordingly been placed near the statue to obtain a wider range of illumination.

2. The lamp was first lighted on the 4th July 1866, and has been exhibited on fifteen different nights, in the absence of moon-light and under trial on other three occasions for experiment, and for determining the intensity of the light, and although there has been considerable interruption in the series, owing to derangement of the lamp from the fusion of the (soft) solder, ample opportunity has been afforded of judging of its illuminating power, and of its advantages, or otherwise, for the purpose contemplated. It may suffice here to state that the results are unfavorable to its adoption as a Barrack light, but that it may be found useful, though not with the present form of lantern, for lighting the platforms of Railway stations, or for junction signal lights.

3. No description or instructions having accompanied the lamp, the following account may in some measure supply a want which was much felt at the commencement of these trials.

4. The lamp on the argand fountain principle, consists of a waste receiver supporting a burner of four concentric wicks, with rack adjustments, a plain glass chimney, a closed oil reservoir, and an open feed-cup, which receives the oil from the reservoir by means of a pipe, the lower portion of which is adjustable. In this portion, near its lower extremity, there is an "air hole," which, when exposed, permits the ascent of air to the void in the reservoir, whereby the oil is forced down the pipe, and replenishes the feed-cup to an extent depending on the pressure of the external atmosphere.

Sketch illustrating the Feeding Apparatus in the Pharos Lamp.



5. The cup is connected with the burner by a duct, through which oil is conveyed to the wicks.

6. The lamp is enclosed in an inverted glazed pyramidal-shaped lantern, the top of which is formed of two conical frustra of sheet iron, joined base to base, constituting, when the lamp is lighted, a hot air chamber, in which the oil reservoir is placed, an arrangement especially necessary in cold climates to maintain the oil in a state of liquefaction.

7. The flue, carrying a damper, passes through the chamber into the lantern sufficiently to connect it with the glass chimney, thus guarding against smoke, &c., escaping into the lantern.

8. The whole is supported on an iron pillar with cross bars, and foot-board at the top, and a ladder is fixed to one side, for the purpose of getting access to the lantern.

9. In arranging the lamp some care is necessary in adjusting the position of the air hole in reference to the level of the oil in the burner. It depends mainly on the viscidity of the oil, the capillary action of the wicks, and on the temperature of the air chamber. With the limpid oils of this country, although the position of the air hole may have been apparently rightly determined,

there is still a tendency to overflow the burner, especially as the temperature increases, and, in the earlier trials, the adjustments had to be repeated, before the exact position could be ascertained.

10. Attention is also necessary to the position of the damper by which the draught is regulated, and to the state of the wicks, the neglect of which may cause the burner to become overheated.

11. Should the heat become such as to vaporise the oil too rapidly, flame may be communicated to the oil in the waste receiver, and the working parts would be liable to be disconnected by the fusion of the solder.

12. An accident of this kind occurred on two occasions when using lamp-oil, combustion being so great during strong gusts of wind, that the damper had to be entirely shut, and the lamp, extinguished.

13. It is evident, therefore, that the management of the lamp cannot be entrusted to inexperienced hands, and that frequent attention as to its condition cannot be dispensed with.

4th to 13th July 1866.

14. The earlier experiments with this lamp in the Fort were made with cocoanut-oil usually considered to be the most suitable oil in this country for argand lamps. The lamp was first arranged by one of the Light-house keepers, with the view to instruct the Barrack attendants in its future management. It was evident however,

4th.

on the lamp being lighted, that they had obtained but a very imperfect idea of its action, and under pretence of watching it, were frequently supplying oil to the feed-cup, by opening and shutting the stop-cock of the reservoir pipe; under such conditions the light was necessarily intermittent and unsatisfactory.

15. On checking this interference with the natural action of the fountain, and causing a re-adjustment of the air hole, the light became more steady, and comparatively brilliant, though there were occasional indications of a too rapid supply of oil, which were subsequently confirmed by the light being extinguished by a sudden overflow about 11 P. M., the temperature of the lantern being considerably raised.

5th July.

16. On the following day the lamp was taken to the Barrack Master's office, and the mode of adjustment more fully explained, one of the Light-house keepers being present. It then appeared that the men had been alarmed at the gurgling noise caused by the ascent of air up the pipe to the void in the reservoir, and that they had kept up the supply of oil by hand "for fear of some accident." The stiffness of the sliding-tube had also prevented a sufficient depression of the air hole into the oil in the feed-cup.

17. The consumption of oil, under these conditions, irregular as they had been, was 9 of a gallon in four and a quarter hours, about half a pint of oil being in the receiver.

To 13th July.

18. On subsequent occasions the lamp giving apparently a maximum intensity of light, as evidenced by a full conical flame, the absence of smoke, and small carbonization of wick, the consumption from six trials was found to be at the rate of a quart of oil an hour. The unconsumed oil in the receiver being about the same 1½rd pint on each occasion.

19. At this rate the nightly consumption of cocoanut-oil would be 2½ gallons or 912½ gallons per annum. The cost as furnished by the Commissariat Department would be Rupees 1,882-0-0 at Rupees 2-1-0 per gallon.

20. According to data obtained from the Traffic Manager of the Madras Railway, an argand lamp of ¾ inch wick, burning for short periods, consumes 2½ ounces of cocoanut-oil per hour. This would give about 57 gallons per annum, the cost being Rupees 117-9-0.

21. The consumption of the Pharos lamp is therefore equal to that of sixteen argands.

Proceedings of the Madras Government, Public Works Department, 5th October 1866.

22. The quantity of oil consumed by a burner used in the first order of dioptric sea lights, of which the Pharos burner is a copy, is stated not to exceed 570 gallons of sperm oil per annum. The former, however, is fed mechanically.

23. The quantity of sperm oil required for an argand lamp of one inch wick is given at "one-third gill per hour for the standard lamp of the Trinity Board." The annual consumption would thus be about 38 gallons per annum, or equal to that of fifteen argands of one inch wick.

24. Subsequent experiments were made with lamp-oil, which is of greater viscidity than cocoanut or ground-nut oil, and is richer in the elements of combustion. The first trial was made on the 14th July 1866, and the improvement in the light was very evident, though it is not usually considered to be a suitable oil for argand lamps.

25. The light though of a slightly yellowish tinge, was very clear and brilliant, but as might have been expected was attended with considerable evolution of heat. As the oil became warm the light increased, illuminating the Parade Square, and casting shadows of objects on the walls of the buildings opposite.

26. It was intended that the lamp should continue to burn during the night to obtain fair data as to the rate of consumption of oil, but about 2-30 A. M., during rain and strong gusts of wind, the draught was much increased, and combustion became so active that the damper had to be entirely shut, and the lamp extinguished, but not before the heat had fused the soft solder of the rack adjustments, and disconnected them from the burner. It was afterwards seen that the oil in the receiver had been completely decomposed.

27. The consumption of oil during 7¾ hours the lamp was burning was ⅝ths of a gallon, giving an hourly rate of 3½ gills. The cost at Rupees 2-1-0 per imperial gallon would then be Rupees 1-11-6, and the annual rate per night of ten hours Rupees 777-4-0.

28. The lamp was sent to the Workshop of the Department Public Works for repair, but failed on trial, the whole of the junctions being rendered more or less imperfect.

29. It was evident that harder solder, having a higher point of fusion, must be used to withstand the heat evolved, especially from lamp-oil.

30. The lamp was finally put together after some delay, and difficulty from the thinness of the parts, with chloride of zinc fused under a blow pipe.

24th August 1866.

31. The lamp was then tested in the gallery of the water cisterns of the Fort, and showed no signs of yielding. Measures were taken at the same time of the illuminating power of the two oils previously used.

32. These experiments, however, can only be considered approximate, as from want of ventilation in the gallery, the light was not at a maximum brightness. The results are given further on.

33. On the 1st and 2nd September the lamp was lighted for the observations of the Superintending Engineer, 4th Division, who had been absent on leave. The consumption of oil confirmed the previous result as to quantity, but on these occasions to guard against overheating of the burner, the door of the lantern was kept open, as it was inferred that the lantern was very imperfectly ventilated; and such is evidently the fact, as the lamp was comparatively cool on being extinguished.

34. The light on the 1st, from a mixture of lamp and cocoanut-oil, was bright, but was not so clear as with cocoanut-oil alone. On the following night the lamp was fed with cocoanut-oil, the door of the lantern being again open. The light was considered to be now much improved, and the temperature of the lantern and state of the wicks confirmed the previous impression, that the ventilation of the lantern is defective.

Illuminating power.

35. In order to observe the full effect of the lamp, it has only been lighted in the absence* of moon-light, when the contrast with the surrounding darkness would be more apparent.

* Except in one instance.

36. Generally speaking, the light may be termed strong and good, but by no means powerful, which more appropriately distinguishes the light from Parafine or Kerosine oils.

37. The Parade Square, when the lamp is burning well, is fairly illuminated; and shadows are cast on the opposite walls of the Adjutant General's office, about 100 yards distant.

38. Photometrical measurements in the water gallery gave mean results as follows, compared with an argand of $\frac{7}{8}$ inch with—

Cocoanut-oil, illuminating power... ...	10·9 to 1.
Lamp-oil do.	12·2 to 1.

39. These experiments, owing to a smoking of the lamp in an imperfectly ventilated gallery, (the ventilators being closed to exclude day-light,) can only be considered approximate. Subsequent experiments in the office, the photometer being a highly polished ball, and the images being magnified, gave mean results with—

Lamp-oil, illuminating power	12·9 to 1.
Cocoanut-oil, do.	11·5 to 1.

40. The argand consuming cocoanut-oil in each trial.

41. An attempt was made to institute a comparison with the argand fed with lamp-oil, but failed, the oil being too viscid and givingbuta faint light.

42. Sperm or colza-oil, for which the Pharos lamp is adapted, not being procurable, no experiments could be made as to the comparative illuminating power over the two oils used in these trials, but taking the statement previously given as data, it may be inferred that the Pharos light with the oils of this country is by no means economical, and its adoption as a Barrack light cannot be recommended.

43. As a Railway junction or platform light, in a properly constructed movable lantern with reflectors, it may probably be found useful, as the light can be diminished at pleasure, and concentrated on any point as circumstances require.

(Signed) W. K. WORSTER, Colonel,
Barrack Master.

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1. The foregoing Memorandum and Notes of experiments on the Pharos Light by the Barrack Master, Colonel Worster, R. A., are forwarded to Government, with reference to their Orders Nos. 696 and 1,829, dated 1st March and 10th June 1866.

2. The Superintending Engineer was absent on leave during the various trials of the lamp referred to by the Barrack Master and saw it lighted only once, when he was disappointed with the light given out.

(Signed) A. J. M. BOILEAU, Colonel, R. E.,
Superintending Engineer, 4th Division.

No. 133. ORDER THEREON, 5th October 1866, No. 3,174.

CIVIL WORKS, No. 28.

1. Ordered that a copy of the papers above recorded be forwarded to the Right Honorable the Secretary of State for India.

Proceedings of the Madras Government, Public Works Department, 5th October 1866.

2. His Lordship in Council observes that the Barrack Master is of opinion that it would not be advisable to introduce the "Pharos Lamp" for the illumination of Barrack squares in India.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Superintending Engineer, 4th Division.
,, Barrack Master.
,, Military Department.
,, Consulting Engineer for Railways.
,, Officer in charge of the Store Department.

Exd. S. T. Augustin.

2. His Lordship in Council observes that the Barrack Master is of opinion that it would not be advisable to introduce the "Pharos Lamp" for the illumination of Barrack squares in India.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

No. 134. *Docket No.* 3,175, *dated 5th October* 1866.

Copy forwarded to the Superintendent of Police and Chairman of the Managing Municipal Committee at Surat with reference to his letter dated 17th August 1866, No. 87.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

Exd. S. T. Augustin.

Burns on the Pharos lamps erected
at the Parade Sunderland Light House

The light from a lamp of this description
used in 1st class sea lights is stated there
equal to 16 or 20 argands and consumes
a proportionate quantity of oil: Sperm
or Colza - the Argands having a 1" wick.

The average consumption of oil
of the Pharos lamps is one quart of
Cocoa nut oil per hour or 2½ gallons
per night, the light being equal to that
of 10 Argand lamps of 7/8" wick.
The cost of 2½ gallons at 2-1 per gallon
is 5-8 — the intensity of light was deter-
mined in the Picture gallery by three
Off. of Engineers.

Sergt Stewart
Bombardier
Capt Goddard

With Lamp oil the consumption
is 5/16 of a gallon per night or nearly
3½ gills per hour the light being as
12·2 to 1 — the cost 1-11 6 per night.

The light has been exhibited
upon dark nights - on the dates as per
margin - as the Lamp oil was
found when the heat was such that the
sinking pumps became disconnected,
from the freezing of the solution which
was found to be of 15 degrees.

4th July
5th

After considerable delay & difficulty
the lamps have been put together with
the fresh chloride of zinc & is now
far stronger & better adapted for it-
purpose than formerly.

The result of the experiments appears
unfavorable both as to cost & illumi-
nating power. However its economy

Pharos Light

28 Augt

Mk. File

2647

From
The Barrack Master

Dated
Rec'd August 6 1866.

A B

C No 3947/66

Memo on the
Pharos Lamp erected
in the Parade or Square
for Signalling Purposes

The Lamp
lighted at
Picture of
Square
Colchester
be pro

Notes on the Pharos Lamp.

The Orders of Government direct that the Pharos Lamp should be set up within the Barrack Square; on enquiry however, it was ascertained that the Parade Square was the intended site: it has accordingly been placed near the statue to obtain a wider range of illumination.

2. The lamp was first lighted on the 4th July 1866 and has been exhibited on 15 different nights, in the absence of moonlight, and under trial on other three occasions for experiment, and for determining the intensity of the light, and although there has been considerable interruption in the series, owing to a derangement of the lamp from the fusion of the (soft) solder, ample opportunity has been afforded of judging of its illuminating power, and of its advantages, or otherwise, for the purpose contemplated. It may suffice here to state that the results are unfavorable to its adoption as a Barrack light, but that it may be found useful - though not with the present form of Lantern - for lighting the Platforms of Railway Stations, or for junction signal lights.

No description or instructions having accompanied the lamp, the following account may in some measure

supply a want which was much felt at the commencement of these trials.

4. The lamp on the argand-fountain principle consists of a waste receiver supporting a burner of four concentric wicks, with rack adjustments; a plain glass chimney; a closed oil reservoir, and an open feed cup, which receives the oil from the reservoir by means of a pipe, the lower portion of which is adjustable. In this portion, near its lower extremity, there is an "air hole," which, when exposed permits the ascent of air to the void in the reservoir, whereby the oil is forced down the pipe, and replenishes the feed cup to an extent depending on the pressure of the external atmosphere.

5. The cup is connected with the burner by a duct, through which oil is conveyed to the wicks.

6. The lamp is enclosed in an inverted glazed pyramidal shaped lantern, the top of which is formed of two conical frustra of sheet iron joined base to base, constituting, when the lamp is lighted, a hot air chamber in which the oil reservoir is placed. An arrangement especially necessary in cold climates to maintain the oil in a state of liquefaction.

7. The flue, carrying a damper, passes through the chamber into the lantern sufficiently to connect it with the glass chimney thus guarding against smoke &c. escaping into the lantern.

8. The whole is supported on an iron pillar with cross bars and foot board at the top, and a ladder, fixed to one side, for the purpose of getting access to the lantern.

9. In arranging the lamp some care is necessary in adjusting the position of the air hole in reference to the level of the oil in the burner. It depends mainly on the viscidity of the oil, the capillary action of the wicks and on the temperature of the air chamber. With the limpid oils of this country, although the position of the air hole may have been apparently rightly determined there is still a tendency to overflow the burner, especially as the temperature increases, and in the earlier trials the adjustments had to be repeated before the exact position could be ascertained.

10. Attention is also necessary to the position of the damper by which the draught is regulated, and to the state of the wicks, the neglect of which may cause the burner to become over-heated.

11. Should the heat become such as to vaporise the oil too rapidly, flame may be communicated to the oil in the waste receiver, and the working parts would be liable to be disconnected by the fusion of the solder.

12

An accident of this kind occurred on two occasions of using lamp Oil, combustion being so great during strong gusts of wind, that the damper had to be entirely shut, and the lamp extinguished.

13. It is evident therefore that the management of the lamp cannot be entrusted to inexperienced hands, and that frequent attention as to its condition cannot be dispensed with.

14. The earlier experiments with this lamp in the Fort, were made with Cocoanut Oil, usually considered to be the most suitable oil in this country for argand lamps. The lamp was first arranged by one of the light house keepers, with the view to instruct the Barrack attendants in its future management. It was evident however on the lamp being lighted, that they had obtained but a very imperfect idea of its action, and under pretence of watching it, were frequently supplying oil to the feed cup by opening and shutting the stop cock of the reservoir pipe; under such conditions the light was necessarily intermittent and unsatisfactory.

4th to 13th July 1866.

15. On checking this interference with the natural action of the fountain, and causing a re-adjustment of the air hole, the light became

17

became more steady, and comparatively brilliant, though there were occasional indications of a too rapid supply of oil which were subsequently confirmed by the light being extinguished by a sudden overflow about 11 P.M.; the temperature of the lantern being considerably raised.

5th July

16. On the following day the lamp was taken to the Barrack Masters office, and the mode of adjustment more fully explained, one of the light house keepers being present. It then appeared that the men had been alarmed at the gurgling noise caused by the ascent of air up the pipe to the void in the reservoir, and that they had kept up the supply of oil by hand "for fear of some accident." The stiffness of the sliding tube had also prevented a sufficient depression of the air hole into the oil in the feed cup.

17. The consumption of oil under these conditions irregular as they had been, was .9 of a Gallon in 24 hours about half a pint of oil being in the receiver.

13th July

18. On subsequent occasions the lamp being properly arranged and burning steadily, giving apparently a maximum intensity of light, as evidenced by a full conical flame, the absence of smoke, and small carbonisation of wick, the consumption from 6 trials was found to be at the rate of a quart of oil an hour. The unconsumed oil in the

receiver

receiver being about the same 1/3 pint on each occasion.

19 At this rate the nightly consumption of Cocoanut Oil would be 2½ Gallons or 912½ Gallons per annum. The cost as furnished by the Commissariat Dept⁴ would be Rupees 1882 —"—6 at Rs 2-1—" per Gallon.

20. According to data obtained from the Traffic Managers of the Madras Railway, an argand lamp of 7/8 inch wick burning for short periods consumes 2½ oz of Cocoanut Oil per hour. This would give about 57 Gallons per annum. the cost being Rs 117-9—"

21. The consumption of the Pharos lamp is therefore equal to that of 16 Argands.

22. The quantity of oil consumed by a burner used in the 1st order of dioptric Sea lights, of which the Pharos burner is a copy, is stated not to exceed 570 Gallons of Sperm oil per annum. The former however is fed mechanically.

23. The quantity of Sperm oil required for an argand lamp of 1" wick is given at 1/3 gill per hour for the standard lamp of the Trinity Board. The annual consumption would thus be about 38 Gallons per annum. or equal to that of 15 argands of 1" wick.

24. Subsequent experiments were made with Lamp Oil which is of greater viscidity than Cocoanut or Groundnut Oil

oil and is richer in the elements of combustion. The first trial was made on the 14th July 1866 and the improvement in the light was very evident, though it is not usually considered to be a suitable oil for argand lamps.

25. The light though of a slightly yellowish tinge was very clear and brilliant, but as might have been expected was attended with considerable evolution of heat. As the oil became warm the light increased illuminating the parade Square and casting shadows of objects on the walls of the buildings opposite.

26. It was intended that the lamp should continue to burn during the night to obtain fair data as to the rate of consumption of oil, but about 2.30 A.M. during rain and strong gusts of wind the draught was much increased, and combustion became so active that the damper had to be entirely shut and the lamp extinguished, but not before the heat had fused the soft solder of the rack adjustments, and disconnected them from the burner. It was afterwards seen that the oil in the receiver had been completely decomposed

27 The consumption of oil during 7¾ hours the lamp was burning was 5/6 of a Gallon, giving an hourly rate of 3½ Gills. The cost at Rs 2-1—" per Imperial Gallon would then be Rs 1-11-6 and the annual rate per night of 10 hours Rs 777-4—"

28 The lamp was sent to the Workshop of the D.P.W. for repair, but failed on trial, the whole of the junctions being rendered more or less imperfect.

29 It was evident that harder solder, having a higher point of fusion, must be used to withstand the heat evolved, especially from lamp Oil.

30. The lamp was finally put together after some delay, and difficulty from the thinness of the parts, with chloride of Zinc fused under a blow pipe.

31. The lamp was then tested in the gallery of the water cisterns of the Fort, and shewed no signs of yielding. Measures were taken at the same time of the illuminating power of the two Oils previously used.

24th Augst 1866.

Capt Strachan Royal Engineers Capt Goodwin

32 These experiments however can only be considered approximate as from want of ventilation in the Gallery, the light was not at a maximum brightness. The results are given further on.

33 On the 1st and 2d September the lamp was lighted for the observations of the Superintending Engineer 4th Div. who had been absent on leave. The consumption of oil confirmed the previous result as to quantity, but on these occasions to guard against overheating of the burner, the door of the lantern was kept open, as it was inferred that the lantern was very imperfectly ventilated, and such is evidently the fact, as the lamp was comparatively cool on being extinguished.

34 The light on the 1st from a mixture of lamp and Cocoanut Oil was bright, but was not so clear as with Cocoanut Oil alone. On the following night the lamp was fed with Cocoanut Oil the door of the lantern being again open. The light was considered to be very much improved and the temperature of the lantern and state of the wicks confirmed the previous impression, that the ventilation of the lantern is defective.

Illuminating power

Lamps in common use

35 In order to observe the full effect of the lamp, it has only been lighted in the absence of moonlight, when the contrast with the surrounding darkness would be more apparent.

36 Generally speaking the light may be termed strong and good, but by no means powerful, which more appropriately distinguishes the light from Paraffine or Kerosine oils.

37. The Parade Square, when the lamp is burning well, is fairly illuminated, and Shadows are cast on the opposite walls of the Adjt. Generals office about 100 Yards distant.

38 Photometrical measurements in the water gallery gave mean results as follows compared with an argand of 7/8 inch with Cocoanut Oil

Illuminating power	10·9 to 1.
Lamp Oil	13·2 to 1.

39 These experiments owing to a smoking of the lamp in an imperfectly ventilated gallery (the ventilators being closed to exclude day light) can only be considered approximate. Subsequent

experiments

experiments in the Office, the Photometer being a highly polished ball, the images being magnified, gave mean result with Lamp Oil. Illuminating power 12.9 to 1.

Coccanut Oil 11.5 to 1.

40 The argand consumming Coccanut Oil in each trial

41 An attempt was made to institute a comparison with the argand fed with Lamp Oil, but failed, the oil being too visced and giving but a faint light.

42 Sperm or Colza oil for which the Pharos lamp is adapted not being procurable no experiments could be made as to the comparative illuminating power, over the two oils used in these trials, but taking the statement previously given as data, it may be inferred that the Pharos light with the oils of this country is by no means economical and its adoption as a Barrack light cannot be recommended.

43 As a Railway junction or Platform light in a properly constructed moveable lantern with reflectors, it may probably be found useful as the light can be diminished at pleasure, and concentrated on any point as circumstances require.

H.

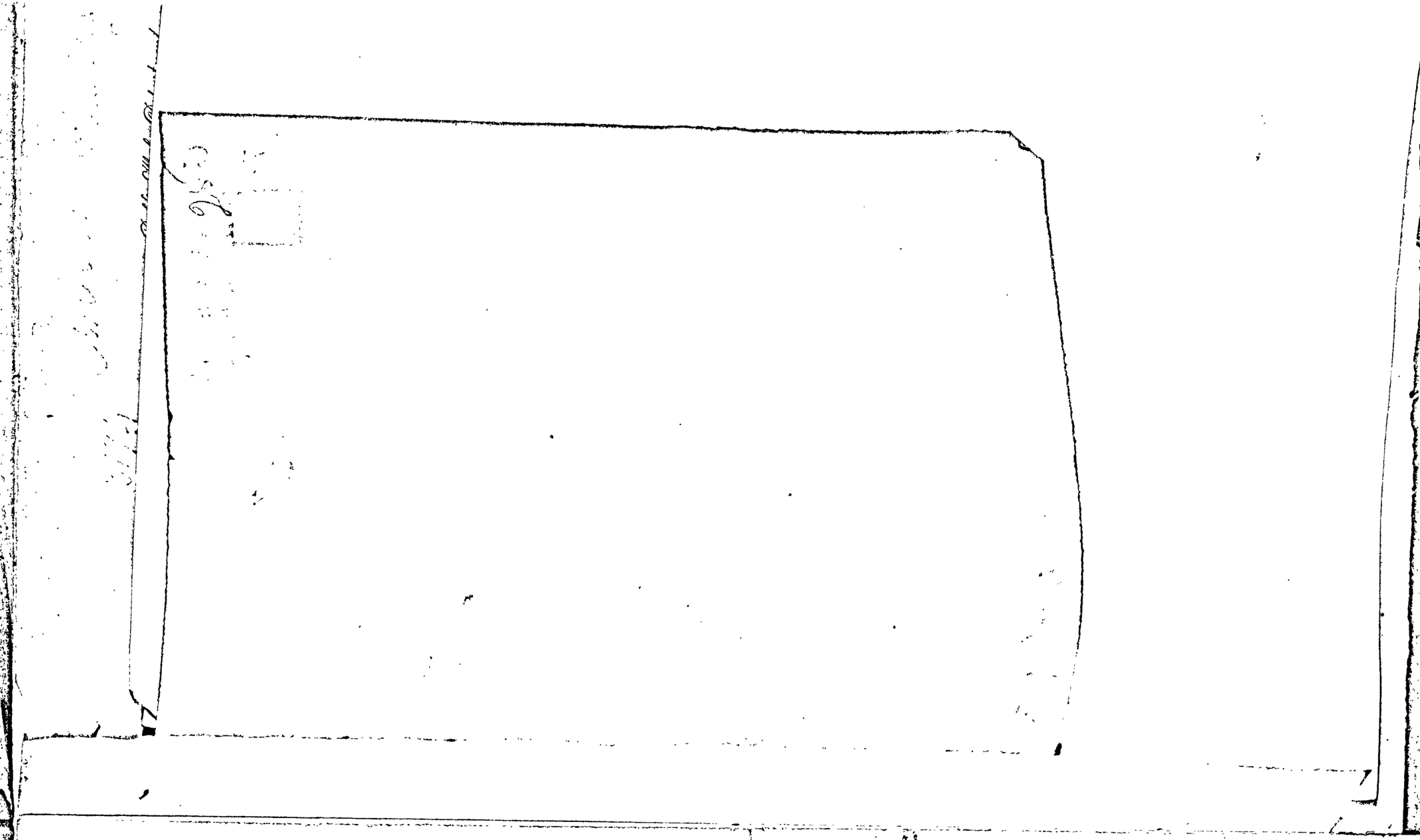
No 2302.

The foregoing Memo. & Notes of experiments on the Pharos Light by the Barrack Master, Colvd Worster R.A. are forwarded to Government with reference to their Orders No 696 & 1829 dated 1st Maudt 10th June 1856

2. The Supt Engineer was absent on leave during the various trials of the Lamps reported by the B.K. Master & saw it ~~alone~~ lighted only once, when he was disappointed with the light given out.

H. Horsley Colonel R.E.
Supt Engr & Dr

Supt Engr Office & Dr
Madras
24th Sept. 1856



Memo.

From

The Barrack Master

Read September 18

1878

Report on the

Pharos Lamp in

the Barrack Square

Fort St George

Copy in a Letter to England
dated 10th October No 53 of 1866

G.O. 1866 Dept
Bd of Ordnance 10th October
From No 3947
The Supt Engineer
4th Division

To The Secretary
to Government

dated 24th Sept 1866
Recd 25th Sept 1866

No 2302

Encl: 3.

Submitting a Memo:
and Notes of experiments
on the Pharos Light by
the Barrack Master with
his opinion.

No 132

28th Sept 66 R. 1st Oct

Nos 3174 & 3175 - 5th Oct

No 3174 Public Works Department.

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 5th Octr 1866.

From

The Superintending Engineer
of the 4th Division

Read the following

(Here enter No. 2302 dated 24th Sept 1866.)

Ordered that a Copy of the papers above recorded be forwarded to the Right Honorable the Secretary of State for India.

His Lordship in Council observes that the Barrack Master is of opinion that it would be advisable to introduce the "Pharos Lamp" for the illumination

illumination of Barrack squares in India.

Dre Ret No 1 dated October 66.

No 3175

Copy forwarded to the Superintendent of Police and Chairman of the Managing Municipal Committee at Surat with reference to his letter dated 17th August 1866 No 87.

Fort St George 5th Oct 66

To
The Surg Genl & Dr
" Barrack Master
" Civil Dept
" Cons Offs for Railways
" Offg in Ch of the Store Dept

Dispd 10th October

33/6

Copy rec^d with Letter to England
No 10: dated 4th Sept. 1866.

No 53 of 1866 Despatch

Rec^d of the Sec^y of State for Col^s 1866

£ 31 7s 4d 31 7s 5d

Rec^d of the Madras Govt

Dated 5th October 1866.

Papers on the Ex-
hereditary Head of Rhoni
Lambs which was erected
in Fort St George, for-
warded to the Home Govt

A/182. 1338/34

C. 28th Sept. 1866 Oh Hartcup 66