

MADRAS RECORD OFFICE.

Government of Madras.

Public **DEPARTMENT.**

G.O. No.	547	Press Mis.
Dated	31-5	1866.

Not to be folded or roughly handled

24/1/36

Proceedings of the Madras Government, Public Department,
31st May 1866.

No. 171. Read the following letter from the Secretary to the Government of India, to the Chief Secretary to Government, Fort Saint George; dated Fort William, 31st March 1866, No. 364M.

Public Works Department,
Military Works.

I am directed to acknowledge the receipt of your letter, No. 143, dated 8th February 1866, to the address of the Secretary to Government of India, in the Home Department, forwarding the Proceedings of the Madras Government with regard to the experimental manufacture of gas for lighting Fort Saint George.

2. With reference thereto, I am to forward, for the information of the Madras Government, copy of a Resolution* by the Government of India, in this Department, in which such steps as have been

* Nos. ^{554—8}₃₇₀₃, dated 8th August 1864.

already taken towards the introduction of gas in Military Stations in this Presidency are described, various details of cost, &c., being entered into.

3. In this Resolution the views of the Government of India on the general subject are stated, and the course which it is proposed to follow, in view to the extension of the system to other Military Stations, laid down.

4. His Excellency in Council thinks that the information supplied in this Resolution may be of some assistance to the Government of Madras in the solution of a question of great importance, on which few data applicable to this country are available.

5. It will be observed, in the first place, that, whilst it is anticipated by the Government of Madras that the cost per gas burner will be considerably less than that of an ordinary oil-lamp, the cost in this Presidency is expected to be from $1\frac{1}{2}$ times to twice as great, the difference in cost being compensated for by the large increase of the illuminating power, which may be estimated at from 2 to $2\frac{1}{2}$ times that of the oil-lamp.

6. This difference in the estimates of probable cost leads to a comparison between the burners which are used in Fort William and those in use in Fort Saint George.

7. The former, it will be observed, are of two classes, consuming respectively 5 cubic feet and 3 cubic feet per hour. Two-thirds of each class burn for 10 hours, and the remainder for 3 hours every night.

8. The burners used in Fort Saint George are reported to consume only 8 cubic feet in 12 hours.

9. From the reports received from the Commanding Officer of a Regiment in the Fort, it is apparent that this is insufficient; and although the burners in use in Fort William may consume more gas than is absolutely necessary, some nearer approach to their rate of consumption would appear to be desirable in Fort Saint George.

10. I am further directed to draw the attention of the Madras Government to the rate at which gas is procured at Fort William, and that at which it is estimated that it can be obtained at Dinapoor, both of which are considerably less than that which is being paid at Madras.

Copy sent to Dept. 12/5

11. In conclusion, I am to observe that a large expenditure is now contemplated by the Madras Government in the extension to the whole Fort of the present gas burners. The grounds on which this extension is proposed are, to a great extent, economical, the calculation of results in a financial point of view being based on the supposition that the cost of a gas burner is Rupees 2 per mensem, whilst that of an oil-lamp is Rupees 3-8-0 per mensem.

12. The papers submitted shew that the calculations of rates have varied considerably from time to time, and also that burners, as at present adopted, do not afford that increased comfort to the Soldier which should be ensured by the introduction of gas. The Officer Commanding a Regiment in the Fort complains that the men have to read by their own lamps, in consequence of the faintness of the gas light.

13. Under these circumstances, the Governor General in Council requests that, before any fresh work of this nature is put in hand, a project may be drawn up and submitted by the Government of Madras to the Secretary of State, for his orders, after consultation with Gas Engineers in England, as ordered in the Resolution sent herewith for the Stations of Rawul Pindee and Dinapoor.

14. The Report should be accompanied by a full report of the present gas works, with explanatory drawings, showing the details of the gas manufactory, the existing mains, &c., so that final orders can be passed without further reference.

15. A copy of the Report should, I am to add, be submitted for the information of the Government of India.

Enclosure to Public Works, No 364 M of 1866.
Nos. 551-6 M, dated 8th August, 1864.
3703

RESOLUTION,—By the Government of India, Public Works Department.

Read letter, No. 3968, dated 5th September 1861, from Secretary to Government of Bengal, Department Public Works, to Secretary to Government of India, Public Works Department.

Letter, No. 3615, dated 8th October 1861, from Secretary to Government of India, Department Public Works, to Secretary to Government of Bengal, Department Public Works.

Demi-official Memorandum, dated 27th November 1862, and Estimate from H. Prince, Esq., C. E., to Under Secretary to Government of India, Department Public Works.

Letter and Estimate, dated 26th May 1863, from Secretary, Oriental Gas Company, to H. Prince, Esq.

Project of Lieutenant-Colonel A. Robertson, for lighting the European Infantry Barracks at Rawul Pindee with oil gas (*deposited*).

Memorandum, dated 15th October 1862, by the Quarter Master General of the Army, on the number of lights allowed to a Regiment of European Infantry, and the daily consumption of oil.

RESOLUTION.—His Excellency the Governor General in Council observes that the Barracks in Fort William are the only Military buildings in the Bengal Presidency which are lighted with gas. Here coal gas is supplied by the Oriental Gas Company at a rate of Rupees 5 per 1000 cubic feet, which rate includes cost of mains of branches to the several buildings, of wastages of gas by leakage, of establishments for lighting and cleaning lamps; in fact, of all charges, except those for interior fittings, and these latter appear to have amounted to about Rupees 88 per burner. Two classes of burners are used, the first class consuming five, and the second class three cubic feet of gas per hour; and about two-thirds of each class are kept alight for ten hours, and the remaining one-third for three hours only.

2. His Excellency in Council further observes that two approximate estimates have been prepared—the one by Mr. H. Prince, C. E., of the Department of Public Works, and the other by the Manager of the Oriental Gas Company—of the cost of introducing coal gas into the Military Cantonment at Dinapoor, and that the results of the two estimates are nearly the same, *viz* :—

	Mr. Prince's Estimate.	Oriental Gas Co.'s Estimate.
Outlay on works including mains, fittings, plant	Rs. 80,000	Rs. 89,000
		s. d.
Cost of Gas	Rs. 7 per 1000 c. ft.	13 7½ per 1000 c. ft.

The cost of gas, or rather the rate at which it can be supplied, includes a charge of 10 per cent. on the outlay on works, and all charges for establishment, repairs, wear and tear, &c., &c., and the same classes of burners are proposed as those used in Fort William.

3. Lastly, His Excellency observes that an estimate has been prepared by Lieutenant Colonel A. Robertson, for lighting the barracks of one European Regiment at Rawul Pindee with oil gas. In this estimate, the outlay on works and fittings is set down at Rupees 18,771, and the cost of gas at Rupees 13-6 per 1000 cubic feet; but this latter rate only includes charges for wood and oil, and if those for interest on outlay, wastage, establishments, wear and tear, &c., &c., be added, the rate will, no doubt, be raised to Rupees 20 per 1000 cubic feet. Colonel Robertson has assumed very moderate rates for the items of his estimate; still the rate for the manufactured gas is high; but it must be borne in mind that the illuminating power of oil gas is to that of coal gas as 3 to 1, so that, according to the present data, the cost of oil gas at Rawul Pindee and that of coal gas at Dinapoor would be nearly the same. It is also to be observed that Major Robertson proposes burners of only about one-third the capacity of those in use at Calcutta.

4. From a return received from the Quarter Master General of the Army, it would appear that, according to the present imperfect arrangements for lighting barrack buildings with the commonest description of oil lamps, the consumption of oil per diem averages 16 seers for a Regiment of British Infantry. The average cost of this quantity may be set down at Rupees 5, and probably a similar amount will represent the cost of establishment, of lamps, wicks, &c., &c.; so that the total cost of lighting barracks for a Regiment may be set down at Rupees 10 per diem.

5. If, for each of the oil lamps detailed in the Quarter Master General's Return, a gas burner be substituted, and the rates of consumption per burner and the number of hours of illumination be assumed as on the Fort William and Dinapoor schemes, then the consumption of gas per diem will be about 3000 cubic feet of coal gas, or 1000 cubic feet oil gas; the cost of which will be, according to—

	rs.
Fort William rate, ...	15 per diem.
Dinapoor... ..	21 ..
Rawul Pindee	20 ..

On the whole, it may be assumed that, allowing in both cases for an equal number of lights, and for gas burners of the capacities above noted, the cost of gas for all India will be from two to two and a half times greater than that of the present oil lights; but that, if illuminating power be taken into consideration, the cost of gas will be very much less than that of oil lights.

6. The foregoing calculations relate only to the number of lights according to present authorized scale; but looking to the proposed extension of barrack accommodation, and to the present imperfect system of lighting, a greater number of lights may possibly be required in future. In this view, therefore, and with the classes of burners already specified, 4000 cubic feet of coal gas, costing Rupees 30 a day, may, perhaps, be a more correct allowance for consumption per Regiment per diem. The present cost being Rupees 10 only per diem, there would be an additional charge of £2 per diem, or £730 per annum, for each Regiment; or, say, for 70 Regiments, £ 51,000, equal to about five lakhs per annum. On the other hand, it is not improbable that the sizes of the Fort William burners are considerably in excess of what will be found really essential, and that economy in this respect may be effected by adopting the scale which has been established in English barracks after long experience.

7. The Government of India is satisfied that something must be done towards greatly improving the present system of lighting barrack buildings; and although the foregoing data are very imperfect, they appear to afford sufficient grounds for leading to the inference that gas, which has been adopted almost universally elsewhere, should also be introduced into all Indian Military Cantonments. Wherever coal can be procured at moderate cost, it seems obvious that coal gas will be more economical than oil gas, and this will be the case in many stations. To arrive at a practical conclusion as to the probable cost of lighting with coal gas, it will be desirable to make an experiment at some convenient station where coal will certainly be the cheapest source of supply, and His Excellency in Council considers that Dinapoor is a suitable one at which to test the coal gas.

8. Mr. Prince's project should, therefore, be re-considered in detail, and plans prepared, showing, on a sufficiently large scale, the position of all the buildings to be lighted, and the probable positions of the mains and service pipes. Such further plans, with sections of the buildings to be lighted, should also be given, as will admit of the Gas Engineers, who will have to provide the apparatus, being able to form an opinion as to how many lights will be necessary, and how the pipes shall be arranged.

9. The primary object being the lighting of barrack buildings, the project should show separately:—

1st.—What would be essential for this alone.

2nd.—What extension would be likely to be desirable in the way of road-lamps, &c., &c.

As regards this second part of the scheme, a specific statement should be made as to the existence of any fund that could pay for road gas lights; also, whether there is reason to think that private persons would take the gas at reasonable rates. If this be not shown to be likely, the project should be restricted to the first part.

10. The design being completed, as well as the information of the local officers will admit, it should be sent to the Secretary of State, with a request that it may be submitted to an experienced Gas Engineer in England, and that the needful steps may be taken for obtaining the plant to be sent out, with an intelligent person to superintend the execution of the work.

11. Before settling the design as to the detail of lights, the War Department should be requested to see that the number is adjusted to what is considered suitable for barracks in England, as to number of burners and sizes of jets; also, that no buildings are supplied for which, under the English barrack system, provision is not made. The time allowed for the gas to continue burning in England, in each class of buildings, should also be carefully noted.

If, at any time hereafter, the Government of India desire to extend the lighting, it can be done, but to commence with a very strict attention to economy will be essential.

In this duty of correcting the design sent from India, the co-operation of some Officer of Indian experience with the English Gas Engineer will be desirable.

12. But as coal gas will not be procurable everywhere, the provision of oil gas will probably be necessary at many stations, if gas is to be used at all. From Lieutenant-Colonel Robertson's estimate, it seems likely that oil gas may be supplied at moderate prices; but this question is one that can only be fully tested by a trial, which should be made, if, on further inquiry, the cost does not seem excessive, and the results are otherwise encouraging. His Excellency in Council, therefore, considers that a project should be prepared for some station where coal will almost certainly never be available, and where oil may be expected to be procured at reasonable cost, and that Rawul Pindee seems a good place to select for the purpose, unless the Local Government would desire the trial to be made at some other station.

13. Lieutenant-Colonel Robertson's project should be revised, as explained, with regard to the Dinapoor project, and like information prepared to send to England for further scrutiny there.

In dealing with this scheme, the Secretary of State might be asked to consider the propriety of obtaining Lieutenant-Colonel Robertson's co-operation, as he has given much attention to oil gas, and any needful preparatory experiments might be made in England. The gas apparatus should

probably be designed to obtain the gas from oil seeds of all sorts, without the necessity for extracting the oil in liquid form, as well as from animal fat; but in these respects the result of further inquiries must be awaited. The superior illuminating power of oil gas should, of course, receive due attention in the working out of the details of the scheme, both in the way of direct experiment as to the degree to which it may in practice be relied upon, and as to the reduced dimensions of the various parts of the apparatus, pipes, &c.

14. Finally, His Excellency in Council observes that, as some time must obviously elapse before any practical result can be obtained from the measures now proposed, it is desirable that the question of the existing system of lighting barracks may receive present attention in the Military Department, with a view to considering whether some of the improved cheap oil, or other lamps of the present day, might not at once be introduced in barracks, in supersession of the existing very imperfect oil lights.

ORDER.—Ordered that a copy of the above Resolution be forwarded to the Government of Bengal, in view to the Dinapoor project being worked out.

Ordered, also, that a copy of the Resolution be forwarded to the Government of the Punjab, with reference to the orders regarding the project for Rawul Pindee.

Ordered, also, that a copy be forwarded to the Military Department, with reference to the concluding paragraph.

No. 172.

ORDER THEREON, 31st May 1866, No. 547.

Ordered that the foregoing letter, together with the previous papers on the subject, be transferred to the Public Works Department, in view to all further matters connected with the question being there considered.

(True Extract).

A. J. ARBUTHNOT,
Chief Secretary.

To the Public Works Department, with No. 143 of 1865,
and its accompaniments.

Exd. J. H. Burns.

Public Department.

PROCEEDINGS of the MADRAS GOVERNMENT.

Read the following letter from
the Secretary to the Government of
India - Public Works Department.

(Here enter 31st March 1866 No. 364 M)

Order thereon 31st May 1866 No. 547.

Ordered that the fore-
-going letter, together with the pre-
-vious papers on the subject, be
transferred to the Public Works
Department, in view to all further
matters connected with the
question being there considered.

[Signature]

To the P. Works Dept^y 31st May 1866
with P^o 143 of 1854 & its
accompaniment } despatch 31/5
Military Dept^y despatch 12/6

hint of 5 June

Office 1860. Department.

No 547.

PROCEEDINGS OF GOVERNMENT.

Dated 31 May 1860.

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