P.W. Encl
5994/83

B. 2499 W 26.9.82
B. 2998 W 13.11.82
" 99 W 10.11.83
B " 1992 W 18.7.83

P.W.C. No. 5994

Under Secreta[illegible] to Government Public Works Depart[illegible], with 5 copies of the Plan.

(By order)

Qr. Mr. Genl's Office
Simla
14 July 1883

D. J. [illegible]cLeod Major
Offg. Dy. Qr. Mr. Genl.

No. 2051W d/ 26th Ju[illegible]

Recd 16/7/83

Encl. 2 (4 S.C. of [illegible]
4 S.C. of Encl 2 [illegible])

No. 2051W d/ 26-7-83

B. Communicate to the Supdg. Engrs. Thi[illegible] Fifth Circles in con[illegible] of G.O. No. 1992 W d/ 18 July 1883.

CY

Recd 27/7
Io 30/7

27/7
2

SE Third Circle } with copies of
" Fifth Circle } plan & Encl.

With Order
Entd. in Receipt Reg.

No. 46[illegible]3.

CIRCULAR.

The Commander-in-Chief having approved the accompanying improved plan of Cinerator, directs its adoption in substitution of that forwarded with this Office Circular No. 10340, dated 19th December 1882.

2. A copy of Veterinary Surgeon Mills' letter* describing the improvements he has effected on the previous plan is also enclosed.

(By Order.)

D. J. S. McLEOD, Major,
Offg. Deputy Quartermaster-General.

Quartermaster-General's Office,
Fort St. George, 28th June 1883.

To

No. 5057.
True copy forwarded to the Acting
under

* No. 1141-B, dated 27th April 1883.

GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

4th September 1882, No. 4704.

Horses—Sanitary.

Read the following papers:—

No. 63. *From Lieutenant-Colonel J. EWING, Officiating Quartermaster-General, to Colonel E. L. HANKIN, Acting Secretary to Government, Military Department; dated Fort St. George, 2nd August* 1882, *No.* 6018.

I have the honor, by order, to forward, for submission to Government, the enclosed report on cinerators received from the Inspecting Veterinary Surgeon, Madras Army.

2. His Excellency the Commander-in-Chief is fully convinced of the value of such cinerators, and has accordingly issued orders that at all stations in this command where mounted corps are stationed one or more of the cheap description of cinerator (plan marked A) shall be provided for the purpose of burning refuse, stable litter, dung and carcasses of animals which may have died from infectious diseases, the labor of horse-keepers, &c., of the corps being utilized to carry out the work as was done at Secunderabad.

3. I am to mention that the Commander-in-Chief of India has already approved of the cinerators, and is about to order their general introduction in Bengal.

4. Sir Frederick Roberts thinks it most desirable, in the interest of the public generally, that the advantages of the cinerator should be as widely known as possible; he accordingly approves of the Inspecting Veterinary Surgeon's proposal to send the report to the Secretary, United Service Institution of India, for publication in its journal. I am to request, therefore, that the report may be returned to this office when no longer required.

From Veterinary Surgeon J. MILLS, Army Veterinary Department, doing duty Royal Artillery, Centre District, to Inspecting Veterinary Surgeon G. EVANS, M.D., Madras Army, dated St. Thomas' Mount, 24th May 1882, No. 97.

I have the honor to forward a small report on my cinerators, together with a photograph of the "cinerator in operation" at St. Thomas' Mount, and plans with estimates of the mud and brick erections, marked respectively Nos. 1 and 2.

No. 241.

Forwarded to the Adjutant-General for the information of His Excellency the Commander-in-Chief with a request that it may be returned to this office, and that His Excellency will be pleased to allow me to send the report to the Secretary, United Service Institution of India, for publication in the journal.

2. The photograph was damaged in transit. The appendix and plan No. 3 were not received before yesterday; hence the delay in forwarding.

Ootacamund,
15*th June* 1882.

(Signed) G. EVANS, M.D.,
Inspecting Veterinary Surgeon.

No. 4112.

Referred through the Financial Department to the President, Madras Municipality, for information as to the result of experiments made with cinerators at Madras.

(By Order.)

OOTACAMUND,
4th August 1882.

(Signed) E. L. HANKIN, Colonel,
Ag. Secretary to Government.

No. 672.

Forwarded to the President for report.

OOTACAMUND,
5th August 1882.

(Signed) C. G. MASTER,
Chief Secretary.

No. 64. *From A. T. ARUNDEL, Esq., President, Municipal Commission, Madras, to the Chief Secretary to Government, Ootacamund; dated Madras, 9th August* 1882, *P.W.C. No.* 1058.

In reply to your No. 672, dated 5th August (the enclosures of which are herewith returned), I have the honor to enclose a report by the Vice-President on the working of the cinerators in the Madras Municipality. It will be seen that they have been disused for the last eight years.

No. 783.

Forwarded to the Military Department. It is recommended that the Sanitary Commissioner be asked for his opinion before any orders are passed.

OOTACAMUND,
19th August 1882.

(Signed) C. G. MASTER,
Chief Secretary.

No. 4442.

Referred accordingly for the opinion of the Sanitary Commissioner.

21st August 1882.

(Signed) E. L. HANKIN, Colonel,
Ag. Secretary to Government.

No. 65. *From Deputy Surgeon-General M. C. FURNELL,* M.D., F.R.C.S., *Sanitary Commissioner for Madras, to Colonel E. L. HANKIN, Acting Secretary to Government, Military Department, Ootacamund; dated Madras, 30th August* 1882, *No.* 767.

I have read with much interest Veterinary Surgeon J. Mills' report on cinerators for the cremation of stable refuse, dead horses, &c. There can, I think, be no doubt that, from a sanitary point, his views are perfectly sound and worthy of adoption.

2. The non-success of the Madras cinerators may, as suggested by Mr. Jones, have been due to faults in design; but far more probably, in my estimation, from the fact that sanitary matters in the Madras Municipality have never been superintended by an officer having any special knowledge of the subject, there being no sanitary officer or staff provided for in that large Municipality as in Bombay and Calcutta.

No. 66. ORDER THEREON, 4th September 1882, No. 4704.

The Right Honorable the Governor in Council approves the action of His Excellency the Commander-in-Chief, reported in para. 2 of the Quartermaster-General's letter above recorded.

2. Veterinary Surgeon Mills' report on his cinerators is returned as requested.

(True Extract.)

(Signed) E. L. HANKIN, Colonel,
Ag. Secretary to Government.

To the Quartermaster-General, with 4 enclosures.
,, Surgeon-General, Her Majesty's Forces, Madras.
,, Public Works Department.
,, Financial Department, with 1 plan.
,, Sanitary Commissioner.
,, Adjutant-General, for information.

Exd. A. F. Goodall.

Order No 2499 r. d/ 26th Septr/82

Communicated to the Supdg: Engineers Third & Fifth Circles

(True Extract)

Sd/ Ross Thompson
Lt Col &c,
Actg C. S. to Govt Mil Dpt

Govt. of (1882) Madras.

MILITARY.

To
THE QUARTERMASTER-GENERAL,
&c., &c., &c.

Dated September, 4th.

Issued

Recd. *Encl.*

G.O., 4th September 1882, No. 4704.

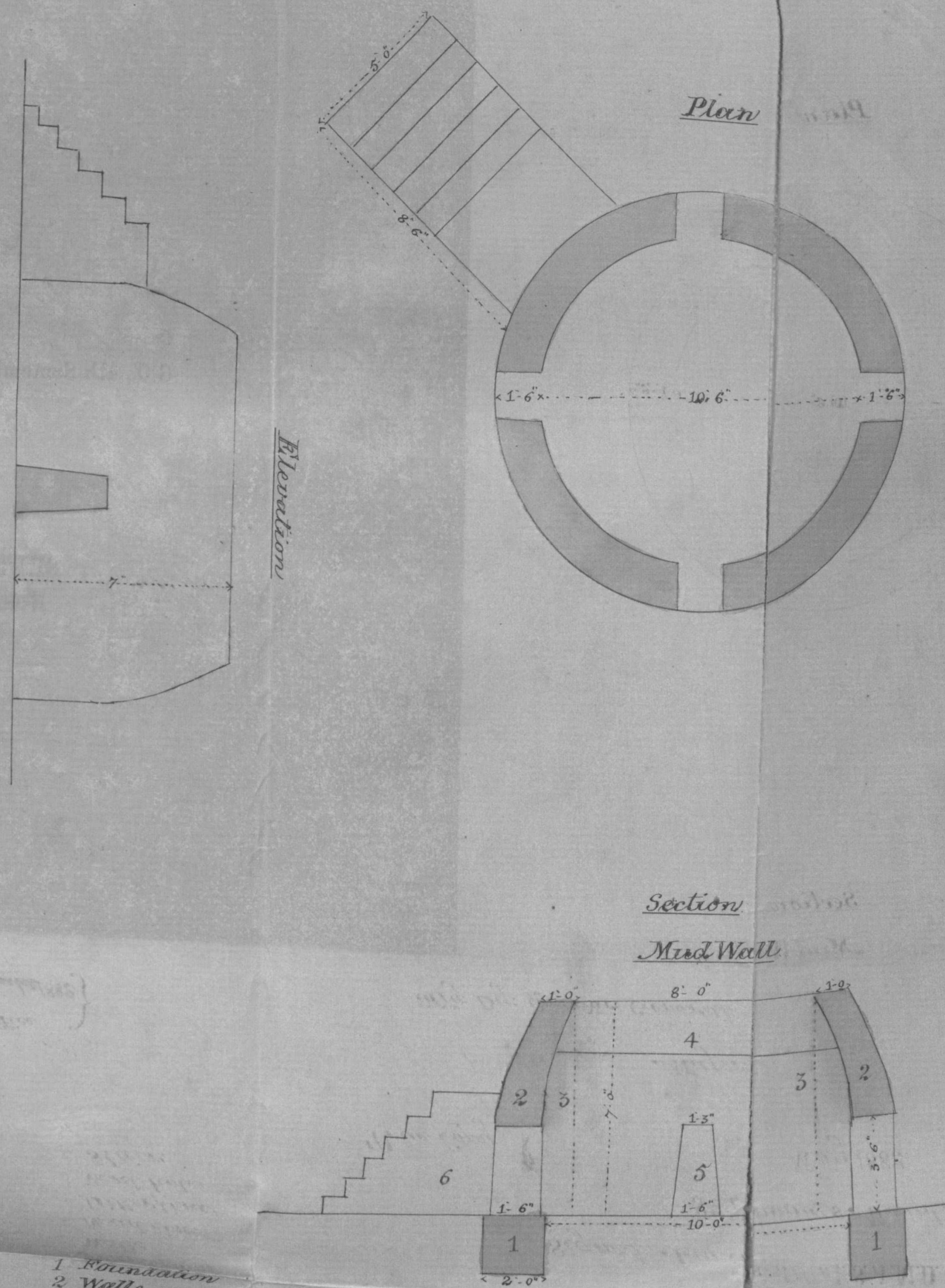
SEPTEMBER.
Nos. 63—66.

Horses—Sanitary.

Cinerators.—Provision of — at all stations where mounted corps are located, for the purpose of burning refuse, stable litter, and carcasses of animals, approved.

Supdg Engr: Third Circle
" " Fifth Circle

Existing Cinerator at St Thomas Mount.



1 Foundation
2 Walls
3 Mud line
4 Litter line
5 Vent hole
6 Stair.

(Signed) James Mills V.S.A.M.D.
St Thomas Mount.
May 1882.

(True Copy)
D. J. S. McLeod Major
Offg: Dy: Qr: Mr: General.

Qr: Mr: Generals Office
Fort St George 4th November 1882

Madras.

Jud. 2
7674/82

REPORT ON CINERATORS.

CINERATORS AND SANITATION.

1. In a country like India where there are so many domesticated animals the proper disposal of the dead seems to me a question of paramount importance, although one evidently much neglected.

2. By burial, however deep, certain parts of the country in time, must become more or less contaminated, and the atmosphere rendered impure and unhealthy, and dangerous both for man and beast to live in.

3. Burying is without a doubt the most insanitary mode of getting rid of the dead, and one which ought to be put a stop to, where practicable, by Government, and even the institution, if necessary, of stringent laws on the subject. Although, perhaps, they might infringe on the private rights of the population, that consideration must be set aside when through improper sanitation the lives of human beings are in danger.

4. I would strongly recommend the building throughout India of cinerators, according to my plans, herewith attached. Not only for the purpose of cremating, or reducing to ashes, the carcases of animals that have died from such diseases as Anthrax, or have been destroyed for Glanders, but also for getting rid of all refuse or objectionable matter, such as dressings from wounds and sores, and the stable litter in stations where it cannot be utilized as manure, and where its accumulation becomes objectionable.

5. I am perhaps late in bringing this subject to notice, but it is to be hoped not too late to do some good; for I see no better or more effectual mode of getting rid of diseased germs than by fire, and in fact it is clearly evident that this is the only true way of preventing the spread of contagion.

6. Pasteur says that the disease germs of Anthrax (one of two most fatal animal scourges we have in India and one whose increasing prevalence no doubt is due to the burial instead of the cremation of the dead) can travel long distances through the medium of earth worms and retain their vitality for a very long period. Is not such an authority as his enough for us to use proper and thorough means for the destruction of these germs, and in that way to remove the cause of the disease; as while the cause exists the effect will never cease.

7. In various parts of India where we hear of outbreaks of disease amongst men and animals, we should ask what are the causes? Might they not be due to the absence of proper measures for the disposal of infected matter? but whether such be the case or not, I should like very much to see cineration get a trial.

8. Cinerators ought to be erected near all hospitals, cholera camps, sick lines for animals, and bazaars, for the purpose of burning every thing likely to convey disease or to prove insanitary.

9. As regards the question of fuel for those for hospital use, in all stations where there are horses, it would be an easy matter to get a load of stable litter, which I find answers the purpose well.

10. Now as to the cost of building a cinerator: made of mud or clay a small one would cost only Rs. 8 or 9, and a large one for cremating animals in would cost Rs. 16 or 18; therefore on the score of expense there can be little objection to them. Clay is of course much to be preferred as it forms a firmer and more permanent wall, and less likely to be affected by the rains than mud, and in stations where it is procurable I would strongly recommend its use. If they are to be constructed of brick, then we come into the subject of expenditure, which is always best to be avoided; but from two

20th Dec /82

years' experience of the mud ones I find they serve every requirement. They can be easily and readily put up without the aid of skilled labor, and at a trifling cost, which is no small item in their favor.

11. To show what can be done with these cinerators, I have been able during the outbreak of Glanders and Farcy at St. Thomas' Mount, to cremate the carcases of eleven of the horses destroyed for the disease, and at Secunderabad I disposed of the carcase of a horse, that died from Anthrax, in the same manner. The average time occupied in reducing them to ashes was about twelve hours per horse, and with no other fuel than stable litter. I think this is sufficient evidence of their utility, and I cannot help remarking that I look upon it as most satisfactory, for I have been able to effectually dispose of the carcases of these animals without incurring but little expense to the Government, and saving the district from probable contamination by burial; and it also tends to illustrate how far many of the sanitary evils which now exist are subject to human control.

12. Of course cremation may be made much more speedy by the aid of wood, but I do not see that it is at all necessary, as the stable litter consumes the carcase quick enough for all practical purposes.

13. It requires very little consideration to see that the cineration of diseased matter is but a rational means for the preservation of health, and the prevention of epidemic afflictions.

SITE.

14. The site for building them on should be selected where as much draught is procurable as possible, and where the smoke from the cinerator will not become a nuisance or in any way interfere with the public health.

BUILDING.

15. Where clay is not procurable the wall must be made much thicker, especially at its base, in fact to stand any time it ought to be made nearly double that of a clay wall, see mud line marked 3 in Plan I.

16. After the foundation is constructed allow it to set for some days before beginning the superstructure, then build the first 3 feet of the wall, and allow that also to thoroughly harden before placing the stones on which are to form the top or arch of the vent holes. After this you may build as quick as circumstances will permit, care being taken not to be in too great a hurry.

17. I find the best men to employ, as builders, are the horse-keepers of the battery as although they are not skilled laborers and require a good deal of watching, still they are well up in the erection of mud buildings.

18. A good foundation for the steps is a few loads of stones or large boulders.

19. When the cinerator is finished, and thoroughly dry, it ought to be well "lapped" over, and this operation repeated weekly after all the cracks in the wall have been filled up.

RULES FOR ITS USE.

20. (1.) In filling the cinerator for the first time let as much straw as can be spared be placed in the bottom so as to give the fire a start, and then gradually fill it up, and when half full ignite the straw at the vent holes; after the walls are thoroughly heated any material will burn.

(2). Care must *be* taken to keep the vent holes *well* cleared of ashes to prevent "choking." This can be done by having a rake or fork made, and secured to the end of a long bamboo.

(3). Clear the cinerator entirely out about every fortnight or three weeks, so as to make any repairs to the walls which may be necessary.

(4). For cremating a carcase fill your cinerator about three parts full with litter, see "litter line" marked No. 4 in Plan No. 1, place the body on, either whole or in pieces, and cover over. From time to time supply plenty of fuel to ensure the thorough cineration of the carcase.

5. During the "rains" have a large tattie made to place against the side on which the rain is beating, and construct a trench round it to prevent inundation.

REMARKS.

21. As regards the building of the brick cinerator, as shown in Plan No. 2, that of course must be left to those who make such work their profession. I have never had the opportunity of seeing one at work, but have no doubt they would answer the purpose well, and if at all practicable they ought to get a trial. Of course the cost of construction will, I am afraid, debar them from becoming generally used, except perhaps in large stations such as Secunderabad or Bangalore, where one of them might be built, for cremation purposes, for the common use of all the troops.

22. The ashes or charcoal from the cinerator I have found most useful, to throw down in stables where animals have urinated, acting by absorbing the urine and also as a deodorizer. All that is required are a few heaps of the ashes distributed throughout the stable so as to be readily got at by the syces.

23. In conclusion, these cinerators like everything else, if we want them to succeed must be personally superintended both in the building and the working of them, as if left to others carelessness will probably bring them into discredit and eventual disuse; but after two years' experience of them, and having spent a great deal of time and trouble in bringing them to their present state, I can confidently assert that, if built according to the plans I have submitted, and worked as laid down in this report, they will be found valuable agents in a sanitary point of view.

JAMES MILLS,
Veterinary Surgeon, A.M.D.

APPENDIX.

1. In the photograph accompanying this report it will be observed that a derrick and tackle have been brought into use to lift the whole carcase into the cinerator, but as the purchase and upkeep of this mode of working would be somewhat expensive, which I wish particularly to avoid, and not always available, I have invented a ramp and platform as shown in Plan No. 3, so as to entirely do away with that arrangement.

2. The ramp is at a gradient of 1 foot in 5, which will not be found excessive. It is broad enough for a cart to be driven up, which when on the platform can be turned round, tilted up, and the carcase, or anything else it might contain, slid into the cinerator.

3. The platform I have designed as a place where, when an animal is to be destroyed, he can be shot close to the mouth of the cinerator, and then rolled in without trouble. And also as a place where all *post-mortem* examinations ought to be made, which seems to me highly essential as it is *undoubtedly* a bad and unsafe practice to allow these examinations to be made in the vicinity of sick lines or stables.

4. The 2 feet wall on ramp and platform is put up for the purpose of preventing the animal when in the act of falling, after being shot, from getting over the side. This wall I find to be necessary, because a few days ago I shot a horse on the ramp, on which he fell, but the greatest difficulty was experienced in moving the carcase in, as in rolling it over the head or hind legs were always getting over the side, which caused a certain amount of delay, with the risk of its slipping off the ramp altogether.

5 So as not to make the ramp and platform too high, which would have increased the gradient, I have taken a portion of the wall out opposite the stage (see part of wall removed, No. 9 in Plan 3) to bring the mouth of the cinerator on a level with it. This portion of the wall which has been taken out will be found not to interfere in any way with the cremating powers of the arrangement.

6. The wall next the ramp must be straight, see Fig. 2, Plan 3, as it is only natural to infer that if inclined inwards the mass of earth behind it will bring it down

7. In constructing on this plan build your ramp first, and allow it to be thoroughly dry and hardened before beginning your cinerator, for if not the ramp is liable to give way and bring the whole to the ground.

8. This arrangement dispenses with one vent hole, but I find three are ample, as I have had two cinerators working on this system for some time and they do well.

9. Of course I wish it to be clearly understood that this artificial ramp is not to be erected where a natural one is to be found, either on the face of a hill or some other rising piece of ground, but as that is not always procurable I submit this plan to overcome that difficulty.

10. Some may think that it is difficult to get a horse to walk up on to the platform to be shot, but I have never encountered the slightest trouble yet, in getting the animal close up to the cinerator as he suffers no mental agony being in utter ignorance of what is about to take place.

11. Since writing my first report on this subject I have seen the bodies of some human beings cremated by means of bratties or dung cakes, which was most effectual, simple in the extreme, and inexpensive, and might with advantage be made applicable to the disposal of the carcases of the lower animals, more especially where it might be impracticable and unnecessary, to build a cinerator, in such instances where a regiment or battery were on the march, or where a sudden outbreak of disease gave no time to erect one. These bratties can be bought in the bazaars for about two annas per 100, but when a regiment or battery is in a station they ought to be made up by the sick line syces in their spare time, and stored away in stacks so as always to be ready for use when required. The way I saw them used was, a pile was made of the bratties about 1½ feet high, then the body was laid on and more of them placed over it which formed a regular mound, the whole was lit from below, and in a very short time little was left but ashes.

12. With the carcase of an animal of course the difficulty would be in getting it on to the pile, but I think if it was simply laid on the ground and well covered with bratties, and lighted, that cremation would rapidly take place. Of course if a hole were dug, say, 6 × 4 × 2 and filled with dung cakes, the carcase placed over them and well covered, there would, no doubt, be a saving in fuel.

JAMES MILLS,
Veterinary-Surgeon A.M.D.

ESTIMATE for constructing a mud-wall cinerator as shown in the accompanying Plan No. 1.

ST. THOMAS' MOUNT,
May 1882.

Item No.	Detail of Cost.	Total Estimate of Cost. RS.	A.	P.	REMARKS.
1	157 Cubic feet, excavating foundation at 3·50 per 1,000 feet	1	0	0	
2	592 Cubic feet, constructing a mud-wall at 2·00 per 100 feet	11	0	0	
3	4 Granite stones at 1·50 each	6	0	0	
	Total ..	18	0	0	

JAMES MILLS,
Veterinary-Surgeon.

The above estimate was given by the Executive Engineer of the District.

Detailed Estimate for constructing a brick-wall Cinerator as per accompanying Plan No. 2.

ST. THOMAS' MOUNT,
May 1882.

Particulars.	No.	Measurement. Length.	Breadth.	Depth.	Contents.
BRICK IN CLAY.					
Foundation to cinerator	1	44·00	3·00	3·00	396·00
Superstructure do. below	1	44·00	2·50	4·00	440·00
Do. do. above	1	37·00	2·00	12·00	888·00
					C.ft. 1724·00
Deduct—					
Door way ..	1	4·00	2·25	6·00	54·00
Arch do.	4	2·00	2·50	2·75	55·00
Side of door	2	6·00	2·25	0·75	20·25
Flat arch-work	1	5·00	2·25	1·50	17·00
Do. small	4	5·25	2·50	1·50	79·00
					C. ft. 225·25
					1498·75
Remaining left		....	....	....	
BRICK IN CHUNAM.					
Side of door	2	6·00	2·25	0·75	20·25
ARCH-WORK IN CHUNAM.					
Over door	1	5·00	2·25	1·50	17·00
Over arch-ways	4	5·25	2·50	1·50	79·00
					C. ft. 96·00
ROUGH-STONE WORK INCLUDING POINTING.					
Foundations to ramps	2	12·00	2·00	1·50	72·00
Superstructure to ramp	2	12·00	1·50	2·00	48·00
					C. ft. 120·00
EXCAVATION FOR FOUNDATION.					
Cinerator	1	44·00	3·00	3·00	396·00
Ramp	2	12·00	2·00	1·50	72·00
					C· ft. 468·00
Iron door, complete	1	4·00	6·00	No.	1
Iron-work, square iron bars, for gratings ..	1	350·00	1½"	1½"	Lb. 2628·50

Abstract Estimate for Constructing a cinerator as per Plan No. 2.

Quantity.	Description.	Rate.	Per	Amount.	Total.
1499	C. ft. brick in clay	12·00	100 C.ft.	180	
26	Do. arch-work in chunam	25·00	Do.	24	
20	Do. brick in chunam	16·00	Do.	3	
120	Do. rough stone work including pointing	5·50	Do.	7	
468	Do. excavation	4·00	1,000 C.ft	2	
1	No. Iron door, complete, 4′ × 6′ ..	50·00	Each	50	
2629	Lb. of square iron bar for grating ..	30·00	500 lb.	158	
8	Squares of plastering, one coat ..	1·50	Sqr.	12	
	Total Estimate, Rupees ..	....	....	....	436·00

If old rails were used, instead of new square iron bars, for the grid or grating, the cost would be Rupees 79 less or Rupees 357.

JAMES MILLS,
Veterinary-Surgeon.

REPORT ON CINERATORS.

CINERATORS AND SANITATION.

1. In a country like India where there are so many domesticated animals the proper disposal of the dead seems to me a question of paramount importance, although one evidently much neglected.

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SITE.

14. The site for building them on should be selected where as much draught is procurable as possible, and where the smoke from the cinerator will not become a nuisance or in any way interfere with the public health.

BUILDING.

15. Where clay is not procurable the wall must be made much thicker, especially at its base, in fact to stand any time it ought to be made nearly double that of a clay wall, see mud line marked 3 in Plan I.

16. After the foundation is constructed allow it to set for some days before beginning the superstructure, then build the first 3 feet of the wall, and allow that also to thoroughly harden before placing the stones on which are to form the top or arch of the vent holes. After this you may build as quick as circumstances will permit, care being taken not to be in too great a hurry.

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18. A good foundation for the steps is a few loads of stones or large boulders.

19. When the cinerator is finished, and thoroughly dry, it ought to be well "lapped" over, and this operation repeated weekly after all the cracks in the wall have been filled up.

RULES FOR ITS USE.

20. (1.) In filling the cinerator for the first time let as much straw as can be spared be placed in the bottom so as to give the fire a start, and then gradually fill it up, and when half full ignite the straw at the vent holes; after the walls are thoroughly heated any material will burn.

(2). Care must *be* taken to keep the vent holes *well* cleared of ashes to prevent "choking." This can be done by having a rake or fork made, and secured to the end of a long bamboo.

(3). Clear the cinerator entirely out about every fortnight or three weeks, so as to make any repairs to the walls which may be necessary.

(4). For cremating a carcase fill your cinerator about three parts full with litter, see "litter line" marked No. 4 in Plan No. 1, place the body on, either whole or in pieces, and cover over. From time to time supply plenty of fuel to ensure the thorough cineration of the carcase.

5. During the "rains" have a large tattie made to place against the side on which the rain is beating, and construct a trench round it to prevent inundation.

REMARKS.

21. As regards the building of the brick cinerator, as shown in Plan No. 2, that of course must be left to those who make such work their profession. I have never had the opportunity of seeing one at work, but have no doubt they would answer the purpose well, and if at all practicable they ought to get a trial. Of course the cost of construction will, I am afraid, debar them from becoming generally used, except perhaps in large stations such as Secunderabad or Bangalore, where one of them might be built, for cremation purposes, for the common use of all the troops.

22. The ashes or charcoal from the cinerator I have found most useful, to throw down in stables where animals have urinated, acting by absorbing the urine and also as a deoderizer. All that is required are a few heaps of the ashes distributed throughout the stable so as to be readily got at by the syces.

23. In conclusion, these cinerators like everything else, if we want them to succeed must be personally superintended both in the building and the working of them, as if left to others carelessness will probably bring them into discredit and eventual disuse; but after two years' experience of them, and having spent a great deal of time and trouble in bringing them to their present state, I can confidently assert that, if built according to the plans I have submitted, and worked as laid down in this report, they will be found valuable agents in a sanitary point of view.

JAMES MILLS,
Veterinary Surgeon, A.M.D.

APPENDIX.

1. In the photograph accompanying this report it will be observed that a derrick and tackle have been brought into use to lift the whole carcase into the cinerator, but as the purchase and upkeep of this mode of working would be somewhat expensive, which I wish particularly to avoid, and not always available, I have invented a ramp and platform as shown in Plan No. 3, so as to entirely do away with that arrangement.

2. The ramp is at a gradient of 1 foot in 5, which will not be found excessive. It is broad enough for a cart to be driven up, which when on the platform can be turned round, tilted up, and the carcase, or anything else it might contain, slid into the cinerator.

3. The platform I have designed as a place where, when an animal is to be destroyed, he can be shot close to the mouth of the cinerator, and then rolled in without trouble. And also as a place where all *post-mortem* examinations ought to be made, which seems to me highly essential as it is *undoubtedly* a bad and unsafe practice to allow these examinations to be made in the vicinity of sick lines or stables.

4. The 2 feet wall on ramp and platform is put up for the purpose of preventing the animal when in the act of falling, after being shot, from getting over the side. This wall I find to be necessary, because a few days ago I shot a horse on the ramp, on which he fell, but the greatest difficulty was experienced in moving the carcase in, as in rolling it over the head or hind legs were always getting over the side, which caused a certain amount of delay, with the risk of its slipping off the ramp altogether.

5 So as not to make the ramp and platform too high, which would have increased the gradient, I have taken a portion of the wall out opposite the stage (see part of wall removed, No. 9 in Plan 3) to bring the mouth of the cinerator on a level with it. This portion of the wall which has been taken out will be found not to interfere in any way with the cremating powers of the arrangement.

6. The wall next the ramp must be straight, see Fig. 2, Plan 3, as it is only natural to infer that if inclined inwards the mass of earth behind it will bring it down

7. In constructing on this plan build your ramp first, and allow it to be thoroughly dry and hardened before beginning your cinerator, for if not the ramp is liable to give way and bring the whole to the ground.

8. This arrangement dispenses with one vent hole, but I find three are ample, as I have had two cinerators working on this system for some time and they do well.

9. Of course I wish it to be clearly understood that this artificial ramp is not to be erected where a natural one is to be found, either on the face of a hill or some other rising piece of ground, but as that is not always procurable I submit this plan to overcome that difficulty.

10. Some may think that it is difficult to get a horse to walk up on to the platform to be shot, but I have never encountered the slightest trouble yet, in getting the animal close up to the cinerator as he suffers no mental agony being in utter ignorance of what is about to take place.

11. Since writing my first report on this subject I have seen the bodies of some human beings cremated by means of bratties or dung cakes, which was most effectual, simple in the extreme, and inexpensive, and might with advantage be made applicable to the disposal of the carcases of the lower animals, more especially where it might be impracticable and unnecessary, to build a cinerator, in such instances where a regiment or battery were on the march, or where a sudden outbreak of disease gave no time to erect one. These bratties can be bought in the bazaars for about two annas per 100, but when a regiment or battery is in a station they ought to be made up by the sick line syces in their spare time, and stored away in stacks so as always to be ready for use when required. The way I saw them used was, a pile was made of the bratties about 1½ feet high, then the body was laid on and more of them placed over it which formed a regular mound, the whole was lit from below, and in a very short time little was left but ashes.

12. With the carcase of an animal of course the difficulty would be in getting it on to the pile, but I think if it was simply laid on the ground and well covered with bratties, and lighted, that cremation would rapidly take place. Of course if a hole were dug, say, 6 × 4 × 2 and filled with dung cakes, the carcase placed over them and well covered, there would, no doubt, be a saving in fuel.

JAMES MILLS,
Veterinary-Surgeon A.M.D.

ESTIMATE for constructing a mud-wall cinerator as shown in the accompanying Plan No. 1.

ST. THOMAS' MOUNT,
May 1882.

Item No.	Detail of Cost.	Total Estimate of Cost.			REMARKS.
		RS.	A.	P.	
1	157 Cubic feet, excavating foundation at 3·50 per 1,000 feet	1	0	0	
2	592 Cubic feet, constructing a mud-wall at 2·00 per 100 feet	11	0	0	
3	4 Granite stones at 1·50 each	6	0	0	
	Total ..	18	0	0	

JAMES MILLS,
Veterinary-Surgeon.

The above estimate was given by the Executive Engineer of the District.

Detailed Estimate for constructing a brick-wall Cinerator as per accompanying Plan No. 2.

ST. THOMAS' MOUNT,
May 1882.

Particulars.	No.	MEASUREMENT.			Contents.
		Length.	Breadth.	Depth.	
BRICK IN CLAY.					
Foundation to cinerator	1	44·00	3·00	3·00	396·00
Superstructure do. below	1	44·00	2·50	4·00	440·00
Do. do. above	1	37·00	2·00	12·00	888·00
					C.ft. 1724·00
Deduct—					
Door way	1	4·00	2·25	6·00	54·00
Arch do.	4	2·00	2·50	2·75	55·00
Side of door	2	6·00	2·25	0·75	20·25
Flat arch-work	1	5·00	2·25	1·50	17·00
Do. small	4	5·25	2·50	1·50	79·00
					C. ft. 225·25
Remaining left		....	....	....	1498·75
BRICK IN CHUNAM.					
Side of door	2	6·00	2·25	0·75	20·25
ARCH-WORK IN CHUNAM.					
Over door	1	5·00	2·25	1·50	17·00
Over arch-ways	4	5·25	2·50	1·50	79·00
					C. ft. 96·00
ROUGH-STONE WORK INCLUDING POINTING.					
Foundations to ramps	2	12·00	2·00	1·50	72·00
Superstructure to ramp	2	12·00	1·50	2·00	48·00
					C. ft. 120·00
EXCAVATION FOR FOUNDATION.					
Cinerator	1	44·00	3·00	3·00	396·00
Ramp	2	12·00	2·00	1·50	72·00
					C· ft. 468·00
Iron door, complete	1	4·00	6·00	No.	1
Iron-work, square iron bars, for gratings ..	1	350·00	1½"	1½"	Lb. 2628·50

Abstract Estimate for Constructing a cinerator as per Plan No. 2.

Quantity.	Description.	Rate.	Per	Amount.	Total.
1499	C. ft. brick in clay	12·00	100 C.ft.	180	
26	Do. arch-work in chunam	25·00	Do.	24	
20	Do. brick in chunam	16·00	Do.	3	
120	Do. rough stone work including pointing	5·50	Do.	7	
468	Do. excavation	4·00	1,000C.ft	2	
1	No. Iron door, complete, 4′×6′ ..	50·00	Each	50	
2629	Lb. of square iron bar for grating ..	30·00	500 lb.	158	
8	Squares of plastering, one coat ..	1·50	Sqr.	12	
	Total Estimate, Rupees ..	....	....	....	436·00

If old rails were used, instead of new square iron bars, for the grid or grating, the cost would be Rupees 79 less or Rupees 357.

JAMES MILLS,
Veterinary-Surgeon.

REPORT ON CINERATORS.

CINERATORS AND SANITATION.

1. In a country like India where there are so many domesticated animals the proper disposal of the dead seems to me a question of paramount importance, although one evidently much neglected.

2. By burial, however deep, certain parts of the country in time, must become more or less contaminated, and the atmosphere rendered impure and unhealthy, and dangerous both for man and beast to live in.

3. Burying is without a doubt the most insanitary mode of getting rid of the dead, and one which ought to be put a stop to, where practicable, by Government, and even the institution, if necessary, of stringent laws on the subject. Although, perhaps, they might infringe on the private rights of the population, that consideration must be set aside when through improper sanitation the lives of human beings are in danger.

4. I would strongly recommend the building throughout India of cinerators, according to my plans, herewith attached. Not only for the purpose of cremating, or reducing to ashes, the carcases of animals that have died from such diseases as Anthrax, or have been destroyed for Glanders, but also for getting rid of all refuse or objectionable matter, such as dressings from wounds and sores, and the stable litter in stations where it cannot be utilized as manure, and where its accumulation becomes objectionable.

5. I am perhaps late in bringing this subject to notice, but it is to be hoped not too late to do some good; for I see no better or more effectual mode of getting rid of diseased germs than by fire, and in fact it is clearly evident that this is the only true way of preventing the spread of contagion.

6. Pasteur says that the disease germs of Anthrax (one of two most fatal animal scourges we have in India and one whose increasing prevalence no doubt is due to the burial instead of the cremation of the dead) can travel long distances through the medium of earth worms and retain their vitality for a very long period. Is not such an authority as his enough for us to use proper and thorough means for the destruction of these germs, and in that way to remove the cause of the disease; as while the cause exists the effect will never cease.

7. In various parts of India where we hear of outbreaks of disease amongst men and animals, we should ask what are the causes? Might they not be due to the absence of proper measures for the disposal of infected matter? but whether such be the case or not, I should like very much to see cineration get a trial.

8. Cinerators ought to be erected near all hospitals, cholera camps, sick lines for animals, and bazaars, for the purpose of burning every thing likely to convey disease or to prove insanitary.

9. As regards the question of fuel for those for hospital use, in all stations where there are horses, it would be an easy matter to get a load of stable litter, which I find answers the purpose well.

10. Now as to the cost of building a cinerator: made of mud or clay a small one would cost only Rs. 8 or 9, and a large one for cremating animals in would cost Rs. 16 or 18; therefore on the score of expense there can be little objection to them. Clay is of course much to be preferred as it forms a firmer and more permanent wall, and less likely to be affected by the rains than mud, and in stations where it is procurable I would strongly recommend its use. If they are to be constructed of brick, then we come into the subject of expenditure, which is always best to be avoided; but from two

years' experience of the mud ones I find they serve every requirement. They can be easily and readily put up without the aid of skilled labor, and at a trifling cost, which is no small item in their favor.

11. To show what can be done with these cinerators, I have been able during the outbreak of Glanders and Farcy at St. Thomas' Mount, to cremate the carcases of eleven of the horses destroyed for the disease, and at Secunderabad I disposed of the carcase of a horse, that died from Anthrax, in the same manner. The average time occupied in reducing them to ashes was about twelve hours per horse, and with no other fuel than stable litter. I think this is sufficient evidence of their utility, and I cannot help remarking that I look upon it as most satisfactory, for I have been able to effectually dispose of the carcases of these animals without incurring but little expense to the Government, and saving the district from probable contamination by burial; and it also tends to illustrate how far many of the sanitary evils which now exist are subject to human control.

12. Of course cremation may be made much more speedy by the aid of wood, but I do not see that it is at all necessary, as the stable litter consumes the carcase quick enough for all practical purposes.

13. It requires very little consideration to see that the cineration of diseased matter is but a rational means for the preservation of health, and the prevention of epidemic afflictions.

SITE.

14. The site for building them on should be selected where as much draught is procurable as possible, and where the smoke from the cinerator will not become a nuisance or in any way interfere with the public health.

BUILDING.

15. Where clay is not procurable the wall must be made much thicker, especially at its base, in fact to stand any time it ought to be made nearly double that of a clay wall, see mud line marked 3 in Plan I.

16. After the foundation is constructed allow it to set for some days before beginning the superstructure, then build the first 3 feet of the wall, and allow that also to thoroughly harden before placing the stones on which are to form the top or arch of the vent holes. After this you may build as quick as circumstances will permit, care being taken not to be in too great a hurry.

17. I find the best men to employ, as builders, are the horse-keepers of the battery as although they are not skilled laborers and require a good deal of watching, still they are well up in the erection of mud buildings.

18. A good foundation for the steps is a few loads of stones or large boulders.

19. When the cinerator is finished, and thoroughly dry, it ought to be well "lapped" over, and this operation repeated weekly after all the cracks in the wall have been filled up.

RULES FOR ITS USE.

20. (1.) In filling the cinerator for the first time let as much straw as can be spared be placed in the bottom so as to give the fire a start, and then gradually fill it up, and when half full ignite the straw at the vent holes; after the walls are thoroughly heated any material will burn.

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REMARKS.

21. As regards the building of the brick cinerator, as shown in Plan No. 2, that of course must be left to those who make such work their profession. I have never had the opportunity of seeing one at work, but have no doubt they would answer the purpose well, and if at all practicable they ought to get a trial. Of course the cost of construction will, I am afraid, debar them from becoming generally used, except perhaps in large stations such as Secunderabad or Bangalore, where one of them might be built, for cremation purposes, for the common use of all the troops.

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6. The wall next the ramp must be straight, see Fig. 2, Plan 3, as it is only natural to infer that if inclined inwards the mass of earth behind it will bring it down

7. In constructing on this plan build your ramp first, and allow it to be thoroughly dry and hardened before beginning your cinerator, for if not the ramp is liable to give way and bring the whole to the ground.

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JAMES MILLS,
Veterinary-Surgeon A.M.D.

Estimate for constructing a mud-wall cinerator as shown in the accompanying Plan No. 1.

St. Thomas' Mount,
May 1882.

Item No.	Detail of Cost.	Total Estimate of Cost.			Remarks.
		RS.	A.	P.	
1	157 Cubic feet, excavating foundation at 3·50 per 1,000 feet	1	0	0	
2	592 Cubic feet, constructing a mud-wall at 2·00 per 100 feet	11	0	0	
3	4 Granite stones at 1·50 each	6	0	0	
	Total ..	18	0	0	

JAMES MILLS,
Veterinary-Surgeon.

The above estimate was given by the Executive Engineer of the District.

Detailed Estimate for constructing a brick-wall Cinerator as per accompanying Plan No. 2.

St. Thomas' Mount,
May 1882.

Particulars.	No.	Measurement.			Contents.
		Length.	Breadth.	Depth.	
Brick in Clay.					
Foundation to cinerator	1	44·00	3·00	3·00	396·00
Superstructure do. below	1	44·00	2·50	4·00	440·00
Do. do. above	1	37·00	2·00	12·00	888·00
					C.ft. 1724·00
Deduct—					
Door way	1	4·00	2·25	6·00	54 00
Arch do.	4	2·00	2·50	2·75	55·00
Side of door	2	6·00	2·25	0·75	20·25
Flat arch-work	1	5·00	2·25	1·50	17·00
Do. small	4	5·25	2·50	1·50	79·00
					C. ft. 225·25
Remaining left		....	....	....	1498·75
Brick in Chunam.					
Side of door	2	6·00	2·25	0·75	20·25
Arch-work in Chunam.					
Over door	1	5·00	2·25	1·50	17·00
Over arch-ways	4	5·25	2·50	1·50	79·00
					C. ft. 96·00
Rough-stone work including Pointing.					
Foundations to ramps	2	12·00	2·00	1·50	72·00
Superstructure to ramp	2	12·00	1·50	2·00	48·00
					C. ft. 120·00
Excavation for Foundation.					
Cinerator	1	44·00	3·00	3·00	396·00
Ramp	2	12·00	2·00	1·50	72·00
					C· ft. 468·00
Iron door, complete	1	4·00	6·00	No.	1
Iron-work, square iron bars, for gratings ..	1	350·00	1½"	1½"	Lb. 2628·50

Abstract Estimate for Constructing a cinerator as per Plan No. 2.

Quantity.	Description.	Rate.	Per	Amount.	Total.
1499	C. ft. brick in clay	12·00	100 C.ft.	180	
26	Do. arch-work in chunam	25·00	Do.	24	
20	Do. brick in chunam	16·00	Do.	3	
120	Do. rough stone work including pointing	5·50	Do.	7	
468	Do. excavation	4·00	1,000 C.ft	2	
1	No. Iron door, complete, 4′×6′ ..	50·00	Each	50	
2629	Lb. of square iron bar for grating ..	30·00	500 lb.	158	
8	Squares of plastering, one coat ..	1·50	Sqr.	12	
	Total Estimate, Rupees ..	....	....	....	436·00

If old rails were used, instead of new square iron bars, for the grid or grating, the cost would be Rupees 79 less or Rupees 357.

JAMES MILLS,
Veterinary-Surgeon.

1

Thro: Secretary to Govt
Military Deptt

QUARTERMASTER-GENERAL'S OFFICE,
Fort Saint George.
4th November 1882

No. 8866

From

THE QUARTERMASTER-GENERAL,

To

THE Ag Under Secretary to Government
Public Works Department.

SIR,

With reference to your No. 1874 dated 20th October 1882, I have the honor, by order, to forward copy of the cheap Cinerators referred to.

2. 5 Copies of the Printed Report on Cinerators are also enclosed for information.

I have the honor to be,
Sir,
Your Obedient Servant

D. J. S. McLeod
Major
Offg Dy Q. M. General.

No. 5906.
Forwarded
[illegible] Colonel
6-11-82. Offg Secy to Govt
To Mily Dept [illegible]

P.W.C. No 7674

P.W. (1882) Departt

No 6422

From.

The Quartermaster Genl

To

The Ag Under Secretary
to Government
P.W. Deptt

Enclos. [illegible] + 4 [illegible]
+ (1 plan)

No 8866

Dated 4th November 1882.
Recd 6 " "
Recd. 8/11/82

Forwards a Copy of the plan of the Cheap Incinerator, together with five copies of printed reports on Incinerators.

B. G.O. 2998 W.A. 13/11/82

Entd in Receipt Regr.

B No 2998 W.A. 13th Nov/82

Copies of the plan & report will be furnished to the Supdg Engrs Third & Fifth Circles in continuation of G.O. No 2499 W. d/ 26th Sept 82.

10.11.82

G.O. 2499 W. 26.9.82
No 1874-C. 20.10.82

S.E. Third Circle with refce to his letter No 1270 d/ 17.10.82 }
S.E. Fifth Circle }
with copies of Report & plan.

Despd 17-11-82.

J 17/11

GOVERNMENT OF MADRAS.
MILITARY DEPARTMENT.

8855/12

cepted 17-11-82.

Entd. in Receipt Regr.

Jd 7/11

Jd 31/7

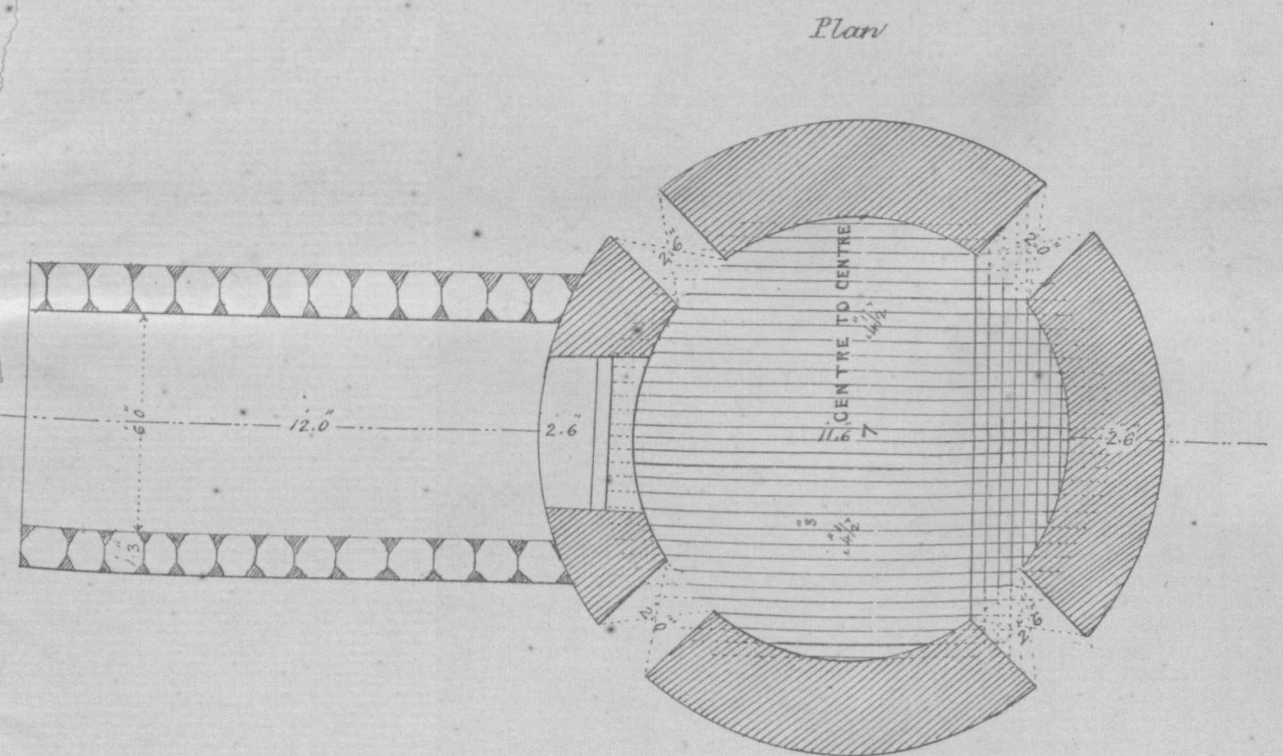
e.r.c.

Entd. in

GOVERNMENT OF MADRAS.
MILITARY DEPARTMENT.

ANIMAL CREMATION.

882.



Section thro: A.B.

Despd 17-11-82.

Entd in Receipt Regr.

J 07/11

Col Monder

F 31/7

C.T.C.

Entd in

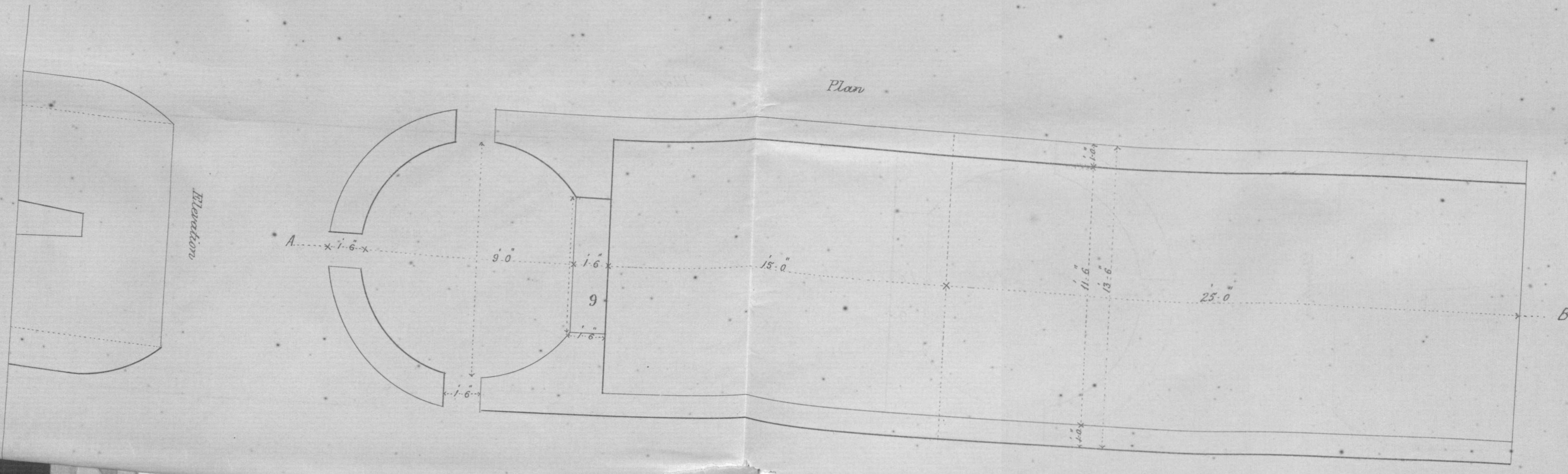
GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

No 3.

PLAN OF CENERATOR WITH RAMP AND PLATFORM.

See. O.G. No 4704 dated 4th September 1882.



Despd 17-11-82.

J.O. 7/11

Entd in Receipt Regr.

with order

No 31/1 e.r.c.

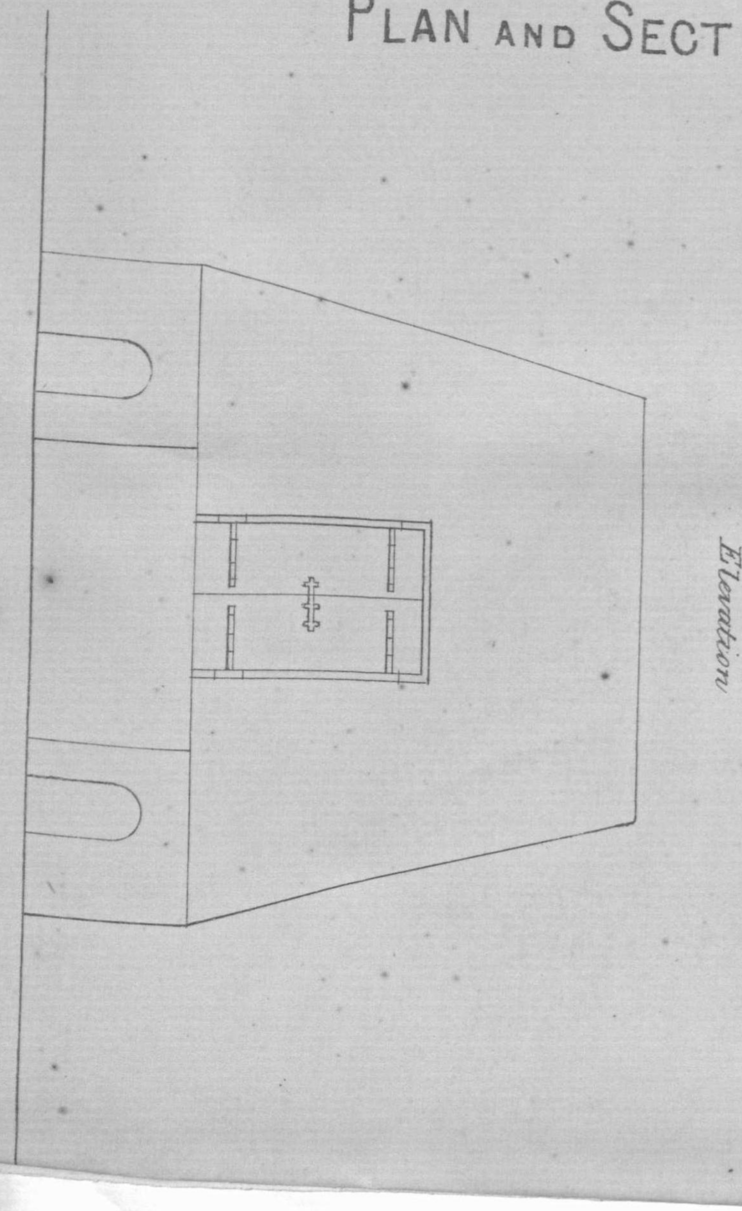
Entd in [illegible]

GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

PLAN AND SECTION OF A CINERATOR FO

See. O.G. No. 4704 dated 4th Sep



Despd 17-11-82.

Entd in Receipt Regr.

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With order

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Entd in

GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

1_ Foundation
2_ Wall
3_ Grid
4_ Door
5_ Vent holes
6_ Ramp
7_ Grid shewing-squares.

Saldrey
Supt. and Manager
Govt. Lithoc. Dept. Chepauk .....
Madras....... December 1882

(Signed) James Mills V.S.A.M.D.
Saint Thomas Mount.....
May 24th 1882......

Quarter Master Gene
Fort Saint George 6

epted 17-11-82.

Entd in Receipt Regr.

10/7/11

F 31/1

O.T.C.

Entd in

Thro' Mily. Department

QUARTERMASTER-GENERAL'S OFFICE,
Fort Saint George
19th December 1882.

No. 10334

From

THE QUARTERMASTER-GENERAL,

To

THE Ag. Under Secretary
to Government P. W. Deptt

SIR,

In Continuation of this Office letter No. 8866 dated 4th November 1882 I have the honor by Order to forward you five Copies of each of the plans referred to in para 4 of the Report on Cremators forwarded therewith, and to request you will be good enough to acknowledge their receipt.

I have the honor to be
Sir
Your Obedient Servant
D. J. S. McLeod Major
Offg. Dy. Qur. Genl.

No. 6837
Forwarded

Colonel
Ag. Secy. to Govt.

30th Dec 82

Fd 31/1

C. T. C.

Entd. in [illegible]

Thro Mily Deptt

No. S 7346

From P. W. C No. 8885

The Quarter Master Genl

To The Ag. Secy to Govt
P. W. Deptt.

Enclos: 2
(2 plans)
4. S.C of plans in each.

Dated 19th Decr

Received 20

Rew. 22/12/82

No. 10334

Forwards 5 Copies of each of the plans referred to in para 4 of the Report on Cinerators.

No. 99 W of 10 Jany/83

By No. 99 W of 10 Jany/83

Copies will be
Copies will be
furnished to the Supdg:
furnished to the Supdg.
Engineers 3rd & 5th circles
Engrs 3rd & 5th Circles
in continuation of
in Continuation of
G.O. 2998 W of 13 Novr/82
G.O. 2998 W of 13 Novr 82

CEL
5/1/83

G.O. 2299. W 26.9.82
" 2998. W. 13.11.82

S. Es 3rd & 5th Circles with plans
S. Es 3rd & 5th Circles with plans
Mily: Dept
Mily: Dept

5, 4 plans
5, 4 - do Despd 10-1-83

with order

with order

GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

9th July 1883, No. 3806.

Horses—Sanitary.

Read the following paper :—

No. 79. *From Colonel R. C. STEWART, Officiating Quartermaster-General, to Colonel E. L. HANKIN, Secretary to Government, Military Department; dated Ootacamund, 25th June 1883, No. 427-4662.*

With reference to O. G., No. 4704, dated 4th September 1882, I have the honor, by order, to forward, for the information of Government, the enclosed improved plan of a cinerator, accompanied by copy of a letter * from Veterinary-Surgeon Mills, describing the improvements which he has effected, by experiment, on the previous plan, and recommending that this plan be adopted in substitution of the former one.

2. His Excellency the Commander-in-Chief has approved of the improved plan, and has directed that it be circulated, with copy of letter from Veterinary-Surgeon Mills, to out-stations, in substitution of the previous one.

* No. 1141-B., dated 27th April 1883.

From J. MILLS, Esq., M.R.C.V.S., Inspector of Cattle Diseases, to G. EVANS, Esq., Inspecting Veterinary-Surgeon, Madras Army, Ootacamund; dated Saidápet, 27th April 1883, No. 1141-B.

I have the honor to report that, in continuing my experiments with cinerators, I have at last been able to devise one which seems to me as near as perfect as one can get them, especially when only built of mud, and certainly an improvement on any I have yet built.

It differs from those referred to in my previous reports in the following particulars :—

1st.—The vent holes are much smaller ;
2nd.—The opening at top is narrowed ;
3rd.—They are higher in proportion to their breadth than the previous cinerators ;
4th.—They cremate the carcases much quicker ;
5th.—The cost of building is only Rs. 4-8-0. †

† When coolies are hired for the work.
(Initialled) G. E.

2. With these advantages, and after many careful experiments, I have come to the conclusion that this form of cremator will be found in every way preferable to any others, and I would strongly recommend its adoption.

3. Since building this cinerator, I have reduced to ashes one large Australian cow and three horses in it, and the time occupied was certainly less than on any other occasion.

4. For particulars as to construction, see attached plan marked enclosure No. 1.

No. 80. ORDER THEREON, 9th July 1883, No. 3806.

Communicated to departments furnished with Proceedings of Government, No. 4704, dated 4th September 1882, and the plan transferred to the Financial Department.

(True Extract.)

(Signed) E. L. HANKIN, Colonel,
Secretary to Government.

To the Quartermaster-General.
„ Surgeon-General, Her Majesty's Forces.
„ Financial Department, with 1 plan.
„ Public Works Department.
„ Sanitary Commissioner.
„ Adjutant-General, for information.

Exd. P. L. Pereira.

Fd 31/7 C.T.C.

5847

Govt. of {1883} Madras.

MILITARY.

To
The QUARTERMASTER-GENERAL,
&c., &c., &c.

Dated July, 9th.

Issued

Recd. *Encl.*

G.O., 9th July 1883, No. 3806.

No. 1992 w.f. 18 July 1883.

JULY.
Nos. 79-80.

Communicated bth Sces 3d & 5th Circles in continuation of G.O. No. 2499 W of 26th Septr/82

Sce, 3d Circle
" 5th " "

Sd J.A.S.R.

Horses—Sanitary.

Cinerator.—Improved plan of —, forwarded by the Quartermaster-General in view to its adoption in substitution of the former one.

Fd 31/7 C.T.C. Estd. in [illegible]

Office of the Inspector of Cattle Diseases,
Saidápet, 27th April 1883.

No. 1141-B.

From

J. MILLS, Esq., M.R.C.V.S.,
Inspector of Cattle Diseases,

To

G. EVANS, Esq.,
Inspecting Veterinary Surgeon,
Madras Army,
Ootacamund.

Sir,

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For particulars as to construction, see attached plan marked Enclosure No. 1.

I have, &c.,

(Signed) J. MILLS, V.S.,
Inspector of Cattle Diseases.

(True Copy.)

(Signed) J. MILLS, V.S.,
Inspector of Cattle Diseases.

(True Copy.)

D. J. S. McLEOD, Major,
Offg. Deputy Quartermaster-General.

Quartermaster-General's Office,
Fort Saint George,
28th June 1883.

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* When Coolies are hired for the work.
(Intd.) G. E.

F 31/7

c.r.c.

Entd. in Receipt