

(1) Number of pages 11(2) Date of repair 5/11/67(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 1379	Press Mis.
216-17	
Dated 8. 5	1867.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
8th May 1867.*

No. 216. Read the following Proceedings of the Madras Government in the
Military Department:—

Communicating certain correspondence on the
subject of the introduction of the dry earth
system of conservancy in the Fort, and request-
ing the Public Works Department to issue in-
structions for the better ventilation of the
privies } (Here enter 2nd May 1867, No. 1,598.)

No 217. ORDER THEREON, 8th May 1867, No. 1,399.

MILITARY WORKS, No. 19.

1. Communicated to the Superin-
tending Engineer of the 4th Division,
in continuation of the Proceedings of

Government No. 1,375, dated 6th instant.

2. Colonel Boileau will take measures for carrying out the improvement
referred to in paragraph 2.

(True Extract.)

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

To the Superintending Engineer, 4th Division.
,, Military Department.

MILITARY DEPARTMENT.
PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following papers:—
From the Barrack Master, Presidency, Fort Saint George, 27th March 1867,
No. 2364; to the Secretary to Government, Military Department.

Government having entrusted the Barrack Department with the conduct of
the experiment with dry earth, as a

Enclosures 2

means of conservancy, I have the honor

to submit an outline of the operations carried out under circumstances adverse to
its complete adaptation.

2. I am the more desirous in this early stage of the experiment, that Govern-
ment should be made acquainted with the mode really adapted, as in a memoran-
dum recently received from the Sanitary Commissioner, herewith forwarded, the
details are but imperfectly represented, and questions are involved which, if acquies-
ced in, would increase the cost of the experiment.

3. Shortly after the introduction of the system, (on the 1st of March) the
Secretary to the Commissioner was informed, under date the 8th idem*, that the
earth conservancy was in "partial ope-

**Copy accompanying.*

ration in the Fort privies, and in the

Vepry latrine," circumstances as explained in the letter having prevented the
adoption of the conservancy in its entirety.

4. The principle of the system was explained to the attendants, viz. that dry
earth is a "disinfectant," but that to render it efficacious in promoting rapid and
inoffensive decay, it is necessary that the matter should be completely surrounded
with dry earth, and that on all occasions when vessels in the privies had been used,
they were to be supplied at once with earth. Its advantages were also fully pointed
out, and in fact had been illustrated, on previous occasions, at the Male Asylum
where they had been instructed in the subsidiary operations with the pug-mill.

5. The following rules were prescribed as a guide in carrying out the method
derived principally from conversations with Mr. Gover.

"Before placing the pans in the recesses, earth is to be put to the depth
of at least $\frac{1}{2}$ an inch. This earth to be fine and sifted so as to dust the sides."

"On taking out a pan, earth is to be thrown on the contents, and the pan
is to be re-placed by a clean one perfectly dry, if necessary."

"The men in rear being now entirely dependent on the watchman in front,
he will be reported to the Officer Commanding the Regiment if failing in his
attention to give warning."

"No water is to be used, but when it is desirable to thoroughly wash the
pans, they are to be taken out by sixes, and washed in the sea."

"Earth is to be thrown completely over the flooring of the archways."
"In re-placing the pans, care should be taken to keep them to that posi-

tion which prevents all escape of solid or fluid excreta beyond the funnels."

"Before pugging, the pans are to be well covered with dry earth, and one
small basket of earth is to be put into the mill to fill the lower portion, and then
the contents are to be discharged into the mill; after every three or four buckets, a

Since increased to 45 lbs.

second basket full is to be put, and when
ready for pugging, the whole of the top

is to be strewn with earth, say 27 lbs. of earth, altogether when the pugging will
commence."

"It will be better that the mill should be turned a few turns after three or four buckets have been emptied."

"No bare excrement is to be thrown into the mill, but is always to be covered with earth."

"The maistry will see to this and report immediately any neglect."

"The fine earth to be kept in the earth store for the pans, but such lumps as are hard may be used in the urine tubs."

"Carts are to be covered with tarpaulins when travelling to the soil pits, and also on return."

"On the contents of one or more vessels being discharged into the mill during the day, the shaft is to be turned a few times round, with the view to more complete mixing of the soil and to diminish the ultimate disengagement of offensive gasses if possible."

"In the event of the pans being used during the night, the attendant on duty early in the morning, about 5.30 A. M., will be careful to see that a complete covering of earth is added, and that when discharged into the mill, additional covering of earth is supplied to absorb the fluid matter as much as possible. No escape from the mill should be permitted."

6. Owing to its construction, the privy being ill adapted for earth conservancy, it was necessary to contrive special means to meet the difficulty and incessant labor attending the direct supply of earth to the vessels. This has in some degree been effected by cutting the arches and recently introducing zinc shoots through the wall where the arches were lower, and by funnels fitted to the vessels—openings being made at the back to admit a scoop from which the earth is forced into the pans by a board moving like a piston.

7. The attendants in the rear being unable to ascertain when earth is required, an additional attendant was obtained from the regiment to warn them when vessels had been used, but the arrangement having been found unsatisfactory, I have requested the Executive Engineer to remedy the defect if possible, by perforating the walls to enable them to see into the interior of the privy.

8. There is another defect which I would notice.

9. Situated immediately under the rampart, and cut off from all wind, the privy is hot and close while the radiation of heat from the wall is such, as to render it extremely oppressive, and as the hot weather advances in all probability will be unbearable.

10. I have informed the Executive Engineer that ventilation is required, but it is to be apprehended that no amount of ventilation will remedy this great evil.

11. In forming an estimate as to the number of attendants that would be required, no provision was made for night toties, as it was considered from the experience of the departments that the amount of matter to be removed in the morning was so comparatively small, that an additional expense would be incurred without corresponding advantages, and as decomposition could scarcely commence at so early a period, it was considered that the application of dry earth and subsequent milling process was all that was necessary.

12. The appearance of the matter in the mill noticed by Dr. Montgomery is thus accounted for—by the discharge of the night vessels which are without the

intermediate supplies of earth. The attendants affirm that the covering of earth is invariably made, and that the supplies to the mill would also have been made on the occasion referred to, had not Dr. Montgomery been engaged at the mill.

13. Should the Government consider that the night toties are a necessity, I will at once entertain them.

14. With this explanation of the method adopted, of some of the difficulties contended with, and the break in the earth supply, I may now add a few remarks on the observations of the Sanitary Commissioner.

15. In paragraph 21st, the Commissioner justly observes on the conservancy at the Male Asylum, "that it is admirably conducted," but it must be remembered that this observation is made after first difficulties have been overcome, and that the boys themselves are compelled at all times to supply the earth to the vessels. In the Fort privies the earth is only supplied by attendants outside, whose view of the interior is cut off, and are entirely dependant on warnings being given from within.

16. I believe that in regimental privies a mechanical delivery of earth is issential to perfect earth conservancy.

17. In paragraph 22, a general conclusion has been formed from the exceptional instance mentioned. During the day the excreta are invariably emptied with the due amount of earth in the vessels, an extra quantity being added just before commencing the milling process. The average daily amount of earth expended in the privy vessels has been 1,422 lbs., besides an addition of about 180 lbs. for the pug-mills.

18. The capacity of the mill is about 40 cubic feet, while that at the Male Asylum is but 5 cubic feet, the difference of time and labor in milling is therefore fully accounted for.

19. On one occasion, when the Secretary inspected the pug-mill, I was present, and on opening the door below, the soil was in an offensive semi-fluid state as described by Dr. Montgomery, but no mention has been made of the fact, that it was returned directly to the mill and subsequently turned out a thick coherent mass. The operation having then been completed.

20. The milling at the family privy was also in progress, and though not completed there was no sign of fluidity at the bottom. The fluid had been absorbed.

21. At the commencement of the process, the mixed soil soon becomes in a semi-fluid state, as indicated by the small resistance at the shaft of the mill, but as the operation proceeds, there is increased resistance from the soil becoming more coherent.

22. In no case does the soil assume the form of poudrette in the mill, neither can it be otherwise, but that gases must be liberated from the pressure the "mixed soil" is subjected to. Mr. Gover prepared me for the unpleasantness incident to the process, which was in some degree left about the Asylum mill.

23. Comparing the numbers in a regiment with those in the Male Asylum, it was naturally to be expected that the process would be attended with increased offensiveness—and such is the fact.

24. Anticipating this result, I was desirous that the mills should be placed at the soil pits beyond the town, to this however the Sanitary Commission objected, and the gasses are now liberated immediately under the walls of the fortress.

25. The time occupied in milling at the Asylum is stated to be less than a quarter of an hour, and the labor of one man only is requisite. The contents in the mill are about 5 cubic feet. The Fort mills are eight times the capacity and require the labor of one man at the beginning, two men as the mass becomes stiff, and ultimately four men to complete the process, the time occupied being about that stated.

26. These mills are no doubt far too large and expensive, but as they appear to have been constructed on an approved plan, the Executive Engineer declined to alter them without authority.

27. In regard to the lumps of earth stated in paragraph 24, as used in the mill, it appears that the Secretary took a lump from a heap which was left outside for the purpose of being placed in the urine tubs, as it is has long been found (during the gratuitous supply of earth by the contractor) that earth in this state is more efficacious than when finely pounded. The contents of these tubs are removed separately in close vessels, and are not milled. A visit to the earth store would have shewn that a portion of the earth was pounded and sifted in readiness for issue for the latrine vessels on data calculated according to requirements. The earth for twelve of Captain Roger's machines in the family privy being finer to prevent the shoot being choked.

28. Paragraph 25 has already been noticed above in paragraph 12.

29. It will be observed that paragraphs 21 to 26, to which my particular attention has been called, refer principally to the operations at the pug-mill. The state of the interior of the privy is unnoticed, but I may state that from my own observations and that of the men themselves who have been questioned, that there is nothing to complain of, and that the atmosphere is as pure as can naturally be expected. Complaints are however very general as to the closeness and heat of the privy and of the distance they have to traverse before reaching it.

30. In the concluding paragraph of the Commissioner's memorandum, a comparison is drawn between the conservancy of the Male Asylum and that of the Fort privies, the one being an entire success, the other a failure. The date of the Commissioner's memorandum is the 23rd March 1867, the experiment was reported under date the 8th March, as being in "partial operation," and in that letter several of the points in regard to construction of the the privies recorded by the Commissioner were brought to notice.

31. Twenty-three days only have elapsed since the introduction of the conservancy, and I trust I have shewn that during that time there has been no want of care or attention in the conduct of the experiment—moreover, having explained the cause of the break in the earth supply during the night, I would submit that too general a conclusion has been drawn by the Commissioner; and that negligence cannot be imputed to this department.

From the Barrack Master, Presidency, Fort Saint George, 8th March 1867, No. 2181; to the Sanitary Commissioner, Madras

I have the honor to inform you that the earth conservancy is now in partial operation in the Fort privies, and in the Vepery latrine, but no pug-mill, as yet, has been supplied to the latter.

2. I have been compelled in some measure to introduce the system thus partially, owing to Municipal objections to Mr Pritchard's arrangements, and to his inability to find suitable deposit pits beyond his own premises

3. The Commissioner is aware that the Fort privies were originally constructed for the wet system of conservancy, with small vessels. The arches are now found to be inconveniently low for earth vessels, and they cannot be properly arranged in contact with the seat, and at the same time, admit of earth being applied without withdrawal.

4. The vessels are completely screened from observation, and the attendants in rear are now dependent on notice being given from the front, when earth is required

5. The Executive Engineer has been requested to arrange, so that the experiment can be conducted with every facility, which I believe can be effected at no great expense

6. The family privy has been fitted with twelve mechanical shoots, but they have been twice out of order since the first instant, when they were brought into use.

7. Two pug-mills have been erected for these privies

8. The work is considerable, requiring the power of three or four men to overcome the resistance, while additional labor is involved from the height of the mill, which compels the men mounting to a stage about three feet high to reach the shaft, and to deposit the contents of the buckets into the "well."

9. It would appear that these mills have been constructed on an approved plan and cannot, therefore, be altered without authority.

10. The ultimate effect of pugging the soil is satisfactory, but the disengagement of gasses on opening the door for removal is extremely offensive. I have given orders to endeavour to check this, by increasing the quantity of earth at the bottom of the mill before commencing the operation, though I fear the offensiveness will still exist in some measure.

N. B.—Since writing this, the requisite alterations to the archways are under execution.

(True Copy)

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

MEMORANDUM.

In June last, the Government of India desired to be informed whether the dry earth system had been thoroughly established throughout this Presidency, and whether it is really a great public benefit

2. In order to give a complete answer to the latter portion of this question, namely, whether this system of conservancy is successful and a public benefit, it was essential that the dry earth conservancy system should have been carefully and completely tested in at least one large station.

3. In the early part of 1865, the Sanitary Commission prepared a pamphlet containing detailed information regarding this conservancy, which was widely circulated in all the stations of the Presidency.

4. After many delays and much correspondence, the Government, by their order as per margin, directed the early introduction of the system into the Regimental Latrines at the Fort and into those of the 2nd Battalion 21st at Secunderabad.

No. 2205, dated 28th June 1866.

5. One of the essentials for the proper working of dry earth conservancy, as applied to large Regimental or Public Latrines, is the provision of one or more pug-mills. I wish to record the manner in which this provision has first been demonstrated in the Fort, the imperfect manner of their construction and the negligence which has attended the carrying out the conservancy system.

6. On the 15th February 1866, Dr. Arnold Smith, Acting Secretary to the late Sanitary Commission, requested the Superintending Engineer, 4th Division, to erect a pug-mill to be worked in connection with the new latrine then in the course of erection in the lines of the Native Regiment in Vepery.

7. On 19th March 1866, the Superintending Engineer forwarded to this office a drawing of a pug-mill. This was approved with the following exceptions.

"The bottom of the mill, it was observed, should be conical in form, otherwise the poudrette would collect at the bottom of the mill and close it"

"The arms inserted in the revolving axis should only be at right angles with it at the top."

"The lower ones should point downwards, their angle with the axis becoming more acute as they descend"

A plan of a pug-mill constructed on this principle was forwarded with the letter from which the three preceding paragraphs are copied.

8. On 7th June 1866, my Secretary directed the attention of the Superintending Engineer to the fact that a latrine then recently erected for the use of the men of the 2nd Regiment Madras Native Infantry at Vepery, was in use though not provided with a pug-mill, and information was requested as to the date upon which the pug-mill would be completed

9. On 27th June 1866, the Superintending Engineer reported that the Vepery latrine had been handed over to the Barrack Master when it was completed, (no date of transfer was given(a); and he added that he was unable to say when the pug-mill would be ready. He also stated that an experimental one was about to be erected at the Male Orphan Asylum

10. On 7th July 1866, the Barrack Master addressing my Secretary requested to be informed as to whether the pug-mill was to be considered as an absolute necessity, and proposed that it should not be so for certain reasons

11. Colonel Worster suggested that as the whole dry earth system was on trial and might be eventually condemned, the cost of pug-mills might be avoided. The reply is that the pug mill at the Male Orphan Asylum only cost less than 20 Rupees. (That built by the Department of Public Works has cost 150).

Colonel Worster stated that the earth mixed with the excreta by the sweepers would sufficiently deodorize them.

He also supposed that the toties would require extra pay for working the pug-mill. To this it may be replied that the pug mill, if properly constructed, need necessitate only a very small amount of physical labor, and that by it the poudrette is rendered perfectly inodorous and much less calculated to cause annoyance in transit through crowded thoroughfares.

12. On 10th of same month (July 1866) my Secretary addressed Colonel Worster and pointed out the importance of supplying a pug-mill as essential to the perfect trial of the system of dry earth conservancy, and showed how important it was that suitable carts for the removal of poudrette should be supplied. He also directed attention to the value of the pug-mill in preventing decomposition and fermentation of excreta in latrines which might prove a source of nuisance, even though some earth had been used; and he further showed that unless passed through the pug-mill, the poudrette should be removed in air tight vessels.

It was also pointed out to Colonel Worster that one toty was able to attend to the latrine used by 300 boys at the Male Orphan Asylum.

13. On 24th July 1866, the Officiating Superintending Engineer forwarded a series of objections urged by Mr Gover, as rendering the experimental pug-mill constructed by the Department of Public Works unsatisfactory, and promising that another, "very similar to that now in constant use at the Military Male Orphan Asylum, but with some improvements in construction, though not in principle, and one-third larger," was to be erected near the latrine of the lines in Vepery. (Eight months have since elapsed and the pug-mill has not been placed near this latrine) Mr. Gover objected to the pug mill sent to him in consequence of its vast size and general ill construction, and pointed out in detail many errors in it.

14. On the day following that upon which the foregoing letter was received, I addressed the Officiating Superintending Engineer and urged the desirability of his having a pug-mill made with the alterations as to size and details of construction suggested in his and Mr. Gover's letters.

15. On the 14th of January 1867, the Barrack Master addressed Government and represented that no pug-mills had up to that date been provided either for the Fort latrines or that in the Regimental Lines in Vepery.

Government in Order No. 386, dated 31st idem, ordered the carrying out of the experiment "without further delay"

(a) In Proceedings of Government, Public Works Department, No. 545, dated 25th February 1867, it is stated that the latrine was handed over on the 29th January 1866

16. On 15th of February 1867, the Superintending Engineer solicited sanction for expending 115 Rupees for the experimental pug-mill, and 150 for a new one for the Vepery latrine. Sanction for this was accorded on 25th idem. The pug mill has not yet been supplied to the Vepery Lines.

17. On 1st March 1867, the new privy was opened at the Fort. The construction of this building is little suited to the dry earth system, as the arches through which the vessels are removed and introduced are small and prevent the easy application of dry earth(a). But the essential addition, the pug mill, is found on examination to be faulty. It is six feet nine inches in height and three feet clear in diameter—Mr. Gover's being only 1' 6" in diameter by four feet in height.

18. According to the plan submitted to the Sanitary Commissioner by the Superintending Engineer, the height of the pug-mill should have been five feet and the breadth two. It was particularly explained that the arms of the spindle should not be made in the shape of blades but of square pieces of wood or iron, and that the upper ones should be horizontal to the spindle and the lower arms sloped at varying angles to it, so as to sweep the conical bottom of the machine.

19. The machine constructed in the Fort, which is destined to be the model of other pug-mills, is three feet in width clear, which causes unnecessary lengthening of the arms of the spindle and increased leverage, and the arms are blade shaped, being only about one-third of an inch in thickness which causes to cut through, but not to mix the material requiring to be made into poudrette.

20. But not alone does the Fort pug-mill differ in point of capacity and construction from the standard pug-mill at the Military Male Orphan Asylum, but I have by personal examination satisfied myself that in details of management there is great negligence.

21. In the Military Male Orphan Asylum, where the conservancy is admirably conducted, the excreta are covered with earth immediately upon being passed into the latrine vessels, and if required an additional quantity of earth is added before these vessels are emptied into the pug-mill. The construction of the latter and various other details connected with the practical working of the dry earth system were specially pointed out to the Engineer and Barrack Master

22. In the Fort, on the contrary, the excreta are simply emptied into the pug-mill and there allowed to remain decomposing until the earth is added just before the milling process is commenced. Hence the admixture of the two materials is slowly and with great difficulty effected. Four toties worked for 1½ hours to complete the manufacture of the poudrette in the Fort—the same process being effected chiefly by one man in less than quarter of an hour in the Male Orphan Asylum. In fact in the latter institution, the poudrette is already in great part formed before the mill is used, and in the Fort the whole process of mixing has to be effected under the greatest difficulty, as all the urine and faeces are at the bottom of the mill, and the dry earth works down with difficulty, and while the lower poudrette is too damp and consequently offensive, the upper portion is almost pure earth.

23. The value at the bottom when opened, gave exit to a quantity of offensive ammoniacal gas, and then watery and most offensive poudrette, and on a subsequent occasion at 8 A.M., the exit of pure faeces and urine which had been emptied into the pug-mill apparently without any earth.

24. I must point out also that in another respect the arrangements in the Fort were far from satisfactory. The earth used consisted in great part of large lumps weighing ½ lb and upwards, and these would take a long time to become broken down by absorption of water.

25. On the last inspection made by my Secretary, Dr. Montgomery, this morning, it appeared that no sifted or other earth had been placed in the pans prior or subsequent to these being used by the men.

26. The absolute success of the dry earth system is evidenced by the Male Military Orphan Asylum, where, under the careful supervision of the principal, Mr. Gover, the new conservancy has answered admirably and with only a trifling increase of expense. Judged by this institution, it would be easy to report to the Government of India that the system is an entire success. Judged by the experiments in the Fort, it would be necessary to state that the system is a failure.

OFFICE OF SANITARY COMMISSIONER,
MADRAS, 22nd March 1867.

(Signed) R S ELLIS,
Sanitary Commissioner for Madras.

(a) This necessary alteration was pointed out in paragraph 8 of a report on the dry earth system entered in the Proceedings of 24th February 1866, page 37.

ORDER, No. 1598, 2nd May 1867.

The Governor in Council considers that the foregoing report on the introduction of the dry earth system of conservancy in the Fort, proves, as far as it has gone, that the Barrack Master has done his best, under the circumstances, to carry out the experiment. The necessity for night conservancy is not apparent.

2. The papers will be communicated to the Department Public Works, in view to instructions being issued for the better ventilation of the privies in question.

(True Extract.)

Macmillan Colonel,
Deputy Secretary to Government.

To the Barrack Master, Fort Saint George.
,, Public Works Department. *with 20 spare Copies*
,, Sanitary Commissioner, ...
,, Quarter Master General, ...
,, Adjutant General, ... } for information.
,, Controller of Military Accounts,
,, Commissary General, ... }

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No 1399 - 8 May 1867
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With an Order

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