M.R.O. 1—77,006—8-6-37.

(1) Number of pages_____

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(3) Initials of the Referencer_____

MADRAS RECORD OFFICE.

Government of Madras.

Public Works **DEPARTMENT.**

G.O. No. 3042 (482-to 485)		Press / ~~Mis.~~
Dated	23 – 12.	1872.

Not to be folded or roughly handled

Read the following papers:—

No. 482. *Proceedings of a Committee assembled on 5th January* 1872 *in obedience to Order of Madras Government, Military Department, No.* 4,123, *dated* 18*th December* 1871.

PRESENT.

Colonel J. L. BARROW, C. B., *President.*
Colonel ROBERT CADELL, Royal Artillery,
Colonel C. V. WILKIESON, Royal Engineers,
Major E. W. CHILDERS, Royal Artillery,
Captain J. N. HUNTER, Royal Engineers,
} *Members.*

THE Committee record that they have personally examined very carefully the site of, and the buildings composing, the Gun-powder Factory.

2. In considering "the best means of securing the safety of the existing buildings," the Committee, in their remarks on the various rooms, etc., will follow, as far as possible, the actual stages of powder manufacture.

3. The green charge room (No. 1 in the accompanying plan), has at present no mounds round it. It is only 43 yards from No. 2 group of mills, and 19 yards from the breaking down room. The Committee consider that mounds should be erected on the two sides next to the mills, it being already to a great degree protected from the breaking down room by a mound or traverse already thrown up round the latter.

4. A mound is also recommended to be erected at the north end of No. 1 group of incorporating mills, namely, between that end and the dust deposit-room, No. 15, between which there is a distance of only 36 yards.

5. The breaking down room, No. 2, of mill cake has already a substantial traverse or mound all round it, which only requires to be revetted with masonry.

6. No. 3 in the plan is the pump-room of the Press recently blown up. As it is not thought advisable to rebuild the Press-room on its late site, which is in the midst of the factory and too closely adjoining other powder-rooms, and as there is now no deposit-room for powder in the form of meal after having been broken down from mill cake, it is recommended that the existing pump-room should be used as a "meal deposit-room." It being only 51 yards from No. 1 group of mills, and still nearer three other powder-rooms; it is recommended that it be traversed all round.

7. A small truck railway should be made from the "breaking down room," No. 2, to the existing "Press-room," No. 4, with a branch to the proposed "meal deposit-room." No. 3. The length of this railway would be about 177 yards, over which meal has now to be carried on men's shoulders.

8. No. 4 is the existing "Press-room." It has already mounds on its flanks and rear. Another mound is recommended to be erected in its front, and a slight extension of the rear mound eastwards is considered advisable.

9. No. 5 is the "Press cake deposit-room." It should be traversed all round, and a small truck railway made from the west window of the Press-room to it.

8-10

Its length will be about 60 yards. The door should be removed from the east to the west side of the room, and a truck railway, about 103 yards in length, is considered advisable to unite this room with the granulating-room No. 5.

10. Nos. 6, 7, and 8 are the "granulating," "reeling," and "glazing rooms." Their proximity to each other, with a steam engine in their centre, is manifestly very dangerous.

11. On the east side of the "granulating-room, No. 6, a mound has been partially erected. It is recommended that this should be finished and extended (with or without a break) along the east front of the "glazing and reeling rooms." On the north side of No. 6 there is a mound, but at the too great distance of 13 yards. It is recommended that a built traverse should be erected close to the north side. On the south side there is already a traverse covered with flat bricks and chunam which has stood well for over nine years.

12. No. 7 is the "reeling-room" and it should be traversed on its south as well as on its east side. Between it and the steam engine and glazing-rooms there is at present a screen wall which, however, was built to resist an explosion of 50 lbs. of powder only. Twenty-four times that quantity is now often in close proximity to it, and this screen wall should, therefore, be strengthened if possible. The machinery in the reeling-room was intended to be worked by manual labour, and it is stated to have been only by the exercise of the most constant vigilance that a break down has not occurred in working this machinery by steam power for many years.

13. No. 8 is the "glazing room." It is 12 yards from the "reeling" and 14 yards from the "granulating-room." The nearest barrel, containing 400 lbs. of powder, is within 6 feet of the flue of one of the two steam engine boilers. The wall between the powder barrel and the flue is often much heated. When this room and the reeling-room were erected they were expected only to be used for a short time. The present Officiating Superintendent does not allow the three rooms, which are in such close proximity, to be worked together at present. This arrangement, though on the whole productive of greater safety, is objectionable in so far that it involves a greater carrying about of powder through the factory enclosure, and renders the powder slightly more expensive. The position of the glazing-room is so bad and dangerous that the Committee cannot see any way of securing its safety.

14. No. 9 has been for some years used as the "green powder deposit-room." Its situation as a deposit-room is very objectionable, as it is in close proximity to other rooms and green powder has to be conveyed a long way to and from it. It is therefore proposed to abandon No. 9 as a "green powder deposit-room," and to utilize it as a "barrelling-room." For the latter purpose it is remarked on in paragraphs 18 and 19.

15. It is proposed to make No. 10 the "green powder deposit-room." It is at present used to store a portion of the duplicate machinery sent out from home some years ago for the purpose of immediate use. No. 10 lies directly between the "glazing-room" No. 8, and the "storing-room" No. 11; and a truck railway should be constructed from the glazing room block of buildings past the door of No. 10 to No. 11, the storing-room. Its length will be about 186 yards. The doors of

Proceedings of the Madras Government, Public Works Department, 23rd December 1872.

No. 10 will have to be removed from the east to the west side, and the present brick-floor must be covered with wood and leather. No. 10 should be traversed on its south, west, and north sides.

16. No. 11 is the "store-room." As no protection exists between it and the boiler and distilling-room in close proximity, it is recommended that a strong built traverse or wall be erected between them, and that the room should be traversed on its north and east sides.

17. No. 12 is the "dried powder deposit-room." It should be traversed all round, leaving room, however, for the existing truck railway running to and past it.

18. No. 13 is at present termed the "barrelling-room." In one compartment a separating machine separates from the rest of the powder the small grain which has been broken down in glazing, storing, and handling. In another compartment the suitable grains are passed through two slope reels for the purpose of being finally dusted. In a third compartment the powder is then barrelled. These processes occupy 12 men, too many to be in one room if avoidable. The room itself is too small for these processes being conveniently carried out in it, and there is a strong objection to barrelling powder in the same room as that in which it is finally dusted. This objection is that the clean barrels must be more or less covered with powder dust, which they convey with them into the store magazines. It is therefore proposed to remove the barrelling process to No. 9 room hitherto used as green powder deposit-room. It is recommended that No. 13 room, which will still be used as "separating and final dusting-room," be traversed all round.

19. With regard to No. 9 room alluded to in paragraph 14, and in the paragraph immediately preceding this one, it is recommended that the south and east wings be built up and filled with earth, and that traverses or strong screen walls should be erected on the north and west sides.

20. No. 14 is the room in which are the slope reels for foul-dusting fine grain powders, and which is more often used as a deposit-room when other rooms are under repair. It is not thought necessary to erect traverses round it. The Officiating Superintendent reports that it is intended to remove the present lead flooring as soon as the wood-work of the floor is reported sound to receive a covering of leather.

21. No. 15 is the "dust deposit-room." Its brick-floor should be boarded and leathered and a railway, which will be about 117 yards in length, should connect it with the railway at present existing between the granulating-room No. 8, and No. 9 the proposed barrelling-room. Another truck railway, about 183 yards in length, should connect No. 15 with the two groups of mills.

22. No. 16 is the magazine of the factory. It is only 90 yards from several of the powder-rooms, and 250 yards from the nearest point of Madras Railway. It has often had hitherto from 50,000 to 60,000 lbs. of powder in it. Such accumulations are now avoided. It is recommended that it should be strongly traversed on its south side, and also on its west end if any additional buildings are erected in that direction.

23. The Committee consider that all the mounds should be revetted with masonry. Turf will not grow on earthen mounds in this climate, and the powder

dust from the rooms lies on earthen mounds, and is a source of danger. From earthen mounds, too, grit or particles of sand or earth are apt to be blown into the powder-rooms which they surround. On masonry revetted mounds powder dust is not so apt to be deposited, and that which is lodged can with any grit be easily washed away by the factory fire engines.

24. There is a want of any splinter-proof shelter in certain of the most frequented portions of the factory enclosure. It is recommended that two inexpensive sheds be erected; one on the side of the mound north of No. 6 room, and the other on the terrace in rear of the late press-room near No. 3. Materials for one at least of these can be found in the factory. At present there is a want in these two localities of any place to which the workmen can run for shelter from falling material in case of accidents, or where they can safely remain during the prevalence of a passing thunder-storm, or when not required in their powder-rooms.

25. With regard to the second part of their instructions, namely, "to reconsider the question of how the present" site of the factory might be most conveniently enlarged, the Committee do not see how this can be better carried out than according to the arrangement shown in the accompanying plan which was drawn in conformity to Government Order.* The rooms most requisite are thereon marked from 17 to 22.

* No. 964 of 6th April 1870, Public Works Department.

26. No. 17 is a duplicate "press-room" with "pump-room" and a small magazine or "deposit-room" attached. No. 19 is a duplicate "granulating-room," and 18 is the room to contain the engine and boilers (now here) for working the machinery (now here) in Nos. 17 and 19. No. 20 is the proposed "glazing-room," with a small magazine or "deposit-room," attached. No. 22 is the new "reeling or dusting-room," and 21 is the room to contain the engine and boilers (now here) to drive the machinery (now here) in Nos. 20 and 22.

27. The rooms from 17 to 22 are alluded to in paragraph 3 of Superintendent's letter, published in Proceedings* of Madras Government, Military Department, and afterwards alluded to in Proceedings† of Madras Government, Public Works Department. Sanction for their construction was negatived by the Government of India as published in Proceedings‡ of Madras Government.

* No. 4,034, dated 24th November 1869.

† Nos. 3,842, 137 and 964 of 6th December 1869, 12th January, and 6th April 1870, respectively.

‡ No. 558, dated 16th February 1871.

28. The Committee do not urge the advisability of the immediate erection of these rooms from 17 to 22, with the necessary communications, "for the more extensive manufacture of gun-powder at Madras," as is supposed in letter* from the Government of India to that at Madras, nor for the supply of the other

* No. 303, dated 5th March 1870.

Presidencies which is alluded to in paragraph 2 of letter from the Government of India, published in Proceedings* of Madras Government and already alluded to, but as stated in Colonel Rowlandson's (the Superintendent's) letter† to the Inspector-General of Ordnance and Magazines, "to complete the manufactory for its *ordinary works* and purposes by the erection of the machinery furnished from England for that purpose in lieu of temporary" make-shift expedients in the "dusting and glazing processes, which were resorted to for immediate use pending the receipt of proper machines "from home." The Superintendent goes on to state "these expedients, in the absence of proper requisites, were under the emergency carried out without due regard to the established principles and safe-guards in all powder factories, as respects relative site and proximity to each other, and under conditions of risk and danger which render the continuance thereof a day longer than necessary highly undesirable." He points out also that the factory at Madras is contained in an area of 29½ acres, while that in the Bombay Presidency has an area of 640 acres, and that at Wattham Abbey is three miles long and of varying width, and he adds "there is not a Gun-powder Factory in the United Kingdom which attempts to carry out its operations with a single set of machinery, for an explosion or failure of any single process arrests the progress of the whole; hence duplicate and often triplicate and quadruplicate sets * * * are invariably kept to bring into use on any such emergency, or to meet any extraordinary outturn called for under pressure." The Committee, fully agreeing with the views of the Superintendent above detailed, do not consider that the work of the Madras factory can be carried on without imminent risk to life and property, unless the buildings from 17 to 22 are constructed.

* No. 558, dated 16th February 1871.

† No. 102, dated 18th March 1870.

29. The Committee notice that there is one other portion of the manufacture of gun-powder as at present carried on in the Madras factory which is dangerous as far as the safety of the valuable saltpetre deposit-rooms, refinery, and other rooms under the same roof is concerned. It is the weighing and mixing processes being carried out in the refinery group of buildings. The Committee, however, do not see that it is absolutely necessary to erect new buildings for these processes, particularly as it is with difficulty that the site of the manufactory can be at all extended.

30. The Committee have considered it as no part of their duty to notice the objections to the present site as a whole, because these objections have already been fully brought to the notice of Government.*

* *Vide* P. G., No. 3,105, dated 30th Aug. 1869.
,, ,, 4,034, ,, 24th Nov. ,,

President.

(Signed) J. L. BARROW, Colonel, R.A.

Members.

(Signed) R. CADELL, Colonel, R.A.
(,,) C. V. WILKIESON, Colonel, R.E.
(,,) E. W. CHILDERS, Major, R.A.
(,,) J. N. HUNTER, Captain, R.E.

No. 483. From the Inspector-General of Ordnance and Magazines.
(Here enter No. 189-G., dated 12th September 1872.)

No. 484. From do. do. do.
(Here enter No. 234-G., dated 6th November 1872.)

No. 485. ORDER THEREON, 23rd December 1872, No. 3,042.

MILITARY WORKS, No. 11.

IN consequence of an explosion at the Gun-powder Manufactory which took place on the 10th November 1871, the Superintending Engineer, 4th Division, was instructed in G. O. No. 3,077 of 5th December, to furnish an estimate for constructing certain earthen traverses alluded to in paragraphs 5, 7 and 10 of letter from the Inspector-General of Magazines, No. 279-G. of 27th November.

2. The Superintending Engineer's estimate of Rupees 2,500 was sanctioned and funds provided in G. O. No. 3,210 of 20th December. It appears to have provided for ten traverses of an aggregate length of 1,200 feet, made of earth and turfed, and these are understood to have been carried out.

3. G. O. No. 308 of 1st February, further instructed the Superintending Engineer, 4th Division, to furnish *with the least practicable delay* estimates for traverses and other works recommended by the Committee ordered by Government to report on the best means of securing the safety of the factory.

4. Without any reference to the latter order, the Officiating Superintending Engineeer, Lieutenant-Colonel Goddard, sent up with letter of 30th April an estimate of Rupees 11,500 for throwing up and revetting ten traverses, and one of Rupees 2,500 for throwing up and turfing ten traverses (the latter being the identical estimate sanctioned on 20th December, and both bearing date 16th December, and asked that the amount of the former, a mere approximate estimate, might be placed at his disposal.

5. His letter was forwarded to the Military Department with the Chief Engineer's opinion that the Officiating Superintending Engineer had not made out any case for going to the expense of revetting instead of turfing. This seems to have been concurred in by His Excellency the Commander-in-Chief, though the Ordnance Authorities advocated the extra expense being incurred. But they at the same time brought to notice that no provision was made in the estimates for the work recommended by the Committee.

6. Whereupon G. O. No. 115 of 12th June, called on the Superintending Engineer, 4th Division, Colonel Moberly, to supply detailed estimates for revetting these traverses; and to report whether they were included in the protective works recommended by the Committee, for which the Superintending Engineer had on 1st February been called on to submit estimates with the least practicable delay.

7. Endorsement of the Military Department dated 16th September, referred for remark by the Public Works Department a letter No. 189-G. of 12th September, from the Inspector-General of Magazines.

8. On which the attention of the Superintending Engineer was drawn to the subject by Chief Engineer's memorandum of 23rd October, and he was requested to report when the Government might expect to receive the estimates called for on 1st February and 12th June.

Proceedings of the Madras Government, Public Works Department, 23rd December 1872.

9. Colonel Moberly's reply was that the Superintendent, Gun-powder Factory, informed him that a reference had been made to Government by the Inspector-General of Ordnance and Magazines with a view of making certain modifications in the revetting of the traverses at the Powder Mills.

10. In letter No. 234-G. of 6th November, Colonel Stewart requests an early decision on letter No. 189-G. of 12th September, "as the Engineer Department had called for an early reply in respect to a reference made to the Superintendent, Gun-powder Factory, on the subject of covering the traverses round the buildings in the factory.

11. The Inspector-General's letter of 12th September, on which all progress with estimates is thus made to depend, brings to notice that the traverses and other works recommended by the Committee were not being carried out, and had not even been planned and estimated for. It recommends the adoption of turfed traverses in some places and revetted traverses in others; and it suggests a meeting between the Superintending and Executive Engineers and the Inspector-General and Superintendent of Gun-powder Factory for the purpose of settling the matter.

12. His Excellency the Governor in Council is at a loss to understand why a Government order should be required to bring about such a meeting. The Public Works Department had received peremptory and repeated orders to prepare the necessary plans and estimates; and the papers prepared by them must, according to departmental rules, be concurred in by the superior officers of the department for whose accommodation they were prepared, previous to their obtaining the sanction of His Excellency the Commander-in-Chief and of Government. Nothing whatever therefore prevented immediate action on the part of the Superintending and Executive Engineers, and there is no justification for Colonel Moberly's inaction on his attention being pointedly called to the subject by the Chief Engineer.

13. The Presidency District Engineer will now proceed to submit detailed estimates of the protective works still required for the security of the Gun-powder Factory, allowing for simple turfed traverses wherever the space admits of them, and for revetting where space is limited. A block plan of the buildings showing their distances from the traverses and sections of these latter should accompany his report. It will be prepared in personal communication with the Inspector-General of Ordnance and Magazines and Superintendent of the Gun-powder Factory; and the Inspecting Engineer of Civil and Military Buildings will also give the subject his personal and immediate attention, and see that complete papers are submitted for the orders of Government without avoidable delay.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the District Engineer, Presidency.
,, Inspecting Engineer of Civil and Military Buildings.
,, Military Department.
,, Controller of Public Works Accounts.

Exd. E. C. Shunker.

9th 5

My dear Walker

Your note
about L.O no 3210
of 20th Dec. 71 £2500
The cartoon drawings
10 in number
in the Low
Countries factory-
work completed
and

Money all spent
virtually –
I owe Rs 115 – or
for work not
yet checked
& rec – & the
enclosed Rs cancelled
Jas Symington
Jno Jackson

Ordnance Department

ORDNANCE OFFICE,
Fort Saint George
12th Septr 1872

No. 489

From,

Colonel R. Castle R.A.
Offg. Inspector General of Ordnance and Magazines.
In Charge of the Ordnance Office.

To

The Secretary to Government,
Military Department.

Sir,

Referring to G. O. No. 1757 of 29th May last and to G.O. (Public Works Department) No 115 dated 12th June 1872 communicated by Military Department in Docket No. 1960 dated 13th June 1872, I have the honor to state that it appears therefrom that Government are under the impression that all the earthen Traversers at the Gun Powder Manufactory which were recommended by the Committee whose Proceedings were sent to you with my letter No. 332 dated 23rd January 1872, are completed and only want revetting with Masonry. Such is not exactly the case, as that on the South side of the Magazine has not been made. It cannot be constructed without covering the present South Wall round the Magazine, and no exact Plan of what is intended to be done, has been as far as I am aware made out by the Public Works Department.

2.— Neither is the important Earthen traverse on the

the East side of the Granulating room completed — This cannot be effected from want of space without a certain amount of Masonry pivettings.

3. — I beg to call attention to the 6th para of my letter [a] in which I bring to notice that certain built traverses recommended by the Committee to be constructed [b], where there was not room for those of earth have not been commenced, and I have seen no plans of them — The two inexpensive splinter proof refuge rooms similarly recommended have not yet been begun.

4. — I am not however of opinion that it is necessary to revet with masonry the traverses round the rooms in which Powder is not worked — I think that simple inexpensive but carefully laid on turf revetting may for them, be sufficient; and my opinion is concurred in by the late and the present Superintendent of Gun Powder Manufactory — This modification if carried out will cause a large saving in Masonry & Revetting. I would suggest that the Superintending and Executive Engineers, the Officiating Superintendent of the Gun Powder Factory and myself might meet and settle what traverses ought at once to be revetted with Masonry, and what with turf —

5. — With reference to His Excellency the Commander-in-Chiefs' remark, that a certain amount of Security will

No. 18 dated 4th May 1872

[b] Vide Proceedings for-warded with my letter No 478 of 27th Nov. 1871

be obtained by using the Fire Engine in Earthen traverses, I beg to state that this is an expensive process and one that injures traverses unrevetted with turf or Masonry, and moreover that it cannot be safely carried on while work is going on in the rooms.

6. — I would finally venture to suggest that if the Camp of Exercise is not to be as is rumoured carried out on the same scale as originally intended, a certain portion of the funds saved might appropriately be expended on a Factory which has for long been of the greatest utility to the Army, and on which sums hardly been laid out comparatively trifling to those which have been expended on the Powder Factories of Bombay and Bengal —

I have the honor to be,
Sir,
Your most Obedient Servant
R Ladell Coll A.A.
Offg Dy. Inspector Genl of Ords & Magt
In Charge of the Ordnance Office

Ordnance Department. Only No 9

ORDNANCE OFFICE:
Fort Saint George,
5th Novr. 1872.

No. 9/234

From, Colonel A. Stewart. R.A.
Inspector General of Ordnance and Magazines.

To: The Secretary to Government,
Military Department.

Sir,

With reference to this Office letter(a), I have the honor to request I may be favored with an early decision thereon, as the Engineer Department has called for an early reply, in respect to a reference made to the Superintendent Gun Powder Manufactory on the subject of covering the Traverses round the buildings in the Gun Powder Manufactory.—

(a) No. G/189 dated 12th Septr. 1872.

I have the honor to be,
Sir,
Your most obedt. Servant.
Alex Stewart Coll R.A.
Inspector Genl. of Ordce. and Magazines

Ex. J.S.C.

Military 1872 Department
No 6743.
From
The Inspector General
of Ordnance Magazines
To
The Secretary to Government
Military Department
Dated 6 Nov. 1872
Recd 7th Recd 13th
No 234.

Request an early decision on the subject of this office letter No 759 dated 12th September 1872.—

Transferred to the Public Works Dept; with advertence to previous reference.

Offg Secretary to Govt

Fort St George
12th Novr 1872

To
The Public Works Dept.

No 484.
Ent
Lib Dec 72

Transferred
No 3062. - 23d Dec 772.

Proceedings of a Committee assembled on 5th January 1872 in pursuance to Order of Madras Government Military Department No 6123 dated 18th December 1871.

Present

Colonel J.C. Harrow, C.B. President
Colonel Robert Crichell R.A. Dy
Colonel C.B. Wilkinson R.E. Engrs
Major E.W. Childers R.A. Dy
Captain J.A. Winter R.E. Engrs
Members

1. The Committee record that they have personally examined very carefully the Site of and the Buildings composing the Gun Powder Factory

2. In considering "the best means of securing the safety of the existing Buildings" the Committee in their remarks on the various rooms &c will follow, as far as possible, the actual stages of powder manufacture.

3. The Green Charge Room (No 10 in the accompanying plan) has

has at present no mounds round it. It is only 43 yards from No 2 Group of Mills and 19 yards from the breaking down Room. The Committee consider that Mounds should be erected on the two sides next to the Mills, it being already to a great degree protected from the breaking down Room by a mound or traverse already thrown up round the latter.

4. A mound is also recommended to be erected at the north end of No 1 Group of Incorporating Mills, viz: between that end and the Dust Deposit Room, No 15 between which there is a distance of only 36 Yards.

5th The Breaking Down Room, No 2, of the Mill Cake has already a substantial traverse or mound all round it which only requires to be pivetted with masonry.

6. No 3 in the plan is the Pump Room of the Press recently blown up. As it is not thought advisable to rebuild the Press Room on its late site, which is in the midst of the Factory and too closely adjoining other Powder Rooms, and as there is now no Deposit Room for powder in the form of meal & dust having been taken down from the Mill Cake, it is recommended that the existing Pump Room should be used as a Meal Deposit Room, it being only 51 yards from No 1 Group of Mills, and still nearer other Powder Rooms, it is recommended that it be traversed all round.

7. A small Tuck Railway should be made from the Breaking

Breaking down Room to the existing "Refs. Room" No 4 with a branch to the proposed "Meal Deposit Room" No 3. The length of this Railway would be about 177 yards, over which Meal has now to be carried on men's shoulders.

8. No 4 is the existing Refs. Room. It has already mound on its flanks and rear. Another mound is recommended to be erected in its front, and a slight extension of the rear mound eastwards is considered advisable.

9. No 5 is the "Refs. Meal Deposit Room." It should be traversed all round and by a small truck Railway made from the West Window of the Refs. Room to it. The length will be about 60 yards. The door should be removed from the East to the west side of the

the Room, and a Truck Railway about 103 yards in length is considered advisable to unite this Room with the Granulating Room No 3.

10. No 2, 1, and 5 part of the "Granulating," "Reeling" and "Glazing" Rooms. There is proximity to each other with a Steam Engine in their centre is manifestly very dangerous.

11. On the east side of the "Granulating Room," No 6 a mound has been partially erected. It is recommended that this should be finished and extended (with or without a break) along the east front of the "Glazing" and "Reeling" Rooms. On the north side of No 6 there is a mound, but at too great distance of 53 yards. It is recommended that a built traverse should be erected

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13 No 8 is the "Glazing Room".
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at present. This arrangement though on the whole productive of greater safety is objectionable inso far that it involves a greater carrying about of powder through the Factory enclosure, and renders the powder slightly more expensive. The position of the Glazing Room is so bad and dangerous that the Committee cannot see anyway of securing its safety.

14. No 9 has been for some years used as the "Green Powder Deposit Room". Its situation as a Deposit Room is very objectionable as it is in close proximity to other Rooms and Green Powder has to be conveyed a long way to and from it. It is therefore proposed to abandon No 9 as a "Green Powder Deposit Room" and to utilize it as a "Barrelling Room".

For the latter purpose it is remarked on in para 13 and by 15. It is proposed to make No 10 the "Green Powder Deposit Room". It is at present used to store a portion of the Duplicate Machinery sent out from Home some years ago for the purpose of immediate use. No 10 lies directly between the Glazing Room No 8, and the Storing Room No 11, and a Truck Railway should be constructed from the Glazing Room block of buildings past the doors of No 10 to No 11 the Storing Room. Its length will be about 186 yards. The floors of No 10 will have to be removed from the east to the west side and the present brick floors must be covered with wood and leather. No 10 should be traversed out its South, West and North sides.

16. No 11 is the "Storing Room".

Room". As no protection
exists between it and the
Boilers and Distilling Room
in close proximity, it is
recommended that a strong
built traverse partwall be erected
between them and that the
room should be traversed on
its North and East sides.

17. No 12 is the "Dried
Powder" "Deposit Room". It
should be traversed all round
leaving room however for the
existing Truck Railway
running to and past it.

18. No 13 is at present
termed the "Barrelling
Room". In one compartment
is Separating Machines Separates
from the rest of the powder the
small grain which has been
broken down in glazing,
Storing

Storing and handling — Six
another compartment the suit-
able grains are passed through
two slope Reels for the purpose
of being finally dusted. In
a third compartment the powder
is then barrelled. These
processes occupy 12 men, too many
to be in one room if avoidable.
The room itself is too small
for these processes being conveniently
carried on in it, and there
is a strong objection to
barrelling powder in the same
room as that in which it is
finally dusted. This objection
is that the clean barrels must
be more or less covered with
powder dust, which they
convey with them into the
Store Magazines. It is
therefore proposed to remove
the

the Barrelling process to No 9 room hitherto used as Green Powder Deposit Room. It is recommended that No 13 room which will still be used as Separating and final Dusting Room be traversed all round.

19. With regard to No 9 room alluded to in para 18 and in the para immediately preceding this one, it is recommended that the South and east wings be built up and filled with earth, and that traverses or Strong Screen walls should be erected on the north and west sides.

20. No 16 is the room in which are the Slope Reels for foul dusting Fine grain powders and which is more often used as a Deposit Room when other rooms are under repair. It is not thought necessary to erect traverses round it. The Officiating Superintendent reports that it is intended to remove the present lead flooring as soon as the wood work of the floor is reported sound to receive a covering of leather.

21 No 15 is the West Deposit Room. Its brick floor should be boarded and leathered and a Railway which will be about 114 yards in length should connect it with the Railway at present existing between the Granulating Room No 8 and No 9 the proposed Barrelling Room. Another Truck Railway about 183 yards in length should connect No 15 with the two Groups of Mills.

22. No 16 is the Magazine of the Factory. It is only 90 yards from several of the Powder Rooms and 250 yards from the nearest point of Madras Railway. It has often had hitherto from 50,000 to 60,000 lbs of Powder in it. Such accumulations are now avoided. It is recommended that it should

should be strongly traversed on its South Side and also at its West end if any additional buildings are erected in that direction.

23. The Committee consider that all the mounds should be revetted with masonry. Turf will not grow on earthen mounds in this climate, and the powder dust from the rooms lies on earthen mounds and is a source of danger. From earthen mounds too, grit or particles of sand or earth are apt to be blown into the Powder Rooms which they surround. On masonry revetted mounds powder dust is not so apt to be deposited and that which is lodged can with any grit be easily washed away by the Factory Fire Engine.

24. There is a want of any Splinter proof shelter in certain of

2 Splinter proofs

of the most frequented portions of the Factory enclosure. It is recommended that two inexpensive sheds be erected one on the Side of the mound north of No 6 Room and the other on the terrace in rear of the late Press Room near No 3 Magazine for one at least of these can be found in the Factory. At present there is a want in these two localities of any place to which the workmen can run for shelter from falling materials in case of accident or where they can safely remain during the prevalence of a passing thunder Storm or when not required in their powder rooms.

25. With regard to the second part of their instruction viz" to reconsider the question of how the present Site of the Factory might be most conveniently enlarged the Committee do not see how this can be better carried out than according to

to the arrangement shown in the accompanying plan which was drawn in conformity to Government Order. (a) The rooms most requisite are thereon marked from 17 to 22.

(a) No. 964 of 6th April 1870 P.W.D

26. No. 17 is a duplicate Press Room with Pump Room and also small Magazine or Deposit Room attached. No. 19 is a duplicate Examinating Room and 18 is the Room to contain the Engine and Boilers (now here) for working the Machinery (now here) in No. 17 and 19. No. 20 is the proposed Glazing Room with a small Magazine for Deposit Room attached. No. 22 is the new Reeling or Quieting Room and 21 is the room to contain the Engine and Boilers (now here) to drive the Machinery (now here) in No. 20 and 22.

27. The rooms from 17 to 22 are alluded to in para 3 of Superintendent's letter published in Proceedings of Madras Government, Military Department, and (b) afterwards alluded to in Proceedings of Madras Government Public Works Department sanctioning for their construction was negatived by the Government of India as published in Proceedings of Madras Government.

(b) No. 2034 dated 24th November 1869

(c) No. 3842, 13, 964 of 6th December 1869 and 12th January and 6th April 1870 respectively

(d) No. 555 dated 16th February 1871

28. The Committee do not urge the advisability of the immediate erection of these rooms from 17 to 22, with the necessary communications, for the more extensive manufacture of Gun powder at Madras, as is supposed in letter from the Government of India to that at Madras, nor for the supply of the other Presidencies which is alluded to in para 2 of

(e) No. 233 dated 5th March 1870

letter

letter from the Government of India published in Proceedings of Madras Government and already alluded to, but as stated in Col. Rowlandson's (the Superintendent's) letter to the Inspector General of Ordnance and Magazines to complete the Manufactary for its ordinary works and purposes by the erection of the Machinery furnished from England for that purpose in lieu of temporary make shift expendients in the "Dueting and Glazing processes, "which were resorted to for immediate use pending the receipt of proper Machines from home."

(1) A 5580/16 February 1871

(91) A 192 dated 18th March 1870

The Superintendent goes on to state these expedients in "the absence of proper requisites" were under the emergency carried "out without due regard to the "established principles and safe "guards in all Powder Factories, "as respects relative Site and "proximity to each other and "under conditions of risk and "danger which render the con"tinuance thereof a day longer "than necessary highly undesirable. He points out also that the Factory at Madras is contained in an area of 292 acres, while that in the Bombay Presidency has an area of 650 acres and that at Waltham Abbey is 3 miles long and of varying width and he adds "there is not a Gunpowder Factory "in the United Kingdom which "attempts to carry on its operations "with a single set of Machinery for

for an explosion or failure of any single process arrests the progress of the whole: hence duplicate and often triplicate and quadruplicate sets" "× × are invariably kept" "to bring into use on any such" "emergency or to meet any extra=ordinary outturn called for under" "pressure." The Committee fully agreeing with the views of the Superintendent above detailed do not consider that the work of the Madras factory can be carried on without imminent risk to life and property unless the buildings from 19 to 22 are constructed.

2nd The Committee notice that these are one other portion of the manufacture of gunpowder as at present carried on in the Madras factory which is dangerous as far as the safety of the valuable ad[illegible] stores, Deposit rooms, Refinery and other rooms under the same

roof

is concerned. It is the weighing and mixing processes being carried out in the Refinery Range of buildings. The Committee however do not see that it is absolutely necessary to erect new buildings for these processes particularly as it is with difficulty that the site of the Manufactory can be at all extended.

3d The Committee have considered it as no part of their duty to notice the objections to the present site as a whole because these objections have already been fully brought to the notice of Government.

1st vide P.C. No 3115 dated 30th August 1869
" 4034 dated 24th Nov 1869

6

President
Lt Col J. L. Garraw C.E. R.A.
Members.
Lt Col R. Cadell C.E. R.A.
Lt Col C.F. Wilkinson Ld. R.E.
Lt Col E.W. Childers Major R.A.
Lt J. H. Hunter Capt. R.E.

Public Works 1872 Depts

No 182

Public Works No 3042 G.D.

Proceedings of the Madras Government
Under date the 23 Decr 72
Read the following papers

From The Inspector Genl of Ordnance Magazines — No 2345 dt 6th Nov 72

— Do — — do — G. No 2346 dt 6th Nov —

on consequence of
an explosion at the
Gun Powder Manufactory
which took place on the
10th November 1871. the
Lieut Engineer 2d Division
was instructed on 6 C.
dt 30th of December
to forward an Estimate
for constructing certain
of the buildings alluded
to in paras 3, 4 and 5
of letter from the Inspector
General of Magazines

181

No 279 G. of 27th November.

The Supt Engineer's estimate of Rs 2500 was sanctioned and funds provided vii G.O. No 3210 of 20th December. It appears to have provided for 10 Traverses of an aggregate length of 1200 feet made of earth and turfed - And these are understood to have been carried out. G.O. No 308 of 4th February further instructed the Supt Engineer 4th Division to furnish with the least practicable delay Estimates for traverses and other works recommended by the Committee ordered by Government to report on the best means of securing the safety of the Factory. Without any reference to the latter order the officiating Supt Engineer Lieutenant Colonel Goddard sent up with letter of 30th April an Estimate of Rs 11,500 for throwing up and revetting 10 Traverses, and one of Rs 2,500 for throwing up and turfing 10 Traverses / the latter being the identical estimate sanctioned on 20th December, and both bearing date 16th December, and as Read that the

expense being incurred.
But they at the same time brought to notice that no provision was made in the estimates for the work recommended by the Committee.

Whereupon G.O. No. 115 of 12 June called on the Supt Engineer 2d Division Colonel Moberly to supply detailed estimates for rendering these Traverses; and to report whether they were included in the protective works recommended by the Committee, for which the Supt Engineer had on 1st February been called on to submit estimates with the least practicable delay.

Endorsement of the Military Department

endeavour of the former to make approximate estimates might be placed at her disposal.

This letter was forwarded to the Military Department with the Chief Engineer's opinion that the officiating Supt Engineer had not made out any case for grant to the expense of Excellency undertaken by Sir Forbes. This seems to have been concurred in by His Excellency the Commander in Chief though the Ordnance authorities advocated the extra expense

dated 16th September referred for remark by the Public Works Department's letter No. 189 C. of 12 September from the Inspector General of Magazines -

On which the attention of the Superintendent was drawn to the subject by the Chief Engineer's memo of 22nd October and he was requested to report whether the Government might expect to receive the estimates called for on 1st February and 12th June.

Colonel Moberly's reply was that the Superintendent Gun Powder Factory informed him that a reference had been made to Government by the Inspector General of Ordnance and Magazines with a view of making certain modifications in the revetting of the Traverses at the Powder Mills.

In letter No. 232 C. of 6th November Colonel Stewart requests an early decision on letter No. 189 C. of 12th September, as the "Engineer Department "has called for an early "reply in respect to a "reference made to the Superintendent Gun Powder Factory on the subject of covering the Traverses round the buildings in the Factory.

The Inspector General's

letter of 12 September and
which all preliminaries
estimates as made to
depend, bringing to notice
that the Harbours and
other works recommended
by the Committee were
not being carried out
and had not even
been planned and
estimated for. It recom-
mends the adoption of
turfed traverses in some
places, and revetted
traverses in some
places, and suggests a
meeting between the
Lieut Governor Executive
Engineers and the Inspector
Superintendent of Gun
Powder Factories for the
purpose of settling the matter.
His Excellency the
Governor requires
at present to understand
why a Government
order should be re-
quired to bring about
such a meeting. The
Public Works Depart-
ment had received peremp-
tory and repeated orders
to prepare the necessary
plans and Estimates,
and the Inspecting Offi-
cers had made their
accordingly to Depart-
mental rules he con-
curred in by the supe-
rior officers of the Depart-
ment for whose accom-
modation they were

prepared previous to their obtaining the sanction of His Excellency the Commander in Chief and of Government. Nothing whatever therefore presented immediate action on the part of the Supy and Executive Engineers and nothing of consequence there is no justification for Colonel Moberly in action on his attention being pointedly called to the subject by the Chief Engineer.

The Presidency District Engineer will now proceed to submit detailed estimates of the protective works to shell required for the security of the Main Powder Factory, allowing for embrasures traverses wherever the space admits of them and for revetting where space is limited. A block plan of the buildings showing their distances from the traverses, and sections of these latter, should accompany his report. It will be prepared in personal communication with the Inspector General of Ordnance and Magazines and Superintendent

[illegible] Powder Factory;
[illegible] the Inspector of
Engineers of Civil and
Military Buildings
will also give the
subject the personal
and immediate attention
to, and see that
complete papers are
submitted for the orders
of Government without
avoidable delay.

I have &c.

To The Dy Surgr Generl
" Insp. Surgn of Civil Estabt
" Mily Depts
" Controller

Bengg Hdqrs Chatham Plain

Decr 26th 1872

4493 A 45-92 -

Govt. of {1872} Madras

PUBLIC WORKS.

To

Dated

Rec'd. Encl.

G. O. 23 Con. 1872. No. 3042 -

Nos. 1,820 & 85.

Gun Powder Factory.

Cuddas. Papers

& papers relating to the

construction of earthen

traverses at the Gun

Powder Factory.