Secrt. II-48—22,303—17-1-18.

Home (1918) Department.

Education

Ordinary SERIES.

G.O. No. 414

DATED 27. 3. 18.

INDEXED

104

[Despatch Abstract.]

Lime sand brick plant.

Approving the proposal of the officer in charge of the Department of Industries to sell the ---------to the Gwalior State Trust Limited for Rs.15,000.

C.F.—29.

DEPARTMENT.

REGISTRAR HOME DEPARTMENT
8--OCT-1916
GOVT. OF MADRAS

Received 8--OCT-1916 191 . *Registered* 9.10 191 .

Subject.

Submitting estimate for the probable expenditure on the Lime Brick Experiment for the financial year 1917-18.

ENCLOS RES.
No. 3 Sheets
Spare copies

No. G. Cur: 5.

Station Madras , *Dated the* 29th/30 September 1916 .

From (Name) M.E. Couchman, Esq., I.C.S.,

(Designation) Special Officer, Department of Industries.

To The Secretary to the Government of Madras,

Home (Education) Department.

Through The Accountant-General. Madras.

Sir,

I have the honour to submit my estimate for the probable expenditure on the Lime Brick Experiment for the financial year 1917-18.

2. Mr. Green's letter of 22nd inst. gives the particulars. After discussing the matter with him, I recommend the acceptance of the No. II Estimate (Electric drive) because the Cement Works, to which we hope to sell the plant, if the experiment is successful, use Electric drive themselves, and prefer this. It has the additional advantage that the capital expenditure will be less, and that, while it is impossible to say what will be the case in six month's time, at the present time, all the plant estimated for can

be obtained in India.

3. I think that the experiment is worth a trial, and if successful, would serve a very useful purpose, but the present engine and boiler are so inefficient that working with them we could never obtain any true figures of the cost of production. If we are to get any reliable figures of cost of production, the plant now asked for is absolutely necessary. In case, however, the Government should be unwilling to incur this expenditure, the experiment may be deferred till a more suitable time.

I have the honour to be,

Sir,

Your most obedient servant,

M. Ramchandra

Special Officer.

M.N.

3

3

Dir. of Inds. 1—1,205—5-15.

Telegraphic Address:
"Caromium," Madras.
Post Box 454, Madras, N.C.

OFFICE OF THE DIRECTOR OF INDUSTRIES,
Madras, 22nd September 1916.

No.

From

L.B. Green , Esq.,
Asst. ~~Acting~~ Director of Industries,
Madras,

To

The Director of Industries.
Madras.

Sir,

With reference to ~~his~~ Memorandum No. A.10 dated the 18th inst. I have the honour to submit estimates of expenditure that will be incurred in connection with the working of the Lime Brick Plant during the next official year.

I have submitted two alternative estimates. No. 1 is worked out on the assumption that the existing steam engine will be used in conjunction with the vertical steam engine and Boiler brought from the Glass Factory, throughout the period under review. Estimate No. 2 is prepared on the basis that Electric Power is installed and available during the whole of the period.

Estimate No. 1

Assuming that the factory is working 312 days a year.

1. Staff

Rs. 23 per day = Rs. 7176 per year.

2. Working Expenses

Remunerative.

Coal Rs. 57-12-0	per day =	Rs. 18018
Lime Rs. 29-0-0	,,	9048
Sand Rs. 14-0-0	,,	4368
Petty Stores 1-8-0	,, ,,	468
Water	..	300
Rs. 102-4-0		Rs. 32,202

3. Capital and Non Remunerative Expenditure.

Upkeep of Engine, Boiler and Brick-making Machinery	Rs. 1000
Upkeep of buildings	1250
Cost of connecting Factory to Corporation Water Mains	1000
250 ft. of 2'-3" gauge light rails	650
	Rs. 3900

SUMMARY.

Staff	Rs. 7176
Working Expenses ...	32202
Capital Expenditure ...	3900
	Rs. 43278

Say Rs. 43,500

Estimate No. 2

Assuming as before that the Factory is working 312 days a year.

1. Staff

Rs. 22 per day = Rs. 6864 per year

2. Working Expenses

Remunerative

Current at 1 anna per Board of Trade Unit

plus Rs. 8 per maximum Kilowat Registered

	Rs. 28-4-0	per day =	Rs. 8814 per year.
Coal	18-8-0	,,	5772 ,,
Lime	29-0-0	,,	9048 ,,
Sand	14-0-0	,,	4368 ,,
Petty Stores	1-8-0	,,	468 ,,
Water	...	..	165 ..
	Rs. 91-4-0		Rs. 28635

3. Capital and Non-Remunerative Expenditure.

50 B.H.P. 450 volts Shunt Wound Enclosed Direct Current Motor with pulley and starter	Rs. 3675.

Brought Forward	Rs. 3675.
Main driving Pulley on countershaft ...	100
,, Belt ...	135
Overhead Main, Metre house, Switchboard, and lights	3500
Foundation for Motor ...	150
Enclosed shed for Motor ...	1000
Upkeep of Motor, Boiler, and Brickmaking Machinery	650
Upkeep of Buildings ...	1250
250 ft. of 2'-3" gauge light rails with sleepers	650
22' 6' Lancashire Boiler with Feed pump and Feed Water Heater including setting work	11500
	Rs. 22610

SUMMARY

Staff	6864
Working Expenses	28635
Capital Expenditure ...	22610
	Rs 58109

Say Rs. 58200

I have allowed in the estimates for the requisite material for the maximum output of 8000 bricks per day. When this output is attained and assuming a sale price of Rs. 18/- per 1000 bricks (I believe it will be possible to obtain Rs 20/-), the daily profit with the existing plant in accordance with estimate I would be Rs ~~1-12~~ 15.12. per day, and with the modern Power plant outlined in estimate 2 this would be increased to Rs. ~~52-12-0~~ 30.12.0 per day. Both these figures are however exclusive of interest and depreciation charges and I question whether the maximum output could be maintained with the existing plant. The difference between the two sets of working expenses does not at first sight appear very great owing to the high cost of current, but the existing plant would not work continuously and would be subject to various stoppages and breakdowns which it is fair to assume would be absent from the plant as detailed in the No. 2 estimate.

Corrected with reference to letter on file 10 with

I consider a network of light rails essential for the rapid and economical working of the plant and this has been allowed for in both estimates.

The present water supply is inadequate and unsatisfactory, a fair amount is required for mixing the materials and feeding the boilers. The existing supply is derived from the Cement Works Mains but when they are requiring a large amount of water the supply is cut off and the boilers have to be banked. I propose in estimate 1 to connect the factory to the Corporation Mains. I have previously considered sinking a well but found on investigation that the water in this district is extremely salt.in character. This would not be necessary in estimate 2 as the boiler would only be required for hardening the bricks.during the night when the cement works is not in operation.

With regard to the details of estimate 2,a Motor house is essential to protect the machine from the dust arising from the mixing and pressing, for this reason I have included for one motor instead of two motors which would have been preferable from a mechanical point of view. I have also included in the estimate for a Lancashire Boiler in place of the two inefficient boilers at present installed which are, however, required by the Madura Technical Institute as soon as they can be spared.

The price allowed in the estimate for the boiler may appear somewhat high but prices at present are at an abnormally high level and may be expected to rather increase than decrease, provision is made under this heading for the setting of the boiler and the labour required in this connection.

Estimate No. 2 represents the expenditure that would be required to place the factory on a satisfactory basis for the manufacture of bricks on a Commercial scale.

In arriving at the expenditure required the amount which will be realised from the sale of the bricks has not been offset against any outlay as this will form a separate account.

I have the honour to be,
Sir,
Your most obedient servant,

Asst. Director of Industries.

M.N.

4,000--10-11-15.

8/ 6

OFFICE OF THE ACCOUNTANT-GENERAL, MADRAS,

Fort St. George, the 7th *of* October 191 6

No. Tri P.A. - 13099

ENCLOSURES (2)

SECRETARY TO GOVT. EDUCATIONAL DEPARTMENT
9 OCT 1916
MADRAS

F O R W A R D E D.

2. If the proposal be approved necessary reappropriation of grants should be sanctioned to meet the extra expenditure before it is incurred.

Deputy Accountant-General.

To

The Secretary to the Government of Madras,

Home (Educational) Department.

C.F.—20

DEPARTMENT.

9 7

6.36488

Received ... 191 . *Registered* 13.10. 191 .

Subject.

Regarding Estimate of Lime Brick Plant for 1917-18

ENCLOSURES
No. (11)
Spare copies

G Roc. No. 5.

Station Madras. , *Dated the* 11th October 1916. 191 .

12.

From (Name) M.E. Couchman Esq., I.C.S.

(Designation) Director of Industries.

To The Secretary to the Government of Madras,

Home (Educational) Department.

Sir,

In continuation of my letter G.C. No.5 of the 30th ultimo I have the honour to submit a letter from Mr. Green the Asst. Director amending a statement contained in his letter dated the 22nd ultimo furnishing an estimate of the probable Expenditure in connection with the Lime Brick Plant for the year 1917-18.

I have the honour to be,

Sir,

Your most obedient servant,

M.E. Couchman.

Director of Industries.

G.H.

Copy of letter from The Asst. Director of Industries, Madras dated 10th October 1916 to the Director of Industries, Madras.

With reference to my Estimate of probable Expenditure in connection with the Lime Brick Plant for the next official year, forwarded to Government on the 30th ultimo, I observe that a clerical error has been made in stating that assuming the maximum output is attained a daily profit of Rs.41-12 with the existing plant and Rs.52-12 with the proposed Electric Plant would be realised. This is incorrect as a reference to my schedule of Expenditure and receipts would show and should read Rs.18-12 with the existing plant and Rs.30-12 with the proposed new Electric plant respectively.

I regret that having only just noticed this clerical error and have the honour to request that this letter may be forwarded to Government for attachment to my letter of the 23rd ultimo, as if taken alone without reference to the main statement the incorrect figures may give a misleading impression of the possibilities of the plant.

2-16.

C.F.—29.

DEPARTMENT.

Received 29-MAY-1917 191 . *Registered* 191 .

Subject.

Lime Sand Bricks:-, submitting the final report on the experiments in the manufacture of ----------

30-MAY-1917 UNDER SECRETARY TO GOVT. HOME DEPARTMENT

ENCLOSURES.
No. 2.
Spare copies

G.Cur. No. 5

Station Madras. , *Dated the* 23rd May 1917. 191
28

From (Name) C.A. Innes Esq., I.C.S.

(Designation) Director of Industries.

To The Secretary to the Government of Madras,

Home (Educational) Department.

Sir,

I have the honour to submit herewith my final report on the experiments in the manufacture of lime sand bricks. If Government accept my conclusions, no action is necessary on Mr. Couchman's letter G.Cur. 5 dated 30-9-16.

2. I think also that the report (minus Mr. Green's report on his visit to the Colombo Factory) should be published as a Departmental Bulletin. The experiments, it is true, don't reflect much credit on the Department. Their value was much discounted by the lack of an efficient engine and boiler, and if ever there was a case of spoiling the ship for a ha'porth of tar it is this. But I think that my conclusions are more or less justified and they have a certain negative value. Besides, I think that the Department

p. 1 supra.

The report itself will hereafter be edited from the following

x Pages 13 et seq

12/

ought to publish the result of its experiments even if they are failures.

3. If Government approve of the report being issued as a bulletin, I propose before publication to submit it for criticism to Professor James of the Engineering College and to the Chief Engineer.

4. Efforts will be made to sell the plant. Sanction is requested to this course.

I have the honour to be,

Sir,

Your most obedient servant,

Director of Industries.

G.H.

13/ 10

B

pro 5 of G.O. (A) 1472 23.12.14

Report on the Lime Brick operations.

History of the inception of the experiments:-

Mr. Tressler first drew attention to the possibilities of lime brick manufacture in India in an article published in the Indian Trade Journal in 1908, and in May 1914 he submitted to Government proposals for the inception of experiments in the manufacture of these bricks. At that time the Chetpat brick fields were approaching exhaustion, and it had been decided to shut them down and open a new brick field further away from Madras. Mr. Tressler suggested that before Government committed themselves to the expenditure involved in this scheme, the whole question of brick making in Madras should be subjected to careful examination He had examined the brick fields adjoining the site where the Public Works Department proposed to open the new brick fields and had come to the conclusion that the earth was not first class and not particularly suitable for brick-making. The clay was found in pockets and was freely mixed with sand so that the bricks would not be uniform in quality and in general would contain an excess of sand. The new brickfields would be some distance away from Madras, and the cost of carriage would be expensive. In view therefore of these facts and of the increase in the demand for bricks of high quality which the projected construction of various public buildings in Madras was likely to bring about, he proposed that the question of experimenting with lime bricks should be considered. The materials for the manufacture of these bricks (lime and sand) were available in Madras in large quantities, and Mr. Tressler anticipated that it would be possible to make them at about the same cost as clay bricks. On the other hand he re-

presented that if properly made lime bricks had a crushing strength of between 200 and 300 tons per square foot and were far superior to the ordinary Madras brick. The South Indian Industrials had agreed to assist the experiments by offering a site and free accommodation for them as well as materials at cost price, and in the event of the experiments proving successful, had expressed their willingness to take over any machinery purchased by Government and to carry on commercially the manufacture of the bricks. Some correspondence followed, and eventually in G.O. No.1472 Educational (A) dated the 23rd December 1914 Government sanctioned the inception of the experiments.

2. Objects of the experiments. It will be seen that Mr. Tressler set out to prove two points, namely

(1) that with the materials available in Madras lime bricks could be manufactured at about the same cost as clay bricks, and

(2) that the bricks when made would show a much higher crushing strength than the ordinary Madras clay bricks.

It was hoped that if these two points could be established a promising field for private enterprise would be opened in places where good clay is difficult to obtain while lime and sand are plentiful.

3. The Plant:- On receipt of the sanction of Government, orders were at once placed with an English firm for the supply of brick making machinery sufficient for an output of 8000 bricks a day. The indent comprised a 9 ft. overdriven grinding and mixing mill, automatic feeder and elevator, brick making press, steam hardening chamber, turntables and transfer car. Part of the plant was delivered in June 1915, but owing to the

war and the fact that one consignment of machinery was sunk by a submarine, the delivery was not completed till September 1916. No arrangements however were made for the purchase of an efficient engine and boiler for power and hardening purposes. An engine was obtained on loan from a local firm, but it was antiquated in type and practically worn out. Similarly, two worn out Multubular boilers were borrowed from the Executive Engineer, Government House Division.

4. Process of manufacture:- The process adopted in the manufacture of the bricks is thus described by Mr. Green, the Asst, Director who was in direct charge of the experiments:-

"Lime sand bricks are made from slaked "shell lime and sea-sand, the average composition "being sand 85 %, lime 8 % and water in combination "7 %. The sand used was ordinary beach sand "obtained from the Marina, and the lime was shell "lime obtained already slaked from the South India "Industrials Ltd, the shells being roasted in a kiln "and sprinkled over with water as they issued from "the kiln and turned with a rake until they fell to "a practically dry powder. The lime was afterwards "screened, and arrangements were made to ensure that "only fresh lime was supplied, this being a very "important factor in lime sand brick manufacture. "The lime and sand were thoroughly ground in a "mixing and kneading mill. After leaving the mill "the mixture was fed into a silo, where it matured "for 24 hours, a greater degree of plasticity being thereby assured. The material was then conveyed "by an elevator to the automatic feeding apparatus "of the brick press. Here the bricks were made, "and in the mould they received a pressure of 2 tons "per sq. in., the brick being pressed upward by

"means of an elaborate arrangement of levers which "transmited the necessary pressure. After being "pressed, the bricks were automatically pushed out "of the moulds, and remained at the top of the "circular revolving ~~tube~~ table until taken off by coolies "and placed on transfer cars. The cars were then "conveyed to the hardening chamber, which is a long "steel cylinder resembling a Lancashire boiler but "is of greater length. This chamber has a holding "capacity of 8000 bricks. When the chamber was full "the heavy doors were lowered and bolted. The steam "was then turned on and maintained at a pressure of "120 lbs per sq. inch for a period of 10 hours. The "bricks were subsequently withdrawn and after cool- "ing were ready for use. In the hardening chamber a "chemical reaction takes place between the lime and "part of the sand forming a compound to which the "strength of the brick is due. Under the action of "the ~~ss~~ steam the silica is partly converted into a "soluble modification. As each sand particle is "surrounded by lime the active silica and lime "unite to form a calcium hydro silicate which acts "as a binder between the different sand particles "and gives the brick its strength."

5. Course of the experiments:- Experiments were begun in January 1916, the plant at that time comprising the brick press and hardening chamber obtained from England, an ordinary mortar mill, and the old steam engine and boilers referred to above. It was found that in order to prepare sufficient mixture for one day's pressing it was necessary for the mortar mill to be worked for 8 days. The cost of operation was consequently ruinous, and these preliminary tests were brought to a termination in April pending the arrival of the balance of plant. The number of bricks made during this period was

about half a lac, all of which were used in the construction of the Hydraulic Oil Mill buildings at Washermanpet. The results attained during these trials were satisfactory as regards crushing strength, although the bricks were coarse and soft in character and crumbled to an excessive extent. Tests carried out at the Engineering College in January showed crushing strengths varying from 107.87 to 217.12 tons per sq.ft. or an average for all the bricks tested of 143.75 tons per sq. ft. From January to the end of April manufacture was continued but no further tests appear to have been made. From April to September manufacture was suspended pending the arrival of the balance of plant. The grinding mill arrived in August and the erection was completed in September, but further delay subsequently ensued owing to the collapse of the pillars carrying the shafting which had to be reconstructed on new and firm foundations. By the end of the month work was begun, but it was at once evident that with the engine and boilers avail- able it was impossible to work simultaneously the new grinding mill and the brick making press, and as a corollary that it was impossible to obtain any true figures of the costs of manufacture. Accordingly in his letter G.Cur. 5 dated the 30th September 1916 Mr. Couchman submitted to Government an estimate for working the plant in the year 1917-18 with a 50 B.H.P. electric motor. In the meantime efforts were made to procure the loan of an engine of the horse power required, but these efforts being unavailing, a supplementary steam engine was procured from the glass factory, and experiments were begun again in the manufacture of the bricks.

Page 1 Empire

6. Such was the position when I took over charge of the Department at the end of October last

In November a number of bricks were sent to the Engineering College to be tested. These bricks had been made from sea-sand and slaked lime. 300 lbs. of sand and 150 lbs of lime were first mixed and ground together for 8 minutes, then 950 lbs. of sand were added and the whole mixture was then ground for another 4 minutes. The tests showed crushing strengths varying from 62.67 to 120.7 tons per sq. foot, the average being 76.1 tons per square foot. These results were unsatisfactory. Accordingly various experiments were made. The period of grinding was extended to 18 minutes, and river sand, sea-sand washed and unwashed, and river and sea-sand mixed were all used in making the bricks. Further tests were carried out at the Engineering College the results of which are summarised in the annexed table:-

Mark.	Materials of which Bricks were composed.	Total period of grinding.	Crushing strength in tons per sq. ft.		
			Maximum	Minimum.	Average.
A.	Washed sea-sand and slaked lime	18	53.82	40.64	47.7
B.	River sand and slaked lime	18	72.99	53.21	59.72
C.	River and sea-sand mixed in equal proportions and slaked lime	18	89.13	53.33	69.11
D.	Unwashed sea-sand and slaked lime	18	141.74	74.43	93.67

It will be observed that the lengthening of the period of grinding had improved the crushing strength of the bricks made in the ordinary way with unwashed sea sand and slaked lime. The bricks sent for this trial were also tested for absorption for a period of 24 hours, and the results showed that each brick absorbed in that period 14.5 ozs. of water or 12% of their weight. Subsequently further tests were made of bricks which after manufacture had been

allowed to harden by exposure for a period of 24 hours to the action of the atmosphere. The results of the tests are appended:-

Class.	Materials of which Bricks were composed.	Total period of grinding.	Crushing strength in tons per sq. ft.		
			Maximum	Minimum	Average.
A.	Washed sea-sand and slaked lime.	18	57.89	40.26	49.52
B.	River sand and slaked lime	18	67.43	56.22	62.14
C.	River and sea-sand mixed in equal proportions and slaked lime.	18	85.23	53.36	64.24
D.	Unwashed sea-sand and slaked lime	18	170.61	103.56	119.68
E.	" " "	12	85.76	59.85	71.87
F.	" " "	12	71.52	51.61	57.94

The bricks made of unwashed sea sand and slaked lime, after the materials had been ground for 18 minutes, showed a further improvement, and attained on an average a crushing strength nearly 120 tons per sq ft. But with this exception, the bricks showed little, if any improvement.

7. Results of the experiments:- It was obvious at this stage that the experiments were a failure. It was obviously impossible with the inefficient power plant in use to obtain any reliable figures of cost of production. Not only was it expensive to run two engines instead of one, but also there were frequent stoppages on account of breakdowns, and the output was affected thereby. Thus no progress had been made in demonstrating the first of the two propositions which Mr. Tressler had set out to prove viz. that it was possible to make lime sand

bricks at about the same cost as ordinary clay bricks. Secondly, we had not succeeded in making bricks of the very superior quality anticipated by Mr. Tressler. The bricks it is true, were massive, firm and clean in shape, and to all outward appearances were excellent. But not only did the bricks vary in quality to an excessive extent but also in point of crushing strength they were on an average inferior to the stock clay bricks made in Madras by the Public Works Department. A reference to Professional Papers No.5 of the College of Engineering Experiments on the Strength of Materials will prove this point.

8. Further Enquiries made. Accordingly in December 1916 I closed the factory down. The next point for determination was whether it was worth investing in the plant proposed by Mr. Couchman and carrying on the experiments in 1917-18 at an estimated cost of Rs.58,000. The answer to this question depended on three uncertain factors:-

(1) whether we could produce a brick which would compete in price and quality with P.W.D. stock clay bricks which have a crushing strength varying from 100 to 120 tons to the square foot and sell for Rs.18 per 1000.

(2) if not, whether we could produce a superior brick at a somewhat higher price and

(3) if so, whether there was likely to be a market in Madras for expensive bricks showing a crushing strength of not less than 150 tons to the sq. foot.

A further point which suggested itself for enquiry was whether the conditions in any part of the Madras Presidency were suitable for lime brick manufacture. In Madras itself clay, at any rate of fair quality, is available. But it was possible that in other districts where lime and sand were plentiful clay might be scarce and bricks and building stone dear.

9. Mr. Green's visit to Ceylon:- As the most direct method of obtaining information on the subject, I obtained permission to depute Mr. Green, the Assistant Director to Ceylon. About 12 years ago two separate attempts were made in this island to make lime sand bricks on a commercial scale, but both attempts ended in a failure. Quite recently, however, on the advice of the P.W.D., a private syndicate imported the necessary machinery, and in September last the factory started work. The syndicate courteously offered to show Mr. Green over the factory, and I instructed him to enquire particularly into the processes of manufacture, the selling price of the bricks, and the conditions in Ceylon which made the manufacture of lime sand bricks a commercial possibility. (A copy of Mr. Green's report is appended.) It contains much information of a confidential nature which it would not be fair to the syndicate to publish, and I request that the report may be treated as confidential. It is clear however that conditions in Ceylon differ entirely from those obtaining in Madras. Good brick making earth is apparently scarce, and even inferior country bricks command a high price. There is thus a large market for lime sand bricks at a price far in advance of what can be expected in Madras. It is also clear from the report that the processes of manufacture and the machinery in use at the Colombo factory are more elaborate than our own. The salient features of the Colombo factory, as compared with the experimental factory in Madras, are the preparation of fresh lime on the spot, the thorough amalgamation of the sand and lime by means of a Tube mill, and the grading effect obtained by adding unground sand to the mixture after it has

been left in the silo for 24 hours. It is probable, I think that with the experience gained at our own factory and in the light of the information obtained from Colombo, we could improve the quality of our bricks and possibly attain an average crushing strength of at least 150 tons ~~of~~ to the sq. foot. But to ensure these results, it would be necessary not only to invest in an efficient power plant but also to add to our existing machinery at least a Tube Mill. Some elaboration of our processes of manufacture would also be necessary which would add to the costs of production. But whether it would be worth going to this expense depends on the market for high class bricks in Madras, and in this respect out-look is not hopeful. The Agents of the Madras and Southern Mahratta and South Indian Railways, the Special Engineer to the Corporation of Madras and the Chief Engineer of the Madras Port Trust were all consulted, but none of them held out any hopes that there would be a large demand for a more expensive brick of better quality than the best type of clay bricks made in Madras. I also consulted all Superintending Engineers in the Presidency, as to whether owing to the absence of clay and building stone prospects were favourable in any part of the Presidency for lime sand bricks. The Superintending Engineer, III Circle has not replied, but the replies of the others were all unfavourable. In all circles except the second good brick making clay is available, and in the second circle good stone is procurable at cheap rates.

10. Conclusions. My conclusions may be summarized as below:-

(1) If we go to the expense of improving our machinery and elaborate the process of manufacture, we could probably rely on producing a really high

15

class brick.

(2) For reasons already explained, I cannot give accurate figures of costs of production, but taking a line by the figures obtained from Ceylon and modifying them with reference to the price of lime, sand and fuel in Madras, I feel certain that we could not produce the bricks for less than Rs.22 per 1000 and I think it probable that the cost would be nearer Rs.25 per 1000.

(3) But clay bricks of sufficiently good quality can be obtained in Madras at between Rs.16 and Rs.18 per 1000, and there is no likelihood of any large demand for more expensive bricks even if better in quality.

(4) Conditions in the Madras Presidency generally are not favourable for a lime brick industry. In places where good brick making clay and good building stone are not available, and where there is a demand for building materials, a lime sand brick industry, if the raw materials are available, offers good prospect of success. Such conditions obtain in parts of Canada and America and in Ceylon, but they do not exist in the Madras Presidency.

(5) In the circumstances, I do not recommend that the experiments should be continued.

The statement below exhibits the cost of the experiments.

	Receipts.	Expenditure.	Net cost.
1915-16	743	22,358	21,615
1916-17	428	17,205	16,777
	1,171	39,563 *	38,392

* of this sum, Rs.24,738 represents the value of the plant.

Complete statements of all the tests are appended.

G.H.

28/5/17

Statement 1.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

There is no record of the conditions under which these bricks were made or of the constituents entering into their composition.

Original dimension of cross section.	Thickness	Area of cross section.	Weight of Brick.			Maximum load		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.37 x 9.00	2⅝	39.33	7	2	380	59.30	217.12	
4.37 x 9.00	2⅝	39.33	6	4	410	33.62	123.09	
4.37 x 9.00	2⅝	39.33	6	7	50	34.95	127.96	
4.38 x 9.00	2⅝	39.42	6	6	400	35.40	129.31	
4.38 x 9.00	2⅝	39.42	6	6	120	29.53	107.87	
4.38 x 9.00	2⅝	39.42	6	14	0	43.03	157.19	

Statement 11. November 21st 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from unwashed sea sand and slaked lime.

Original dimension cross of section	Thickness.	Area of cross section.	Weight of Brick.			Maximum load		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.41 x 8.98	2¾	39.60	7	0	400	14.73	53.56	Mixture ground for 12 minutes.
4.38 x 9.01	2¾	39.46	7	3	380	23.37	85.28	"
4.39 x 9.00	2¾	39.51	7	1	280	15.83	57.70	"
4.37 x 9.00	2¾	39.33	7	0	80	22.12	81.00	"
4.38 x 8.98	2¾	39.33	6	11	410	19.28	70.60	"
4.40 x 8.96	2¾	39.42	6	9	20	16.70	61.00	"
4.39 x 9.02	2¾	39.60	7	2	220	17.47	63.52	"
4.39 x 9.04	2¾	39.69	7	8	370	29.70	107.50	"
4.36 x 9.01	2¾	39.55	6	10	250	18.17	66.16	"
4.36 x 9.00	2¾	39.42	7	8	350	26.52	97.32	"
4.38 x 9.00	2¾	39.42	7	0	330	22.40	81.83	"
4.39 x 9.02	2¾	39.60	6	11	300	17.07	62.07	"
4.39 x 9.02	2¾	39.60	7	5	150	25.67	93.35	"
4.39 x 9.02	2¾	39.60	7	12	400	19.23	69.93	"
4.39 x 9.05	2¾	39.73	6	11	0	22.07	80.00	"
4.39 x 9.07	2¾	39.82	7	9	380	33.37	120.70	"
4.40 x 9.05	2¾	39.82	6	14	200	19.50	70.52	"
4.39 x 9.14	2¾	40.12	6	14	300	18.82	67.55	"

Statement 111 (1) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from washed sea sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.37 x 8.90	2¾	38.89	6	6	400	12.3	45.54	Mixture ground for 18 minutes.
4.38 x 9.00	2¾	39.42	6	9	150	14.4	52.60	"
4.37 x 9.00	2¾	39.33	6	8	50	14.7	53.82	"

Boiler could not be maintained at the requisite pressure of 120 lbs. per sq. inch.

Statement 111 (2) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from washed sea sand and slaked lime, the resulting brick being steeped in water for 24 hours.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.37 x 9.00	2¾	39.33	6	8	100	11.10	40.64	Mixture ground for 18 minutes.
4.40 x 9.00	2 11/16	39.60	6	10	150	12.40	45.09	"
4.38 x 9.01	2¾	39.46	6	11	250	13.30	48.54	"

Boiler pressure only maintained at about 100 lbs pressure.

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Statement 111 (3) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from river sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons	Tons per s.ft.	
4.38 x 9.01	2¾	39.46	7	1	350	20.00	72.99	
4.39 x 9.00	2¾	39.51	7	1	250	17.50	63.78	
4.39 x 9.00	2¾	39.51	6	12	250	14.60	53.21	

Boiler could not be maintained at the requisite pressure of 120 lbs. per sq. inch.

Statement 111 (4) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from river sand and slaked lime, the resulting brick being steeped in water for 24 hours..

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Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.37 x 9.01	2¾	39.37	6	15	200	15.9	58.16	
4.38 x 9.00	211/16	39.42	6	14	0	14.6	53.33	
4.42 x 8.99	211/16	39.74	6	14	400	15.7	56.89	

The required Boiler pressure of 120 lbs. per sq. Inch. could not be maintained for any length of time.

Statement 111 (5) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from a mixture of sea and river sand and slaked lime.

Original dimension of cross section	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.38 x 9.00	2⅝	39.42	6	5	400	14.6	53.33	Mixture ground for 18 minutes.
4.38 x 8.99	211/16	39.38	6	12	250	18.9.	69.11	
4.37 x 8.99	2¾	39.29	6	13	100	19.8	72.57	"

Statement 111 (6) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from a mixture of river sea sand and slaked lime the resulting bricks being steeped in water for 24 hours.

Original dimension of cross section.	Thickness.	Area of cross. section.	Weight of Brick.			Medimum load.		Remarks
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.37 x 9.01	2¾	39.37	7	2	150	20.3	74.25	Mixture ground for 18 minutes.
4.38 x 9.00	2¾	39.42	6	14	0	15.4	56.26	
4.38 x 9.00	2¾	39.42	7	5	250	24.4	89.13	"

The bricks comprised in Statement 111 were tested for absorption and on an average absorbed about 14.5 ozs. of water or about 12% of their weight.

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Statement.111 (7) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from unwashed sea sand and slaked lime.

Original dimension of cross section.	Thick-ness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.36 x 9.02	2¾	39.33	7	0	150	20.6	75.42	Mixture ground for 18
4.39 x 8.98	2¾	39.42	7	11	200	38.8	141.74	for 18
4.39 x 8.99	2¾	39.47	6	9	50	20.4	74.43	"

Boiler pressure under 120 lbs per Sq.Inch.

Statement 111 (8) December 18th 1916.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

These bricks were made from unwasned sea sand and slaked lime, the resulting bricks being steeped in water for 24 hours.

Original dimension of cross section.	Thick-ness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.40 x 9.00	2¾	39.60	7	4	250	22.9	83.27	Mixture ground for 18 minutes.
4.37 x 9.00	211/16	39.33	7	0	250	28.4	103.98	
4.37 x 8.99	211/16	39.29	6	14	0	22.7	83.20	"

Boiler pressure under 120 lbs per Sq.Inch.

Statement 1V.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

(January 30th 1917.)

Bricks manufactured from washed sea sand and lime.

Original dimension of cross section.	Thick-ness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.36 x 9.00	2¾	39.24	6	1	230	14.84	54.46	Ground for
4.37 x 8.98	211/16	39.24	6	1	230	10.97	40.26	18 minutes

Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from washed sea sand and lime resulting brick being steeped in water for 24 hours.

Original dimension of cross section	Thick-ness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.36 x 8.98	211/16	39.15	6	4	350	12.36	45.46	Ground for
4.38 x 8.99	2¾	39.38	6	7	250	15.83	57.89	18 minutes.

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Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from River Sand and Lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.	Maximum load. Total	Maximum load. Stress.	Remarks.
Inches.	Inches.	Sq.Inches.	lbs. Ozs. Grns.	Tons.	Tons per s.ft.	
4.38 x 8.99	2¾	39.38	6 11 420	18.44	67.43	Mixture ground for 18 minutes.
4.37 x 8.99	2¾	39.29	6 11 250	17.98	65.90	

Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from River Sand and Lime, resulting brick steeped for 24 hours in water.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.	Maximum load. Total	Maximum load. Stress.	Remarks.
Inches.	Inches.	Sq.Inches.	lbs. Ozs. Grns.	Tons.	Tons per s.ft.	
4.38 x 8.98	2¾	39.33	6 14 350	16.12	59.00	Mixture ground for 18 minutes.
4.36 x 8.79	2¾	38.32	6 14 180	14.96	56.22	

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Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from unwashed sea sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.38 x 8.96	2¾	39.25	6	13	400	19.31	70.84	Mixture ground for 18 minutes.
4.38 x 8.96	2¾	39.33	6	15	260	23.28	85.23	

Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from unwashed sea sand and slaked lime, resulting brick steeped in water for 24 hours.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.37 x 8.99	211/16	39.29	6	6	200	12.97	47.53	Mixture ground for 18 minutes.
do.	2¾	39.29	6	12	180	14.56	53.36	

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Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from unwashed sea sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.	Maximum load.		Remarks.
				Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs. Ozs. Grns.	Tons.	Tons per s.ft.	
4.38 x 9.03	2¾	39.55	7 1 430	28.45	103.56	Ground for
4.36 x 9.01	2¾	39.28	7 9 250	46.54	170.61	15 minutes

Statement 1V. January 30th 1917.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from unwashed sea sand and slaked lime,
resulting brick steeped in water for 24 hours.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.	Maximum load.		Remarks.
				Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs. Ozs. Grns.	Tons.	Tons per s.ft.	
4.37 x 9.00	211/16	39.33	7 3 30	28.44	104.13	Mixture ground for
4.38 x 8.97	2¾	39.29	7 5 430	27.45	100.61	15 minutes

Statement IV.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks (2 months old) manufactured from unwashed sea sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.39 x 9.00	2¾	39.51	7	1	250	23.53	85.76	Mixture ground for 12 minutes
4.39 x 9.01	2¾	39.55	7	2	-	20.21	73.58	

Statement IV.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from unwashed sea sand and slaked lime, resulting brick steeped in water for 24 hours.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
4.41 x 9.04	2⅞	39.87	7	2	130	16.57	59.85	Mixture ground for 12 minutes.
4.39 x 9.03	2⅞	39.64	7	7	50	18.80	68.29	

Statement 1V.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks (3 months old) manufactured from unwashed sea sand and slaked lime.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.42 x 9.82	$2\frac{7}{8}$	39.87	7	3	300	16.42	59.31	Mixture ground for
4.38 x 8.97	$2\frac{7}{8}$	39.29	7	1	430	13.46	49.33	12 minutes.

Statement 1V.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks (3 months old) manufactured from unwashed sea sand and slaked lime, resulting brick steeped in water for 24 hours.

Original dimension of cross section	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	tons.	Tons per s ft.	
4.38 x 9.00	$2\frac{7}{8}$	39.42	7	5	80	19.58	71.52	Mixture ground for
4.39 x 9.00	$2\frac{7}{8}$	39.51	7	2	50	14.16	51.61	12 minutes.

The bricks included in Statement 1V. were exposed to the hardening effects of the atmosphere for a period of two months.

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Statement . V.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

(27th February 1917)

Bricks manufactured at the Lime Brick Factory, Madras.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks
						Total.	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
A.4.36 x 8.99	2.66	39.20	6	14	20	20.92	76.85	
B.4.36 x 8.98	2.71	39.15	6	15	430	22.74	83.64	

Statement V.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured at Colombo.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks
						Total.	Stress.	
Inches.	Inches.	Sq.Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s.ft.	
C.4.28 x 8.79	2.79	37.62	6	13	370	19.12	73.19	
D.4.27 x 8.78	2.84	37.49	6	13	180	18.25	70.10	

Statement VI

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

(17th April 1917)

Bricks manufactured from ground sea sand, slaked shell lime, and unground sea sand.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.38 x 8.98	2.68	39.33	6	13	100	20.90	76.52	Unground sea sand mixed in equal qualities with ground mixture of sand and lime as it issued from Silos.
4.39 x 9.00	2.70	39.51	6	8	253	15.42	56.20	

Boiler pressure could only be maintained at a pressure of 100 lbs per Sq. Inch.

Statement VI.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from sea sand, lime and unground river sand.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	ozs.	Grns.	Tons.	Tons per	
4.38 x 9.00	2.72	39.42	6	15	150	18.21	66.52	Unground river sand mixed in equal quantities with ground mixture of sea sand and lime as it issued from Silos.
4.39 x 9.97	2.75	43.77	6	15	200	16.15	53.13	

Boiler pressure could only be maintained at a pressure of 100 lbs. per Sq. Inch.

The Brick compressed in Statement VI. absorbed from 10% to 10.3 % of their weight of water in 24 hours. The initial mixture was 5 parts of sand to 1 of lime this being ground for 15 minutes.

Statement VI.

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.

Bricks manufactured from ground river sand, lime and unground river sand.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.37 x 9.00	2.77	39.33	7	9	50	25.50	93.36	Unground river sand mixed in equal qualities with ground mixture of sand and lime as it issued from Silos.
4.40 x 9.97	2.84	43.87	7	7	80	17.41	57.15	

Boiler pressure would only be maintained at a pressure of 100 lbs. per Sq. Inch.

Statement VI.

RESULTS OF COMPRESSION TESTS OF LIME SAND BRICKS.

Bricks manufactured from River sand, lime and unground sea sand.

Original dimension of cross section.	Thickness.	Area of cross section.	Weight of Brick.			Maximum load.		Remarks.
						Total.	Stress.	
Inches.	Inches.	Sq. Inches.	lbs.	Ozs.	Grns.	Tons.	Tons per s ft.	
4.48 x 9.00	2.86	40.32	7	1	200	12.60	45.00	Unground sea sand mixed in equal qualities with ground mixture of river sand and lime as it issued from Silos
4.40 x 9.99	2.73	43.96	6	14	220	14.55	47.66	

Boiler pressure could only be maintained at a pressure of 100 lbs per Sq. Inch.

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The manufacture of Lime Sand Bricks in Ceylon.

The manufacture of Lime Sand Bricks in Ceylon was apparently started in Colombo about 12 years ago, but it is difficult to obtain any precise information regarding its inception, or the results of the experiments as the persons originally interested in the industry have since left the island. As far as can be ascertained however, it appears that in 1905 a lime sand brick making plant of German manufacture was imported by a local firm and experiments conducted therewith, but I understand that they were never able to turn out satisfactory bricks and, enterprise ended in complete failure, the machinery being returned to the manufacturers. I examined a wall built of these bricks which ~~were~~ are of so soft a character, that even after years of exposure to the hardening effects of the atmosphere the blade of a knife could be forced in up to the hilt. At a later stage a plant was imported of Messrs. Sutcliffe Speakman's manufacture which appears to have been of a similar type to the Departmental plant, with the exception that they prepared their own lime and introduced a Ball Mill for the grinding of the burnt lime. A quantity of bricks were made with this plant which was however ultimately returned to England. I have also examined a wall made of these bricks and although they are of much better quality than the bricks turned out by the German plant, they do not seem to be, as far as I could judge, so good as the bricks made by the departmental plant.

This plant was in operation at the time of the Rubber Boom, and I understand that there was some difficulty in raising the additional capital required to carry on, at the same time the

the plant does not appear to have been a very great success, and it seems improbable that the plant would have been returned, if the possibilities of commercial manufacture had been established, for there has always been a considerable demand in Ceylon for a good quality brick.

There was apparently an interval of about 10 years before the manufacture of lime sand bricks was again considered, when at the suggestion of the Public Works Department a private syndicate on the advice of the previous owner of the factory, indented for machinery of Messrs. Herbert Alexander and Company's manufacture, the process being elaborated by the introduction of a Tube Mill and in other ways. It is somewhat significant that the machinery indented for in this occassion was not of Messrs. Sutcliffe Speakman's manufacture, and it seems obvious that this plant was never really satisfactory. On account of the war intervening, delivery of the new machinery was not completed until the middle of last year and the factory was not started until September last.

I have divided my analysis of the existing plant and its operation, under various heads:-

Materials:- The bricks are made from coral lime and sea sand with the addition of the requisite amount of moisture. The factory is situated on the sea shore and is flanked on one side by the mouth of a river. The sand is washed up on the sea shore and the side of the river facing the factory, consequently this material is obtained practically without cost. The sand appa appears to be coarser than ordinary sea sand and is very hard. The coral is brought from a distance of 50 miles and the cost is high working out at Rs.15-8-0 a ton of coral, Liquid fuel is used for power production and the cost is about Rs.9-8-0 per day of 10 hours working. The bricks are steamed during the night and to raise the requisite amount of

steam to harden 8000 bricks, a daily expenditure of Rs.30 is incurred for wood fuel. To produce the daily supply of burnt lime 4 tons of wood is used at a cost of Rs.28/-

Process of Manufacture:- The following is briefly the process of manufacture:-

The coral lime is burnt in the kilns for 24 hours, and is brought fresh from the kilns and ground to a fine powder in a Ball Mill, the lime is then mixed with unwashed sea-sand in the ratio of 1 to 3 and the mixture ground to a fineness equal to cement in a Tube Mill. This mill consists of a long revolving shell tube which is lined with silica paving and charged about half full with hard flint pebbles, the material is led in at one end and passes out automatically at the other end, the grinding being effected by the rolling of the pebbles on the material, which is ground to the finest powder.

The mixture from the Tube Mill is elevated to an upper floor where it passes through a trough over which is fitted a preforated pipe, and it is here that the requisite amount of moisture is added the lime not having been previously slaked in any way. The material then falls into silos where it matures for 12 hours. On issuing from the silos it is mixed with an equal quantity of unground sea sand and the final mixture is conveyed to the Kneading Mills, where it is automatically passed through, and is then subjected to a pressure of 150 tons in the power presses. The bricks are finally subjected to the hardening effects of steam at a pressure of 120 lbs. sq.inch in closed vessels for a period of ten hours.

Mixture:- As above stated one part of lime is mixed with three parts of sand and this mixture

after issuing from the silos is mixed with an equal quantity of unground sand, the amount of lime used is consequently about 12½ % of the total mixture against about 9% employed in our experiments. I believe however that with their system of manufacture it is usual to use a larger amount of lime.

Plant:- The plant comprises 2 kilns each of a capacity of 3 tons, a Ball Mill, Tube Mill, Elevator and Trough. 2 Silos, 2 Kneading Mills, 2 Power Presses, Hand press for pressing fancy and irregular shaped bricks, and 2 Hardening Chambers 52' long and 3'-6" diameter, each of a capacity of 4500 bricks. A 75 B.H.P. Hornsby liquid fuel burning oil engine is installed for driving the various machines, and a 24' X 6'-6" Lancashire Boiler for supplying steam to the hardening Chambers. The steam hardening chambers are much longer and smaller in diameter than ours and it is probable that more regualr heating of the bricks results, as the heat is more diffused. The hardening chambers at the Colombo factory are built into brick work in the same way as a steam boiler and consequently the loss by radiation is reduced to a minimum. These chambers are never allowed to cool down but are kept warm during the day by the introduction of a small quantity of steam. The brick making machinery is of Messrs. Herbert Alexander and Co's manufacture. The cost of the complete machinery including erection was Rs.103,000.

Output and cost of production:- The output to date is 300,000 the whole of which have been taken by the Ceylon Railway. Each press is capable of an output of 17 bricks per minute and the maximum output is thus about 20,000 per day of 10 hours but the output is governed by the capacity of the two hardening chambers which is only 10,000 and the latter figure accordingly represents their actual outturn. The cost of production including interest and depreciation charges is Rs.25 per 1000, but if another hardening chamber was installed, there is no

reason why the output should not be increased and the cost of manufacture reduced accordingly.

Quality:- The size of the bricks are 8⅝"x4¼"x2¼" and the average weight is 7 lbs. The dimensions of the departmental bricks are 9"x4⅜"x2¼" but the weight is identical. In appearance they are rougher and coarser and crumble more than the departmental bricks, a defect which is due to the inadequate period of grinding to which the final mixture is subjected in the Kneading mills. The manufacturers have had no tests made of these bricks and had no idea of the load they would withstand, I however brought two bricks back with me, and have had these tested at the Engineering College with two average bricks manufactured at the Madras factory. The results are as follows:-

	Madras Bricks Tons per sq ft.	Colombo Bricks Tons per sq ft.
Sample 1.	76.85	73.19
Sample 2.	83.64	70.40

The Colombo bricks are therefore in no way superior as regards crushing strength to the Madras bricks and in appearance are inferior. Nevertheless I am convinced that the process of manufacture there followed is on the right lines, and that greatly improved results, represented by a stronger and closer grained brick, would follow if they subjected the final mixture to from 8 to 10 minutes grinding in the Kneading mill instead of automatically passing it straight through, with the results that the rough unground sand does not bind properly with the finely ground sand and lime, and the resulting brick not only lacks strength but is coarse grained in appearance.

Staff:- The factory is worked under the control of the Cingalese proprietor and the number of employees is 60. The various machines are worked by coolies on pay of as.12 per day under the supervision of maistry maistries. The daily pay roll is Rs.50.

Market:- Colombo appears to be a very suitable centre for this industry as the essential materials

are available, and owing to the absence of competition these bricks command a market price of Rs.32/- per 1000. They accordingly make a profit of Rs.7 per 1000 bricks. There is not good clay found in Ceylon and ordinary country hand made bricks which in Madras sell at about Rs.5 per thousand command in Colombo a price of about Rs.28 per thousand. The only other class of bricks manufactured in Ceylon are cement bricks and these are sold from Rs.40 to 50 per 1000. In the absence of competition these lime bricks command a higher price than their real merits probably justify.

Conclusions:- The salient features of the Colombo plant are the preparation of fresh lime on the spot, the thorough amalgamation of the sand and lime by means of a Tube Mill, and the grading effect obtained by mixing the matured mixture with unground sand. The process of manufacture employed is unquestionably on the right lines, and is the result of experience gained with the two preceding plants. It is desirable for a Lime Brick Factory to manufacture its own lime as in this case only can a supply of fresh lime be assured. Another important point is that it is preferable to slake the lime when in contact with the sand after a preliminary mixing in the tube mill.

The presses installed in this factory are of Messrs. Herbert Alexander and Co's manufacture and are preferable to the type of press adopted by the Department. They appear to be more strongly constructed, the design is better, and what is perhaps more important the bricks are subjected to a greater pressure.

The introduction of a tube mill for grinding the preliminary mixture is necessary for

the production of high class bricks. It is generally recognised that its introduction marked a great advance in the manufacture of lime sand bricks. The crushing and tensile strengths are increased thereby, and the wear and tear on the press moulds is considerably reduced, the latter is an important consideration as the cost of renewing the moulds is very costly, in this factory under the most favourable conditions it amounts to Re.1 per 1000 bricks. But a still greater advantage of the use of the tube mill, in my opinion, is that a thorough amalgamation of the lime and sand is secured before the final grinding is effected. In the case of the Departmental plant the lime is simply mixed with the sand on the platform previous to the mixture being fed into the grinding mill and incomplete assimilation results. In illustration of this view I would point out that with the bricks manufactured in the beginning of 1916, from material ground in an ordinary Mortar Mill, it was necessary to grind the material for about 40 minutes to secure the same grinding effects as 8 minutes grinding in the new mill, and this had the effect of securing a greater consolidation of the sand and lime, with the result that stronger bricks were produced than at any subsequent period.

The sand available at the Colombo factory is probably more suitable than Madras beach sand as it is much harder and binds better. Madras beach sand is of rather too fine a character to be altogether satisfactory.

The Departmental plant is not elaborate enough for the production of high class bricks consisting as it does merely of a grinding mill

and a press with no intermediate arrangements for securing preliminary grinding and amalgamation of the sand and lime. I am also of the opinion that the smallest plant capable of operating on a commercial scale must have an outturn of at least 20,000 bricks per day. This is the maximum capacity of the Colombo plant, and also of the plant situated at Merwe in the Bombay Presidency.

There is little doubt that by the introduction of additional machinery, and by the preparation of the lime at the factory itself, lime sand bricks could be produced in Madras to give a high crushing strength, but including the interest and depreciation charges it is not likely that bricks could be manufactured by this more elaborate process at a less cost than about Rs.22 per thousand and we should have to face the competition of P.W.D. clay bricks, which according to tests carried out by the Engineering College show average crushing strengths of over 100 tons per sq. ft. Under these circumstances I do not think that the manufacture of lime sand bricks can be made commercially profitable in Madras. Given the necessary plant it is not difficult to manufacture lime sand bricks, but it is an extremely difficult proposition for such a plant to prove a commercial success in the face of the competition of clay bricks which can be produced at a much lower price.

L.B. GREEN

Secl. II-8 (f)—11,004—16-1-17.

Home (Education) Dept.

(C.No.2151-A).

Memo. No. 1882-A-98-1-8-17

With reference to his letter G.Cur No.5, dated the 23rd May 1917, the officer in charge of the Department of Industries is requested to report whether the experiments in the manufacture of lime sand bricks are to be discontinued finally or only for the present and whether it is intended to dispose of the plant at once.

2. The Government note that it is proposed to publish the report of the experiments as a departmental bulletin after scrutiny by the Principal of the College of Engineering and the Chief Engineer, P.W.D. The bulletin should be submitted in proof for their approval prior to publication.

1.8.17

To

The Officer in charge
of the Dept: of Industries.
(Memo.)

C.F.—29.

DEPARTMENT.

Edn D 2690 35

Received 16 AUG 1917 191 . *Registered* 191 .

Subject.

Lime Sand Bricks:- Regarding the possibility of reviving the experiment in the manufacture of ----------

17-AUG-1917

ENCLOSURES.
No. 3.
Spare copies

G. cur No. 210

Station Madras. , *Dated the* 15th August 191 7.

From (Name) C.A. Innes, Esqr., I.C.S.,
(Designation) Director of Industries, Madras.

To The Secretary to the Government of Madras,
HOME (Education) Department.

Sir,

I have the honour to reply to Government Memorandum No. 1882 A-9 dated the 1st of August 1917, regarding the possibility of reviving the experiment in the manufacture of lime sand bricks elsewhere than in Madras.

p. 4 b infra

2. I enclose a note by Mr. Green on the possibilities of experimentally manufacturing these bricks at Masulipatam. It will be seen that under certain conditions, and assuming that they withstood the strong sea air, the bricks could be advantageously used for building operations here. But it cannot be definitely stated that they are impervious to the effects of the sea air, and moreover they could not compete in price with clay bricks, the walls of which were only partly cement coated

para 4 p 5 infra

SK

3. I have had a long discussion on the matter with Mr. Scott Mackenzie of the South India Industrials. He agrees generally with my report, with the exception that he thinks that there might be a market for the bricks at Kolar. Apart from the lack of an adequate power and steam raising plant, he considers that the main mistake we made was in not providing a proper grading effect by means of a tube mill. Provided that he can secure the existing plant at a low price, and that his Directors agree, he is prepared to go on with the experiments, and subject to confirmation by Government I have offered him the plant for Rs. 9500. The price may seem somewhat low, but Sutcliffe Speakman's plant as it stands is not elaborate enough, and is not very satisfactory in other respects.

4. I am not anxious to commence experiments at Masulipatam, and I do not see how we could get over the difficulty of the power plant and boilers. The required machinery is certainly unobtainable under present conditions.

5. If we can get the South India Industrials to carry on the experiment it will be something accomplished, and I favour this solution of the difficulty. The issue of the report may be deferred until the negotiations are completed.

I have the honour to be,

Sir,

Your most obedient Servant,

H.B. Rhodes

For Director of Industries.

M.N.

36

Note on the suitability of Masulipatam as a centre for the manufacture of Lime Sand Bricks.

The cost of manufacture of lime sand bricks in Madras has been put at Rs. 22 per 1000, although I believe that with a proper plant they could be manufactured at Rs. 19. The cost of manufacture at Masulipatam may be taken at Rs. 4 per 1000 less than the Madras figure, on account of cheaper labour and materials being available. For the purpose of comparison with clay bricks, the cost of manufacturing lime bricks at Masulipatam may therefore be taken at Rs. 18 per 1000.

2. The ordinary clay bricks in general use at Masulipatam rapidly wear away on exposure to the sea air, and have in consequence to be coated with cement, a process which adds considerably to the cost of constructional work. The Kistna Local Fund Engineer however informs me that the walls are generally plastered with cement outside and chunam inside, and that further the cement plastering is only carried to a height of about six feet from ground level. Comparison between the cost of cement coated clay bricks and lime bricks is therefore somewhat difficult, as the relative cost would vary with the size and class of building.

3. Lime Sand Bricks are theoretically assumed to harden on exposure to the atmosphere as the result of the chemical action between the calcium hydro silicate and the moisture of the air, a hardening action taking place in the same way as when cement sets. The free hydrated lime in the bricks reacting with the calcium dioxide gas in the atmosphere to form calcium carbonate which binds the sand. How far this is true of the departmental bricks however I am not prepared to say. Some of the bricks used in the construction of the Oil Mill buildings appear to show signs of wear, but these can hardly be taken as a criterion, as the mixture from which

they were pressed was ground in an old Mortar Mill, the result being that the bricks always crumbled to an excessive extent.

4. A schedule showing the cost of constructing a wall 100 square feet in area X 1'-6" thick of cement coated clay bricks is attached. It will be seen that the cost works out at Rs.65-14-0, at the pre war price of cement the cost would be about Rs. 61-8-0. The cost of constructing a lime sand brick wall of 150 cubic feet content would be Rs. 49. Consequently if it was the general practice to coat clay brick walls throughout with cement, lime bricks would be cheaper(provided that they proved impervious to the strong sea air). On the other hand if it is only customary, as it appears to be, to coat the clay bricks only to a height of six feet, it would probably be found more expensive to employ lime bricks for ordinary building construction.

5. Masulipatam is probably as suitable a place as can be found in this Presidency for the manufacture of lime sand bricks, but even here the experiment would be attended with risk. I cannot see how we can hope to conduct further experiments under present conditions for we have no engine or boiler available, and it is quite impossible to obtain these until there is a resumption of normal conditions. Moreover if they were available the required outlay would be very considerable. I am not therefore in favour of further experiments being undertaken at present, and think that if the South India Industrials are prepared to purchase the plant at a reasonable price it would be advisable to accept their offer. If we had an adequate steam raising and power plant available, the position would of course be somewhat different.

15/5

51

37

Data for 150 cubic feet of brick work composed of Lime Bricks and chunam mortar.

Bricks ... 9" x 4⅛" x 2¾".
Rs. 18. per 1000.

2150	Lime Bricks @ Rs. 18/- per 1000	Rs.38-12-0.
15	C.ft. lime at Rs. 13-8-0 per 100 c.ft.. ...	2- 0-0.
30	C.ft. sand at Rs. 10-10-0 per 100 c.ft. ...	0- 3-3
30	C.ft. mortar @ Rs. 3-0-0 per 100 c.f.t. ...	0-14-6
5	brick layers @ Rs.0/12/- each. ...	4- 2-0.
3	men coolies @ Rs. 0/5/- ,, ...	0-15-0.
9	boy coolies @ Rs. 0/3/- ,, ...	1-11-0.
	sundries.	0- 6-3.
	Total	Rs. 49-0-0..

150 c.ft. of brick work = Rs. 49/-.

52 38

Cost of constructing a burnt clay brick wall 100 sq.ft. 1½' thick.
Ellore Cooler

Local Fund Public Works Department. Kistna District.

Description.	Materials and Labour. Quantity.	Particulars.	Rate.	Per	Amount	Total.
			Rs.As.Ps.		Rs.As.Ps.	Rs.As
		Bezwada bricks in chunam per 100 c.ft. at Masulipatam.				
	1800	Bricks at Bezwada	10- 0- 0	1000	18- 0- 0.	
	do	Loading on carts to boatstand	0- 3- 0	do	0- 5- 4.	
	do	Unloading from carts	0- 3- 0	do	0- 5- 4.	
	do	Loading on boats.	0- 4- 0	do	0- 7- 0.	
	do	Conveyance by boat to the Basin at Masulipatam 48 miles.	0- 1- 0	do	5- 8- 0	
	do	Unloading from boats at Masulipatam.	0- 3- 0	do	0- 5- 4.	
	do	Loading on carts at the Basin.	0- 3- 0	do	0- 5- 4.	
	do	Carting from the Basin to the workspot 2 miles average at 250 bricks per cart or say 8 bandly loads on road @ 0-2-0 per bandy per mile	- - -		2- 0- 0.	
	do	Unloading from carts	0- 3- 0	1000	0- 5- 4.	
Lime	14 c.ft.	Lime	13- 8- 0	100 c.ft.	1-14- 2.	
Sand	28 ,,	Sand	0-10- 0	,,	0- 3- 0	
	28 ,,	Grinding mortar ...	3- 0- 0	,,	0-13- 5	
	4	Brick layers ...	0-12-.0	each	3- 0- 0	
	2	Men coolies ...	0- 5- 0	,,	0-10- 0.	
	6	Boy coolies ...	0- 3- 0	,,	1- 2- 0.	
		Sundries..			0- 1- 9	
					35- 6- 0.	
Per 100 Sq.ft. Plastering with cement ½" thick (1:2) 1 cement and 2 sand	197 lbs.	cement	100- 0- 0 current rate.	Ton	9- 1- 6	
	5 c.ft.	Fine sand. ...	0-10-10	100 c.ft.	0- 0- 7.	
	1½	Brick layers ...	0-12- 0	each	1- 2- 0.	
	3	Boy coolies. ...	0- 3- 0	,,	0- 9- 0.	
		S u n d r i e s.			0-11- 1.	
					10-15- 0.	

Description.	Materials and Labour. Quantity.	Particulars.	Rate. Rs.	As.	Ps.	per	Amount Rs.	As.	Ps.	Total. Rs.	As.	Ps.
Per 100 Sq.ft.	3½ c.ft.	L i m e	13	8	0	100 c.ft.	0	7	7			
Plastering	7 c.ft.	S a n d	0	10	0	,,	0	0	9			
with lime	7 c.ft.	Grinding mortar	3	0	0	,,	0	3	4			
mortar ½" thick	1	Brick layer	0	12	0	each	0	12	0			
1 lime & 2 sand.	1/2	Man cooly.	0	5	0	,,	0	2	6			
	1	Boy cooly.	0	3	0	,,	0	3	0			
		S u n d r i e s.					0	0	10			
							1	14	0			

per square of 1½' thickness of wall or 150 c.ft. brick in chunam 53-1-0

Cement plastering per 100 s.ft. on exposed portion. 10-15-0

Chunam plastering do inside ... 1-14-0

150 c.ft. of 1½' thick brick walls. 65-14-0

Sd. T.K.T. Veeraraghavachari.

L.F. District Engineer,

K i s t n a.

M.N.

Sectt. II 8 (c).—12-1-16.

Page 39

Memo

12555/W3-1 Dt. 9.9.17

The S.E. V circle is requested to inspect at an early date the plant for the manufacture of lime sand bricks — in charge of the Dept of Industries and report in consultation with the Supdt of the P.W.D. workshops & Stores whether the plant or parts of it would be of any use for the dept, & other than lime brick manufacture, & the price that might be offered for the plant — which may be expected

6.9.17

6.9.17
for W.

D 7/9
✓ Item 2/40/43

To the S.E. Fifth Circle.
Copy to the Director of Industries
(I.D) Remind in 20 days.

2-16.

C.F.—31

PUBLIC WORKS **DEPARTMENT.**

SECRETARY TO GOVERNMENT 17 OCT 1917 PUBLIC WORKS DEPARTMENT

PUBLIC WORKS DEPARTMENT. C. No. 2465 W.B. DATE. 17-10 1917.

Received 17 OCT 1917 191 . *Registered* 191

Subject LIME, SAND, BRICKS PLANT AT SOUTH INDIA INDUSTRIALS.

ENCLOSURES.
No. 1 Copy of letter.
Spare copies

No. 1807/B

Station Madras. , *Dated the* 16th October 1917

From (Name) J.M. Lacey, Esq., A.M.I.C.E.,
(Designation) Supg. Engineer, V Circle.

To The CHIEF ENGINEER,
PUBLIC WORKS DEPARTMENT.

Sir,

With reference to Official Memo No. 1255-O/Wks.B/1, dated 7-9-1917, I have the honour to inform you that I inspected the Lime, Sand, Brick Plant at the South India Industrials on 26-9-1917 with the Superintendent of Stores. The plant is of no use to this department. There are no places to my knowledge where such bricks can be manufactured at a cheaper rate and will be stronger than a burnt earthen brick. The only plant likely to be of use is the Vertical Engine and Boiler but this I understand the Director of Industries wishes to send to the Madura Technical Institute.

2. I have already informed the Director of Industries that

that the plant is not required by any Executive Engineer in this Circle. According to this figures the cost works out to Rs. 17 per 1000 at Madras and the bricks have a crushing strength of 85 tons per sq.ft. Professor James gives the crushing strength of the bricks ($9\frac{1}{4}$ x $4\frac{1}{2}$ x $2\frac{1}{2}$ nearly) used on the Ripon buildings.

First crack 38.6 tons per sq.ft.
Maximum crushing strength 109.6 tons per sq.ft.

Bricks 8.25" x 4.23" x 2.88" average of 6.

First crack 30.9 Tons per sq.ft.

Maximum crushing 100 ,, ,,

(3) I understand that the Director proposes sending the plant to Ceylon.

(4) I enclose copy of letter from Superintendent of Shops No. 399-S.E.V., dated 28-9-1917.

I have the honour to be,

Sir,

Your most obedient servant,

Supg. Engineer, V Circle.

13.X.17

41

Copy of letter No. 399-S.E.V., dated 28-9-1917, from W.P. Roberts, Esq., A.M.I.Mech.E., General Superintendent, P.W.Workshops, Madras, to the Superintending Engineer, Fifth Circle, Madras:-

Lime-sand-brick making plant.

With reference to your No. 1683-G., dated 22-9-1917, transferred to me by the Superintendent, P.W.Stores Division with his No. 547 P.W.W., dated 25-9-1917, and ~~our~~ joint inspection of the lime sand brick making plant on 26-9-1917, I have the honour to state that I saw the Director of Industries about the matter the same afternoon and ascertained from him that he proposes to transfer the Marshall vertical engine and boiler to the Madura Technical Institute for use there.

2. As for the rest of the plant, it is of no use to the Public Works Department in this Presidency while stronger clay bricks can be made or purchased at their present rates.

3. But the Director of Industries informs me, that at present ~~time~~ lime sand bricks are finding a ready market in Colombo where ordinary bricks cost as much as Rs. 25 per 1000, it would seem advisable to offer the plant available here to the Firm in Colombo who have taken up the manufacture of the lime sand bricks.

4. Apart from its originally intended purposes, the only use to which the seasoning chamber could be put would be for creosoting timber, for which it is quite suitable, I do not however know if any one needs it for this purpose.

Q. PWB 29/+

588/42

Home (Edn) Dept

O.M. 1882 A-12 929x07

With reference to para 3 of the letter from the Superintending Engineer V circle, No. 1801 g, dated the 16th October 1917, (copy enclosed) the officer in charge of the Dept^t of Industries is requested to report whether he has received any offer from Ceylon for the purchase of the lime-brick plant and whether in his opinion the plant is likely to fetch a higher price than that offered by the South India Industrials if its sale is advertised in the newspapers.

8/X
2.X.1917

Q.M.2

p. 5 5 ~~8~~/9 c.f.

Retained with connected papers
No 30/10/17

To ~~the~~ 30/10/17
The Officer in charge
of the Dep^tg Industries.

with copy of letter on p. 5 5 5 5 8 c.f.

PWB
29.X.17

26/10/17

DEPARTMENT.

Received ..... 191 . Registered 14/11 191 .

REGISTRAR HOME DEPARTMENT
14-NOV-1917
GOVT. OF MADRAS

Subject.

Submitting report on sale of Lime Brick Plant.

ENCLOSURES.
No. .....
.....
Spare copies .....

No. Ed. 255

Station Madras, Dated the 9th November 191

From (Name) C. A. Innes, Esquire, I.C.S.,

(Designation) Director of Industries.

To The Secretary to the Government of Madras,

Home (Education) Department.

Sir,

With reference to Government Memorandum No. 1882 A12 dated the 29th October 1917, relative to the proposed sale of the Lime Sand Brick plant, I have the honour to state that I have been in communication with the Colombo firm of lime brick manufactures on the subject, and a few days ago received a wire from them in which they expressed their inability to make any offer at present, as the matter is under consideration.

2. The South India Industrials have, after consideration, abandoned their intention of purchasing the plant, and I have received no further offers. In view of the fact that lime sand bricks cannot be manufactured in this Presidency at a price which permits of their competing with burnt

ks, it seems useless to advertise the sale of the
the local newspapers. In Ceylon and Bombay, however
t conditions appear to prevail, and as the Colombo
not seem ~~to~~ prepared to make a definite offer, I propose
rtise its sale in the Times of Ceylon and the Times of
also in the Indian and Eastern Engineer and the Indian
ies and Power.

I have also been in communication with the Indian
ons Board in regard to the possible use of the steam
ing chamber, which forms part of the plant, for the
e of creosoting timber for railway sleepers. The matter
w been referred to the Railway Board, who are making
ries as to whether any of the railways administration could
se it for this purpose.

I will inform Government if I receive any further
unication on the subject from the Colombo firm, or from the
way Board, and in the meantime am arranging to insert par ti-
rs of the plant in the journals mentioned in paragraph 2 of
letter.

I have the honour to be,

Sir,

Your most obedient servant,

Director of Industries.

.N.

C.F. 19-1-14.

60(a) 44

Page No.

Home (Ec

Page 59 C/=

Mem.

No. 1882A-13 D 4.

With reference to the co
pondence ending with this
W.Dc 255 8-9-16 17, the Off
in charge of the depôt of Ind
tries is requested to state
whether he has received any offe
for the purchase of the Lime San
Brick plant and when he will
able to submit a final repor
to Govt. on the subject

dly
31/7/18

To

The Officer in charge of the
Depôt of Industries
Chromepet

Rec'd 1/8/18
Sent 5.2.18

C.F.—29.

DEPARTMENT.

Received 22-FEB-1918 GOVT. OF MADRAS 191 . *Registered* 191 .

Subject.

Lime Sand Brick Plant:- Regarding the sale of ------

SECRETARY TO GOVT. OF MADRAS 22-FEB-1918 REVENUE & HOME DEPARTMENT

ENCLOSURES.
No.
Spare copies

No. C255

Station Madras. , *Dated the* 21st February 1918.

From (Name) C.A. Innes, Esqr., I.C.S.,

(Designation) Director of Industries. Madras.

To The Secretary to the Government of Madras,

Home (Education) Department.

Sir,

With reference to Government's Memorandum No.1882 A-13 dated the 4th February I have the honour to report that the South India Industrials have offered me Rs.9500 for the Lime Sand Brick Plant. I was on the point of recommending to Government that the offer should be accepted when I received a telegram from a Mr. Jacobi, Engineer, Sachin State, Surat, offering me Rs.15,000 for the plant subject to inspection. This gentleman has asked for the plant to be reserved till the 2nd week in March when he proposes to inspect. I am awaiting his inspection before submitting a final report to Government.

I have the honour to be,
Sir,
Your most obedient servant

Director of Industries.

M.N.

2-16.

C.F.—29.

DEPARTMENT.

Received ..... 191 . *Registered* ..... 191 .

REGISTRAR GOVT. OF MADRAS DEPARTMENT 19-MAR-1918 GOVT. OF MADRAS

SECRETARY TO GOVT. OF MADRAS EDUCATIONAL DEPARTMENT 19-MAR-1918

Subject.

Lime Sand Brick Plant.

Submitting the proposals regarding the sale of ----------

ENCLOSURES.
No.
Spare copies

No. G.C 255

Station Madras. , *Dated the* 18th March 1918. 191 .

From (Name) C.A. Innes Esq., I.C.S.

(Designation) Director of Industries.

To The Secretary to the Government of Madras,

Home (Education) Department.

Sir,

In continuation of my letter G.C.255 of the 21st February 1918, and with further reference to Government Memorandum No.1882 A-13 of the 4th February last, I have the honour to report that I have now received a definite offer of Rs.15000 for the purchase of the Lime Sand Brick Plant, and to request that I may be authorised to dispose of the plant at this figure. It still remains to be settled which party shall bear the cost of dismantling the machinery and placing it on rails and I may be authorised to agree to bear half the cost.

2. The offer I have received for the plant is from The Gwalior State Trust Ltd. a representative of

which Corporation arrived in Madras a few days ago, and after an examination of the machinery confirmed the offer personally made. I recommend that this offer be accepted. The plant has been advertised for sale in the leading newspapers and technical journals of India and Ceylon, but ~~par~~ apart from the South India Industrials offer of Rs.9500 this is the only one that has been received.

3. The dismantling of the machinery will not be commenced pending receipt of the agreed amount, payment of which will be made in one sum so that there will be no need to enter into a contract with the Gwalior State Trust in respect of the sale. Mr. Jacobi, the representative of the Trust, has left for Cochin, but will be back here in a few days and as he wishes to settle the matter before leaving Madras, I ask for very early orders.

I have the honour to be,

Sir,

Your most obedient servant,

Director of Industries.

G.H.

NOTES.

64/47

LIME-BRICK EXPERIMENT.

(A) In G.O.No.1472 Edl, dated the 23rd December 1914, the Government approved the proposals of the Director of Industries to manufacture lime bricks experimentally and sanctioned the purchase of the plant and accessories required for this purpose at an estimated cost of Rs.35250. The plant is to be erected near the cement works of the South Indian Industrials and is to be worked in co-operation with that firm. The terms agreed upon are that in erecting the plant the fixures are to be furnished by the firm and ~~the~~ the necessary cooly labour by the Govt. and that in working the machinery raw materials at cost price and technical supervision free of charge should be supplied by the firm and all cooly labour by the Govt. The bricks are to be retained by the Govt. and if the experiment proves commercially successful, the firm is entitled to the first refusal of the plant on payment of cost price.

pars 7 & 8 pp. (A)

(B) In G.O.No.1289 Rev., dated the 31st May 1915, the Govt. sanctioned the removal free of charge of sea sand required by the Director for the experiments. Part of the machinery was not received till the close of the official year 1915-16. TheDirector has in a letter dated the 10th April 1916 stated that intimation has been received that the balance of the plant had been shipped and that it was expected in May.

* in a file which is being subd. separately.

No further communication on the subject has been received from him. There is a provision of Rs.10,000 in the current year's budget for this experiment.

28.5.16

28.5.16

Box No 29
29.5.16

Mr. Couchman may
I think see these papers.

28/5/16.

29.5.16.

Ed. No. 1882-1
30.5.16

Mr Couchman Co.

30/5/16.

GOVERNMENT OF MADRAS
31 MAY 1916
EDUCATIONAL DEPT.

Seen & returned.

31.5.16

Please see Adam. Mr. Couchman
& Co. have the letter stands.

31.5.16

SK
1/6

Scott. II—8 (a)—12-1-15.

NOTES.

66/ Page 48 49

A draft do. is submitted for approval.

8K
1.6.16 CR 1.6.16

JB 2/6/16

D.V. No. 1924-1 Edg
2-6-16

Dear Dr. Hayden,

~~Dear Sir~~ ~~I have the honour to~~ will you please let me ~~request~~ know how matters stand ~~to be informed~~ in regard to the lime-brick experiment proposals regarding which were sanctioned in G.O. No. 1472 Edn., dated the 23rd December 1914?

Yours Sincerely

SK
1.6.16.

CR
1-6-16

2-6-16

To
K. J. B. Hayden Esq.,
Director of Industries.

2-6-16.

Notes CB
3/6/16.

D.O. E 12 CN. 2004 Edl 10.6.16

TELEGRAPHIC ADDRESS:
"CHROMIUM," MADRAS.
POST BOX No. 454.

GOVERNMENT OF MADRAS
10 JUN 1916
SECRETARY TO GOVERNMENT
EDUCATIONAL DEPARTMENT
ENT.

8th June, 1916.

Dear Mr. Rajagopalachari,

Re:- LIME BRICKS.

As you may be aware, the manufacturers of the plant were taken over by Government soon after the order was placed. So delivery has been delayed. Part of the plant shipped was also sunk by a submarine.

I however fixed up some temporary gear and made preliminary experiments. Altogether I made about half a lakh of bricks and these I am utilising on the Oil Mill Building. When I had satisfied myself that I had got the hang of the thing, I discontinued experiments as the operation of the temporary plant was very extravagant and I received information from the makers that the balance of plant was being shipped.

It is said to be in the Clan Farquahar, due here on the 19th, but I should not be surprised if it was on the Golconda. If the plant actually reaches here, I am ready to start regular work within a week of delivery.

Yours sincerely,

S. Rama Rao

The Hon'ble Dewan Bahadur
P. Rajagopala Achariar,
Secy.to Govt. Edl.Dept.

SK

Educational Deptt.

Please see the do. to Mr Dresser on page 4 & his reply on page 5 supra. He will presumably report to the Govt when the plant is received & he begins his experiment. These papers may for the present be recorded

SK 12.6.16 CR 14.6.16

why not lie over?

14.6.16.

Submitted that as the lime brick plant has not yet been received it was thought that the papers maybe recorded for the present. They may perhaps lie over till the receipt of a further report from the Director.

SK 16.6.16. CR 16.6.16

14.6.16

C.N. 3593. From the Special officer, Dept. of Industries N.S-2 dt. 29.9.16

Please see notes on pages 1+2 ~~supra~~ + Mr. Treseder's do. on page 5 — Supra. In his letter dated the 9th June 1916. Mr. Treseder stated that the balance of the lime-brick plant would be delivered in June. Apparently the machinery has been received. Mr. Bouchman now submits proposals for the working of the plant. He forwards two alternative ~~estimates~~ estimates framed by Mr. Green, Assistant to the Director of Industries; the amount of the first estimate is Rs 43,500 while that of the second is Rs 58,200. The latter provides for an electric drive + Mr. Green states that it ~~is~~ represents the expenditure required to place the factory on a satisfactory basis for the manufacture of bricks on a commercial scale. Mr. Bouchman recommends the acceptance of the second estimate.

page 1 of cf. No. 711 29.6.16 (X)

cf. pages 4 + 5 of cf.

page 6 of cf.

para 2, pages 1+2 of cf.

He states that if the Govt should be unwilling to incur this expenditure the experiment may be deferred till a more suitable time. It is submitted that having purchased the plant it ~~appears~~ does not appear desirable to postpone its working. It is therefore for orders whether the Govt may agree to ~~provide~~ provide the amount in the next year's budget estimate. The Public Works and Financial Depts may be consulted in the first instance. Please see rules on pages 9-10 of rules to form 1472 Est. of 23-12-14

Clerk 11.10.16

PUBLIC WORKS DEPARTMENT. (A)
C. No. 2784 W. Ks. 8.
DATE. 16.10.1916

Est no 1882-3
11-10-16

PUBLIC WORKS SECRETARIAT 12 OCT 16 OOTACAMUND

Clerk 10.10.16.
MM 11/10/16

Clerk 13.10.16 P.W. Fin } no.

5252

C.F. 16—17-2-14.

OFFICE NOTE.

55

SUBJECT. Regarding lime-brick manufacture.

pp9-10CF

From The D.I. W^s & Rs the 11th October 1916

Register No. 3648.

Submitted that the file containing Mr. Green's estimates for working the lime-brick plant ~~was~~ was sent (via) to P.W.D & Irrl. Dept^t with D.O. No. 1882-3 dated the 12th instant. The letter now received from the Hon'ble Mr. Leonchman may also be sent ~~Hood~~ to the P.W.D with the request that it may be added to the main file.

SK
18.10.16.

18/10/16

C.O. to WB 19/10

Edue 3648-1
19.10.16
C№ 2854 Wks B
20.10.16

Sent to T Section the main file

D/ P3/ 56

Estimates for the probable expenditure on the lime brick experiment for 1917-18.

W

The data on which the estimates are framed may be examined as follows:-

Estimate No. 1. (Steam Plant).

(a) Staff. The number of working days allowed (365-53 sundays) = 312 is far too many. Another 22 days may be deducted for holidays etc. and 290 will be a liberal allowance. It seems doubtful if all the staff will be employed on daily wages, but as we have no means of checking this, we may let it stand at Rs.23 per day. The annual cost will therefore be 290 x 23 Rs. = Rs.6,670.

p.3 C.F

(b) Working Expenses.

The quantities of coal, lime etc. have not been given, nor have rates been quoted. No check is therefore possible, and we must accept daily working expenses at Rs.102-4-0 and charge for water. This may be taken as (Rs.102-4-0 x 290 + 300) = Rs.29,953 annually. To this must be added upkeep of Engine Boiler etc. Rs.1,000, upkeep of buildings Rs.1,250 which have been put under capital. The total is therefore (29,953+1,000+1,250) = Rs.32,203.

p.3 C.F

p.4 C.F

A

(c) Capital.

No value is allowed for the Boiler brought from the Glass Factory. The other items are only Rs.1,000 for connecting with Corporation mains, and 250 feet of tramway Rs.650. Total Rs.1,650. Nothing is stated about the capital that has already been expended on the plant but taking the figures sanctioned in G.O., No.1472 Educational dated 23rd December 1914 Rs.35,250 less working expenses Rs.7,500, we get Rs.27,750+1,650 = Rs.29,400.

p.7 of Co. Papers A

No

No depreciation or interest has been allowed on the capital. The former, in a case of the kind, must be considerable and 10 % may be allowed. 4 % may be allowed for interest. These items must be taken into consideration, if the experiment is to be a test of commercial success.

(d) Out-turn.

p. 5 CF

The maximum out-turn is estimated at 8,000 bricks a day at Rs.18 per thousand. We therefore get 18 x 8 x 290 days Rs.41,760.

2. With the above data we may roughly examine the profit or loss.

	Working expenses.	Out-turn.
	Rs.	Rs.
(a) Staff	6,670	41,760
(b) Materials and upkeep.	32,203	
(c) Depreciation	2,940	
Interest	1,176	
	42,989	41,760

Rs.42,989 - 41,760 = 1,229 Annual loss.

The amount which will have to be sanctioned for the year's expenditure is

		Rs.
Staff	...	6,670
Cost of tram rails and connecting factory with Corporation water main		1,650
Materials and upkeep.		32,203
	Rs.	40,523

3. Estimate No.2 (Electric Drive).

p. 4 CF

(a) Staff at Rs.22 per day for 290 days (290 x Rs.22) = Rs.6,380

(b) Working expenses at Rs.91-4-0 per day + water Rs.91-4-0 x 290 = Rs.26,463 + 165 for water = Rs.26,628.

Upkeep

	Rs.
	26,628
Upkeep of Motor, Boiler and Brick making machinery.	650
Upkeep of buildings	1,250
Total working expenses.	28,528

(c) Capital cost.

Cost as given by the Asst.Director of Industries Rs.22,610 - the cost of the upkeep of machinery and buildings Rs.1,900 — Rs.20,710

The capital already expended Rs.35,250 as given in G.O.,No.1472 Educational, dated 23-12-14 after deducting working expenses Rs.7,500+Rs.7,500* for Engines and boilers not required in connection with Electric Drive — Rs.20,250

Total capital = Rs.40,960

Op.7 of Co Appendix A.

* Assuming a full credit is obtained.

(d) The maximum out-turn is $\frac{8000 \times 18 \times 290}{1000}$ = Rs.41,760

Out-Turn Rs 41.760

Working expenses.

	Rs.	
(a) Staff	6,380	
(b) Materials and upkeep	28,528	
(c) Depreciation	4,096	
Interest	1,638	
	Rs.40,642	Rs.41,760

Rs.41,760
Rs.40,642
Rs. 1,118 Annual gain.

Amount that will have to be sanctioned for the year's expenditure.-

	Rs.
Wages, materials and upkeep	34,908
Cost of plant	20,710
	55,618

4. In reviewing both estimates we have, in the absence of details, more or less accepted the Assistant Director's figures as they stand, and these figures are admittedly uncertain. On p.5 of current file we are told that a sale price of Rs.18 per 1000 is assumed. No statement is made as to quality of the bricks already turned out, or whether they have found a market, or the price they could be sold at. Apparently all this has still to be found out.

5. It will be seen that in working the experiment under No. 1 estimate there is an annual loss of Rs.1,229 and under 2 estimate a gain of Rs.1,118. Owing however to the roughness of the data I do not think much reliance can be placed on either of these figures, and the future of the enterprise will have to be gauged from actual accounts. It may here be pointed out that it is therefore of the utmost importance that accurate and business like accounts are kept of all outlay and receipts.

6. We now come to the cost of carrying on the expenditure during 1917-18. Under No. 1 estimate this will be Rs.40,523 and under No. 2 estimate Rs.55,618. It is only fair, doubtful though success may appear, that the experiment should be given a fair chance and we may therefore perhaps recommend No.2 estimate provided the electric plant can be purchased at the price stated viz. Rs.20,720.

7. Whichever of the two estimates is adopted, the sum to be found is a very large one at the present time, and we may perhaps suggest as an alternative that the experiment be carried on as small a scale as possible, the only objects in view being to turn out a good lime brick and to find the rate the market is prepared to pay for it. If we can find out something about the demand

and

H/ 77 60

and the sale price of the bricks, we can then work backwards and see if it is worthwhile sinking more capital in the venture.

21.12.16

CHIEF SECRETARIAT
RECEIVED
MADRAS GOVT

Financial

22.12.16

Home should see P.W.D. note before financial objections are overcome. It might be necessary to consult the Director of Industries again.

22.12.16

Home (Edn.) Dept.

Proc. No. 2784 Rec/B-1
Regd. 26/12 22 | 12 | 1916

FINANCIAL
8015
Regd. 26.12.16

File No. 8015-1
27.12.16

GOVERNMENT OF MADRAS
27 DEC 1916
HOME DEPT

Submitted that the file may be put (up) to Mr. Jukes for remarks on the suggestions made in the P.W.D. note.

29/12/16

S. (Mr. Jukes not yet returned from Ooty)

29.12.16

ASSISTANT SECRETARIAT
27 DEC 1916
GOVT. OF MADRAS

Home (Edn.) w.o. 1882-H
30.12.16

Mr. Jukes

3/1/17 (G.C.M.S. 4.1.17)

29/12/16.

C.F. 181-2-15.

G. Roc 5
8-1-17.

par 12 of pp. 1472 (A)
23.12.14

par 7 of pp. ibid (A)

par 10 of cf.

par 5 ante.

I am afraid that this experiment has not been much of a success up to date. Given the necessary plant it is not difficult to make lime sand bricks, and as Mr. Tressler said in para 3 of his letter No.95 G, dated 21-11-1914, the two real points at issue are (1) the cost of manufacture and (2) the quality of the finished brick. Presumably this experiment was intended to settle these two points.

2. But as regards the first point, ~~supposing~~ surprising as it may seem, the present experiments are of no use at all. I observe that in the estimate submitted with his letter No.61 G, dated 20-5-14, Mr. Tressler provided £500 for an engine and boiler. But for some reason or other (there is nothing on record in the file) he did not order an engine and boiler. He borrowed an old engine from the South India Industrials and two boilers from Government House. This ancient dug out (literally the engine was dug out of the ground) proved inefficient. It would run the mill or the press, but not both together. Consequently Mr. Green had to get a supplementary engine from the Glass Works with the result that we have been running the plant with two engines. Naturally the cost of power is ruinous, and ~~he~~ we cannot yet say what it would cost with a decent engine to make the bricks. This is no doubt the reason why Mr. Couchman sent up a revised estimate.

3. We are also in difficulties with the second point - the finished article. As Mr. Tressler reported to Government on the 8th June ~~last~~ last, part of the plant (Viz. the grinding mill and the elevator) was sunk by a submarine. The new grinding mill was not erected till 11th September and further delay occurred owing to the collapse of the pillars which carried the shafting. Consequently, when I took over

Page No.

C.F. 1[illegible]-16.

at the end of October, work had not long been started, and no tests had been made. I sent 18 bricks to be tested in November and the results were decidedly poor. They gave a crushing strength varying from 53.56 to 120.70 tons per square foot. In January 1916 Mr. Tressler had got results varying from 107.87 to 217.12 tons per square foot, and it was obvious that something was wrong. So Mr. Green made specimens of bricks in every conceivable way. He made them of sea sand, washed and unwashed, of river sand, and of river sand and sea sand mixed. He ground the mixture before pressing for 18 minutes instead of the usual 13, and generally made the bricks as carefully as possible. Again however the results were very disappointing. In fact, worse than before. The results were also most astonishing in that the ordinary unwashed sea sand bricks gave the best results (74.53 - 75.42 & 141.74 tons per square foot). I understand that this result is the opposite of what one would expect.

4. I attach for the information of Government 3 tabular statements (1) showing the results of the tests of Mr. Tressler's bricks in January 1916, (2) showing the results of the November tests, and (3) showing the results of the December tests.

5. If the results in statements (2) & (3) are compared with the statistics of ~~comparison~~ compression tests in Professional Papers No.5 of the College of Engineering, Experiments on Strength of Materials, it will be seen that the Lime sand bricks, instead of being better than, are not so good as the P.W.D. Stock clay bricks in Madras. Mr. Tressler's bricks made in January last were good, but unfortunately there is nothing on record as to how long he ground the sand and lime before pressing and as to other details of manufacture. Mr. Green thinks that the disappointing results

Not in file →

obtained in November and December are probably due to the deterioration of the press. If so, it is a point against Lime and Bricks, for obviously they will always be expensive to make if the press has to be renewed at short intervals.

6. At any rate the outstanding fact is that we cannot at present make a really high class brick and I do not believe that we should get Rs.18 per 1000 for the bricks we are now making. It is unfortunate that we have no reliable data of the cost of manufacture owing to the ~~reasons out~~ ruinous cost of our power, but even so I am not in favour of spending any more money on the experiment at present. The first thing to be done is to send Mr. Green to visit the Ceylon Factory as proposed in my letter Cur.No 974, dated 1st December 1916. Mr. Green will be able to study their methods of manufacture and to see how if at all they differ from ours: he will be able to ascertain how much their bricks cost them per 1000, what market they have for them and what price they get. When I get his report, I will come officially to Government with my proposals. In the meantime I have closed the factory for the present, and I suggest that Mr. Couchman's estimate should be allowed to lie over.

7. I may mention that up to date just sufficient bricks have been made as will suffice for the completion of the oil mill buildings.

Secy. to Govt. Home (Edl)
W. O.

8/1/17

The sanction of the Govt. of India has been applied for the deputation of Mr Green.

12.1.17

fo 25 R-Con (Edl) 2
16-1-17

12-1-17

12-1-17

Encl:
Statements I, II, III - 10

SECRETARY TO GOVT. OF MADRAS
-9-JAN-1917
HOME DEPARTMENT

REGISTRAR HOME DEPARTMENT
-9-JAN-1917
POWER RECORDS

Page No. 81

81 18 64

Statement I

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS.
(January 22, 1916)

There is no record of the conditions under which these bricks were made or of the constituents entering into their composition.

Original dimensions of cross section.	Thickness	Area of cross section	Weight of brick.			Maximum load		Remarks
						Total	Stress	
Inches.	Inches	Sq. Inches	lbs.	Ozs	Grns	Tons.	Tons per s.ft.	
4.37 x 9.00	2⅝	39.33	7	2	380	59.30	217.12	
4.37 x 9.00	2⅝	39.33	6	4	410	33.62	123.09	
4.37 x 9.00	2⅝	39.33	6	7	50	34.95	127.96	
4.38 x 9.00	2⅝	39.42	6	6	400	35.40	129.31	
4.38 x 9.00	2⅝	39.42	6	6	120	29.53	107.87	
4.38 x 9.00	2⅝	39.42	6	14	0	43.03	157.19	

Statement II

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. November 21st/16.

These bricks were made from unwashed sea sand and slaked lime. 65

Original dimension of cross section	Thick-ness	Area of cross section	Weight of brick			Maximum load		Remarks.
						Total	Stress	
Inches	Inches	Sq Inches	lbs.	Ozs	Grns	Tons.	Tons per sq.ft.	
4.41 x 8.98	2¾	39.60	7	0	400	14.73	53.56	Mixture groundf for 12 minutes
4.38 x 9.01	2¾	39.46	7	3	380	23.37	85.28	,,
4.39 x 9.00	2¾	39.51	7	1	280	15.83	57.70	,,
4.37 x 9.00	2¾	39.33	7	0	80	22.12	81.00	,,
4.38 x 8.98	2¾	39.33	6	11	410	19.28	70.60	,,
4.40 x 8.96	2¾	39.42	6	9	20	16.70	61.00	,,
4.39 x 9.02	2¾	39.60	7	2	220	17.47	63.52	,,
4.39 x 9.04	2¾	39.69	7	8	370	29.70	107.50	,,
4.39 x 9.01	2¾	39.55	6	10	250	18.17	66.16	,,
4.36 x 9.00	2¾	39.42	7	8	350	26.52	97.32	,,
4.38 x 9.00	2¾	39.42	7	0	330	22.40	81.83	,,
4.39 x 9.02	2¾	39.60	6	11	300	17.07	62.07	,,
4.39 x 9.02	2¾	39.60	7	5	150	25.67	93.35	,,
4.39 x 9.02	2¾	39.60	7	12	400	19.23	69.93	,,
4.39 x 9.05	2¾	39.73	6	11	0	22.07	80.00	,,
4.39 x 9.07	2¾	39.82	7	9	380	33.37	120.70	,,
4.40 x 9.05	2¾	39.82	6	14	200	19.50	70.52	,,
4.39 x 9.14	2¾	40.12	6	14	300	18.82	67.55	,,

83/20 66.

Statement III -(1)

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. December 18th/16

These bricks were made from washed sea sand and slaked lime.

Original dimension of cross section	Thickness	Area of cross section	weight of brick	Maximum load		Remarks.
				Total	Stress	
Inches.	Inches	sq Inches	lbs. Ozs Grns	Tons.	Tons per sq ft.	
4.37 x 8.90	2¾	38.89	6 6 400	12.3	45.54	Mixture ground for 18 minutes
4.38 x 9.00	2¾	39.42	6 9 150	14.4	52.60	,,
4.37 x 9.00	2¾	39.33	6 8 50	14.7	53.82	,,

Statement III - (2)

84 21

67

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. December 18th/16

These bricks were made from washed sea sand and slaked lime, the resulting brick being steeped in water for 24 hours.

Original dimension of cross section	Thickness	Area of cross section	weight of brick.	Maximum load		Remarks.
				Total	Stress	
Inches.	Inches	Sq Inches	lbs. Ozs Grns	Tons.	Tons per s.ft.	
4.37 x 9.00	$2\frac{3}{4}$	39.33	6 8 100	11.10	40.64	Mixture ground for 18 minutes
4.40 x 9.00	$2\frac{11}{16}$	39.60	6 10 150	12.40	45.09	
4.38 x 9.01	$2\frac{3}{4}$	39.46	6 11 250	13.30	48.54	,,

Statement III - (3)

88/22

68

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. December 15th/16

These bricks were made from river sand and slaked lime

Original dimension of cross section	Thickness	Area of cross section	weight of Brick			Maximum load		Remarks.
			lbs.	Ozs	Grns	Total	Stress	
Inches.	Inches	Sq Inches				Tons.	Tons per s.ft.	
4.38 x 9.01	2¾	39.46	7	1	350	20.00	72.99	
4.39 x 9.00	2¾	39.51	7	1	250	17.50	63.78	
4.39 x 9.00	2¾	39.51	6	12	250	14.60	53.21	

Statement: -III - (4)

8/23/69

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS December 10th/16

These bricks were made from river sand and slaked lime, the resulting brick being steeped in water for 24 hours.

Original dimension of cross section	Thickness	Area of cross Section	Weight of brick.	Maximum load		Remarks
				Total	Stress	
Inches.	Inches	Sq. Inches	lbs, Ozs Grns	Tons.	Tons per s.ft.	
4.37 x 9.01	$2\frac{3}{4}$	39.37	6 15 200	15.9	58.16	
4.38 x 9.00	$2\frac{11}{16}$	39.42	6 14 0	14.6	53.33	
4.42 x 8.99	$2\frac{11}{16}$	39.74	6 14 400	15.7	56.89	

8/24 70

RESULT OF COMPRESSION TESTS ON LIME SAND BRICKS. December 15th/16.

These bricks were made from a mixture of sea and river sand and slaked lime.

Original dimension of cross section	Thickness	Area of cross section	Weight of brick	Maximum load		Remarks
				Total	Stress	
Inches.	Inches	Sq. Inches	lbs. ozs Grns	Tons.	Tons per s.ft.	
4.38 x 9.00	$2\frac{5}{8}$	39.42	6 5 400	14.6	53.33	Mixture ground for 18 minutes
4.38 x 8.99	$2\frac{11}{16}$	39.38	6 12 250	18.9	69.11	
4.37 x 8.99	$2\frac{3}{4}$	39.29	6 13 100	19.8	72.57	,,

Statement III-(6)

86/25/71

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. December 18th/16

These bricks were made from a mixture of river and sea sand and slaked lime the resulting bricks being steeped in water for 24 hours.

Original dimension of cross --section	Thick-ness	Area of of section	Weight of Brick.			Maximum load		Remarks
						Total	Stress	
Inches.	Inches	Sq. Inches	lbs.	Ozs	Grns	Tons.	Tons per s.ft.	
4.37 x 9.01	2¾	39.37	7	2	150	20.3	74.25	Mixture ground for 18 minutes
4.38 x 9.00	2¾	39.42	6	14	0	15.4	56.26	
4.38 x 9.00	2¾	39.42	7	5	250	24.4	89.13	,,

Statement - III (7)

89/26/72

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS December 18[illegible]

These bricks were made from unwashed sea sand and slaked lime.

Original dimension of cross section	Thickness	Area of cross Section	Weight of Brick.	Maximum load		Remarks
				Total	Stress	
Inches.	Inches	Sq. Inches	lbs. Ozs Grms	Tons.	Tons per s.ft.	
4.36 x 9.02	2¾	39.33	7 0 150	20.6	75.42	Mixture ground for 18 minutes
4.39 x 8.98	2¾	39.42	7 11 200	38.8	141.74	
4.39 x 8.99	~~2¾~~ 2⅝	39.47	6 9 50	20.4	74.43	,,

Statement - III 8

90/27

73

RESULTS OF COMPRESSION TESTS ON LIME SAND BRICKS. December 15/16

These bricks were made from unwashed sea sand and slaked lime, the resulting bricks being steeped in water for 24 hours.

Original dimension of cross section	Thickness	Area of cross Section	Weight of brick.	Maximum load		Remarks
				Total	Stress	
Inches.	Inches	Sq. Inches	lbs. ozs Grns	Tons.	Tons per s.ft	
4.40 x 9.00	2 3/4	39.60	7 4 250	22.9	83.27	Mixture ground for 18 minutes
4.37 x 9.00	2 15/16	39.33	7 0 250	28.4	103.98	
4.37 x 8.99	2 15/16	39.29	6 14 0	22.7	83.20	,,

Scott. II—8 (a)—12-1-15.

NOTES.

9/ Page ~~28~~ 74

Home (Edn.) Department

Please see Mr. Innes' note on pages 15 to 17 *supra*. The file may lies over for the present.

SK
9.1.17.
MK
9/1/17

B: 9
C: 121.
R: 15-1

HE

Please see Innes's note at page 15 to 17

12.1.17

I agree.

The only further suggestion I have to make is - and I do not know what Mr. Tiessler now is, whether an enquiry of him is practicable - but if it is, would Mr. Innes write and ask him what he thinks in regard to the comparative and disappointing results of in the quality of the bricks.

P
13.1.17.

Edl 110 1882-5/16
15.1.17

DIRECTOR
G. Cert 5
17 JAN 1917
MADRAS

Mr Innes Ltr.

9/15/17

Scott. II—8 (a)—12-1-15.

NOTES.

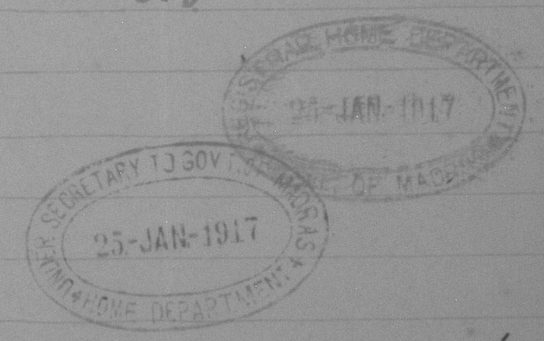
Page ~~27~~ 75

Sen. I have written to
her? I under as suggested
by His Excellency, but as
I hear that he is now
in Basra, I am afraid
that it will be a long
time before I can get a
reply. Mr. Green goes to
Colombo next week

Chirol
24/1/17

Noted in CR
25.1.17

Home Dept (Sec.)
V.C



Home (Sec.) Dept.

Submitted that the file may lie over as decided on the previous page.

SK
26.1.17

EC
30.1.17

Scott. II—8 (b)—12-1-15.

NOTES.

93 Page ~~30~~ 76

Secretary's remarks in the weekly arrears list against this case:-

"I think we might send a sort of reminder."

E.A.H.
27-3-17.

(This file was picked up for a Legislative Council Question asked at the meeting of the 2nd April)

The following draft d.o. to Mr. Innes is for approval:-

No. 1882/16-6
17. 4. 17

Dear Innes,

Page 17 ante

Please refer to your un-official note dated the 8th January last regarding the continuance of the lime-brick experiments. Will you kindly let me know whether you have obtained a report from Mr. Green on the methods of manufacture followed in Ceylon and when you will be able to submit your final recommendations in the matter.

Yours sincerely

17/4/17

17.4.17

A

Chro. 1850 A Sale
23.4.17 77

D. O. G.cur 5.

MADRAS, POST BOX No. 112.
TELEGRAPHIC ADDRESS "CHROMIUM,"

Dated, 19th April 191 7.

Ch 47 22-4-17

My dear Harvey,

p. 30 supra

Your D.O. No. 1882/16-6 of the 17th instant regarding lime-brick experiments. Green has sent in the report of his visit to Ceylon. Since then, we have tried one or two more experiments and we find that our bricks are just as good as the Ceylon bricks. Ceylon bricks, however, find a ready sale at a very high price, the reason being that there is no clay in Ceylon for manufacture of ordinary clay bricks. I am now making enquiries of all Superintending Engineers in the Presidency as to whether there are any districts in their circles where clay is difficult to obtain and clay bricks expensive and where, on the other hand, there are supplies of lime and sand. All the Superintending Engineers have not yet replied. In the meantime, Green is writing up his final report on the subject and I will send in my final recommendations probably within a month. No expenditure or very little

DEPARTMENT.

CURRENT No.

From

Received 191 . *Registered* 191 .

Subject.

expenditure is now being incurred in connection with the lime brick machinery.

Yours sincerely,

To

E.A. Harvey, Esq., I.C.S.,
Under Secretary to Government,
Home (Education) Department,
Stone House Hill,
Ootacamund.

Scott. II.—8 (a)—12-1-15

NOTES.

Home (Edn.) Department

Please see Mr Innes' do. on the previous page. The further communication promised by him may be awaited.

SK
23/4/17.

EMH
25.4.17

C/N. 2101A. From the officer in charge of the Dept. of Industries, Q. Cir. 5 dy 23/25. 5.17.

p. 11 of c.f.

para 38 to 45 of c.f.

para 10, pp. 22 & 23 of c.f.

Mr Innes submits his final report on the lime-brick experiments. He also submits a copy of the report of Mr Green, his assistant, on the working of the lime-brick factory at Kattankoly in Ceylon. From a consideration of the circumstances obtaining in Ceylon & Madras & of the results of the experiments so far conducted by the Dept., Mr Innes concludes that the manufacture of lime-sand bricks cannot prove to be a commercial success in this Presidency where good clay

clay bricks can be obtained at a comparatively cheap rate. He therefore recommends that the experiments maybe discontinued. In view of the opinions expressed both by Mr Green & Mr Innes it is for orders whether the Govt may accept this recommendation & approve the proposal to sell the plant. The P.W.D may perhaps be continued.

Clks 2.6.17

paras 2 & 3, page 1 & 2 P cf.

2. Mr Innes also proposes that the report on the experiments should be published as a Departmental bulletin after getting it examined by Mr James, Principal of the College of Engineering, & by the Chief Engineer. There appears to be no objection to this). At the meeting of the Legislative Council held on the 2nd April last the Hon'ble Mr K.R.V. Krishna Rao Pantulu asked for the publication of the (results of the) experiments in lime-brick manufacture. The Govt replied that the experiments had not been completed & reported upon finally & that it was premature to publish the results.

but Mr Innes may be asked to submit the bulletin for the approval of Govt prior to publication

page 9 of G.O. 5-26 25.4.17 (K)

NOTES.

3. There is a provision of Rs 58,200 in the current year's budget estimate for Laine - brick experiments, and this may be removed if the experiments are to be discontinued

BK
31.5.17.

S.
E.M.
2.6.17

I am not quite sure it can be pronounced the experiment is a failure.

2. Some of the bricks were of very good Quality. But the bricks shew varying grades of quality. It ought not to be difficult to determine the factors that go to the making of a good brick. What I mean is that seeing we have manufactured good bricks it ought to be possible to get an uniform supply of such bricks.

3. The papers clearly shew that the Question of the cost of production has not been given a fair chance.

4. What we began to ascertain viz whether it is possible to get a good ~~clay~~ loam brick at commercial rates has not been really as yet tried. It must be remembered that if Govt only established this, private manufacturers will adopt the industry

5. Perhaps it will also be well to ascertain

NOTES.

quantities of brick earth available in Madras. I have heard from several private individuals that it is very difficult to get good bricks now at the old rates.

6. Moreover from the Industries Point of view what we wish to know is whether under suitable circumstances a particular industry is commercially feasible.

It seems to me the data gathered are not sufficient to pronounce an adverse verdict.

HM 3 for orders 5/6/17

Please ask the Chief Engineer (the Honble Mr Murray) to note on this. I shall be glad to have his views also before I note.

5/6/17

The Honble Mr. Murray.

27/5/17

SECRETARIAT GOVERNMENT OF MADRAS -5-JUN-1917 HOME DEPARTMENT

Box 15
Enc 5.6.17
Rett. 6.6.17

SECRETARIAT GOVERNMENT OF MADRAS -7-JUN-1917 HOME DEPARTMENT

PUBLIC WORKS 8 JUN 1917 -7-JUN-1917 OOTA

Home (Edn) no 1882A—6

C. No 492 5-6-17

Scott. II—8 (a)—160,004—16-1-17.

492 Gen B

99

83

NOTES.

F.W.D

D.S
W

Submitted. Please see the notes from page 15 ante.

KMG 11/6. KLB 11.6.17

W

I think we may agree with Mr. Innes. The main point is that there appears to be no demand for a harder brick than that made at a moderate cost from Madras clay and it therefore seems useless to go on with the experiments. In other words, the Madras brick is quite sound and strong enough for all ordinary building work and this is proved by the fact that we have not got to adopt an undue proportion of thickness to height in the walls of any structure we put up in Madras. It is true that the price of bricks in Madras has gone up in the last few years; but this is due to the general rise in prices of wages, fuel etc., which would equally affect the cost of lime bricks. It is submitted that there are practically inexhaustible areas of clay suitable for brick making near Madras and we need, I think, have no fear of the supply running out for many generations to come. The lead from the kilns to the town will naturally increase as the town expands but the ratio of increase in cost on this account will not be great.

Attention

Scott 11—8 (b)—15,005—27-1-16.

NOTES.

A

Attention may be invited to the portion of Mr. Innes' note side-lined A page 22 c.f. from which will be seen that the opinion of those consulted now is much the same as that expressed by this Department on pp. 4 and 6 of the notes to G.O.No.1472 Educational, dated the 23rd December 1914.

I cannot advise Government to spend any more money on this experiment. In the Madras clay brick we have quite as good a building material as we want at a cheaper price than lime-sand bricks can be manufactured. Another strong point in favour of the clay brick is that it can be made of uniform quality, and we know exactly what load it will stand. The variations in the loads taken by the lime-sand bricks are very great - from 217 tons (statement I) down to 40.6 tons (statement III(2)). An Engineer would be very suspicious of these bricks and would certainly design his work so as to give lime-sand bricks a far lighter load than ~~we~~ he would put on clay bricks of good quality. This of course means that for lime-sand brick construction a more expensive and unreliable material is being used, and that more of it would have to be put into the work.

Even if lime-sand brick manufacture could be so improved as to turn out a brick of uniform quality and superior to clay bricks, you would then be producing a material for which there would be a very limited market. It would be foolish to use lime mortar with such bricks, and cement is the only

alternative

Serial II 8-(a)—80,005—27-4-15.

NOTES.

Page 88

alternative. This would make the cost prohibitive.

I agree generally with the opinions expressed by Mr. Marshall in his note above.

Home (Educational)

REGISTRAR HOME DEPARTMENT GOVT. OF MADRAS
18-JUN-1917

Home (Edn.) Dept

Submitted.

20.6.17

Hon. Imms Co.

21.6.17

I agree with Secretary that the experiment is not entirely conclusive, because for lack of a proper engine and boiler we could neither determine accurately the cost of production nor maintain sufficient pressure in the hardening chamber. Further the

plant was defective in that we had no tube mill, and therefore could not secure a complete amalgamation of the lime and the sand. If therefore we went to the expense of getting a proper engine and boiler and a tube mill, and provided we could get the machinery (which we probably could n't), I think that we could almost certainly greatly improve the quality of our bricks. Mr. Green however thinks that lime sand bricks must always be more variable in quality than clay bricks, and if this is so, it is a point against them. But the main question is one of cost. It is pretty clear that there is no demand in Madras for a more expensive, if better, brick than the best quality clay brick. As Sir Harold Stuart put it, 'what we 'want is not a better and dearer brick, but a cheaper 'brick of the present standard of strength'. It is most unfortunate that we have no accurate figures of costs, and the fact that we haven't makes both the experiment and the Department look ridiculous. But from the Colombo figures, it is pretty certain that we could not make the bricks for less than Rs. 21 or 22 a thousand, and even the Colombo bricks were not good - not even as good as ours. No doubt they could be improved if the final mixture were ground for a longer period, but this elaboration of process would enhance the cost. This being so, and since all the big users of bricks in Madras say that they don't want anything better than Madras clay bricks at Rs. 18 per thousand,

Page 8 of notes to file 4472
23-12-24
(A)

Sectt. H/S 8 (a)—160,001—16-1-17.

NOTES.

Page ~~46~~ 87.

I don't see any use in going on in Madras. Mr. Green thinks that there may be a future for the bricks at Masulipatam and the matter is being enquired into.

Chimes
28/6/17

Home (Education) Department.

U.O.

SECRETARY TO GOVT. HOME DEPARTMENT
30-JUN-1917
GOVT. OF MADRAS

SECRETARY TO GOVT. HOME DEPARTMENT
-2-JUL-1917
GOVT. OF MADRAS

Home (Education) Deptt.

Submitted.

Box 11
CUC 5.7.17
NCH 6.7.17

Sec
2.7.17

Ed.
4.7.17

AM for perusal

MW
5/7/17

I agree with Messrs Jones and Murray that there is no use in going further with this in Madras. Please circulate

SECRETARY TO GOVT. HOME DEPARTMENT
-7-JUL-1917
GOVT. OF MADRAS

SECRETARY TO GOVT. HOME DEPARTMENT
-6-JUL-1917
GOVT. OF MADRAS

DD
6/7/17

S.

may be marked for general circulation.

Ch
7.7.17

Circulated in Box No. 15
19.7.17

Read at Cabinet on 17.7.17
Read & noted by Cabinet 17.7.17

Returned 19.7.17

Box 8
Circ 20/7
Read 23/7

H.M. 2
H.M. 1
H.E. the Governor

} Mw 8/7/17

I agree that the Examiner's marks be maintained.

12.7.17 Bonar

Rl
19.7.17

I agree generally: but this experiment, as the Secretary points out, still leaves some points open. I should like to know whether it is Mr Jones' intention to publish a bulletin giving the full results of this experiment so far — and whether the object of the experiment is — "for this pursuit."?

P
21.7.17

SECRETARY TO GOVERNMENT OF INDIA
23-JUL-1917.
HOME DEPARTMENT

With reference to His Excellency's note above it is submitted that

Mr Jones

NOTES.

Mr Innes in his letter on pages 11 and 12 of the current file expresses the view that his report on the lime - brick experiment should be published as a Departmental bulletin. If Govt agree to this course he proposes to send the report for criticism to Mr James, Principal of the College of Engineering, and to the Chief Engineer prior to publication.

para 3, p. 12 of cf.

2. As regards the further continuance of the experiment attention is solicited to the concluding portion of Mr Innes' note on page 40 ante. The question whether there may be a demand for the bricks at Masulipatam is being enquired into & the proposal to sell the plant will have to be deferred till this question is settled.

Page 12 ante

3. It is for orders whether Mr Innes should be asked for more definite information with reference to H.E. the Governor's note.

8K 24.7.17.

S.

Mr. Innes asks permission to publish the results of the experiments in a bulletin; permission may be granted. But probably he may be seen and approve the proof before publication.

2. Mr. Innes asks to be allowed to sell the plant; it is therefore evident that he does not see any use in saving the experiment. He has been stated that there may be an opening for the boiler at Mandapatam & that the matter is being enquired into.

25.7.17

Re the bulletin, I see Mr Innes is going to publish one after it is seen by Mr James & the Chief Engineer.

Re disposal of plant, further information is necessary.

26/7/17

Mr Innes (H.O.)

S.

Submitted that the file contains notes by H.M.'s N.E. Plans in para 133(x) Office Manual, in which pending ~~not~~ is forbidden H.M.'s notes with no. references. This should be done with the permission of the H.M. May

Scott. II—8 (a)—150.004—16-1-17.

NOTES.

107 Page 44/91

Mr. Innes is asked by O.M.Z whether the plant is to be disposed of or not?

E.L.
27.7.17

Yes please draft: also add that we note that he proposes to issue a bulletin.

30/7/17

Entered Registry Office

30 JUL 1917

SECRETARY TO GOVT OF INDIA HOME DEPARTMENT

30-JUL-1917

A draft memo is submitted for approval.

SK
30/7/17.

(Draft passed by H.E.)

HH
31/7/17

p. 46 of cf.
p. 47 of cf.

[Memo No. 1082A-9 dtd 1.8.17

CN. 2690A. From the Officer in charge of the Dept. of Ind. No. 213/11-8

Please see H.E. the Governor's note on page 41 supra. Mr. Innes considers that with the plant now available it is not possible to revive the ~~coco~~ lime brick experiment in His Presidency with any prospect of success

pages 47+48 of cf.

para 4, p. 48 of cf.

As the machinery required to complete the plant is also not obtainable under present conditions, he proposes to sell the plant already purchased to the South India Industrial. The amount spent by the Deptt in the purchase of the plant is Rs. 24,738. It is now proposed to sell it for Rs. 9,500. Though the price offered is low, Mr. Innes states that the plant as it stands is not elaborate enough and is not very satisfactory in other respects. Mr. Scott Mackenzie, ~~is prepared to accept~~ the General Manager, South India Industrial, is prepared to carry on the experiments provided that the plant is offered at a low price and that ~~he~~ the Directors of the firm agree. It is for orders whether, in these circumstances, the proposal to sell the plant for Rs. 9,500 may be approved.

para 11, pay 23 of cf.

para 3, p. 48 of cf.

do

2. As regards the publication of the results of the experiments

para 5, p. 48 of cf.

NOTES.

93

Mr Innes states that it may be deferred until the negotiations with the firm are completed.

SK
21.8.17.

1.

The plant is practically useless for successful experimentation. Rather than allow it to return our hands, it will be better to accept this offer; for we are not likely to get a better one.

[illegible]
22.8.17

I agree.

24/8/17

Financial (Aud), Finl Depn

Would Hme object to consulting Mr P.W.D. finl as to whether they have any use for the plant, and whether Rs 95-00 is a fair price for it.

Hme 27.8.17

Hme (Edn) department

P.W. no. for favour of remarks.

[illegible]
28.8.17

Finl no 6212 / W
27-8-17

Edn 1882 A-10
27.8.17

6212

Regd 27-8-17.

C. No. 1255 O.
Dated 29.8.1917.

Scott. II—8 (a)—150,004—16-1-17.

ASSISTANT SECRETARY 27 AUG 1917 GOVT OF M[illegible]

TO CHIEF SECRETARIAT 27 AUG 1917 MADRAS GOVT

CURRENT NO. 220 FINANCIAL

PUBLIC WORKS 28 AUG 1917 OUTACA[illegible]

Secret. II—8 (a)

004—16-1-17.

NOTES.

110/ Page ~~47~~ 94 P. W D

DS

Submitted. Please see the notes from p 38 ante.

CHE 31/8 31.8.17

I should if we could the Council but we may ask the S.S. & suggest it & council the Subsidiary Rules & workshops as to whether the Council or any part of it would be of any use to this Dept for any purpose, & this then will such manufacture the price to be offered should be referred direct.

CHE 1.9.17

DS

Draft memo submitted

JKL 6.9.17.

CHE 6.9.17

Read & noted on 4/9/17 & return now called leave JKL 6/9

p54 of Memo & Letter I E N civil N° 1801 C & S 16 Oct 17
pp 55-57 C.E. 2450 Mr Brown . . . . N° 1801 C & S 16 Oct 17
p58 2448 . . . . . 1130 W D 16 Oct 17

95

D.S.

Please see the D.E.'s letter at pp 55-57 of the plant is not required for this Dept. the file may now be sent to ~~Home~~ Home (Edl)

By
19.10.17

Home (Edl) wo

Keer
20.10.17

P.W.D. no
1255 C/Mtrs - 2d 20.10.17

REGISTRAR HOME DEPARTMENT
22-OCT-1917
GOVT OF INDIA

Home (Revn) Deptt.

The file was sent to the P.W.D at the instance of the Finl Deptt. please see Secretary's note on page to b ante. The file will have to be sent to ~~Home Dept~~ (Home Deptt. again) for approval of the proposal to sell the plant to the South Indian Industrials Ltd. for Rs 9500/-.

SK
23.10.17

2 From the Supdtg Engineer's letter and the enclosure on pages 55-57 of CF, it appears that there is likely to be an offer for the plant from Ceylon. For orders whether Mr Jones may be asked

asked by Memo: to report whether any such offer has been received and whether Hanplant is likely to fetch a higher price if the sale is advertised in the newspapers.

96

VM
25/10/17

Advertisement as to Sale
Scheme on Enhanced Price.
The memo may be drafted

21/10/17

A Draft memo is submitted for approval.

SK
26/10/17.

Offr. i/c

VM
26/10/17

[Memo No. 1882A—dy the 29.10.17
Page 58 ci]

C No. 3448 A. From the Officer in charge
Page 59 ci of the Deptt. of Ind. G. 2255 dy 9.11.17

Please see Mr. Innes' letter on pages 57 and 60 ante. The further communication referred to in para 4 of his letter may be awaited.

SK
14.11.17

VM
15/11/17

NOTES.

(Extracts from the arrears list)

"ask if there is any likelihood of Mr Jones being able to give us a further Communication soon. If he replies in the negative this may be closed"

[the hieroglyphic "p." is meant for "H. Br."] → 6 30.1.18

A draft memo to Mr Jones as is submitted below for approval.

2.2.18
6/2/18

[Memo no 1882 A-13 dy 4.2.18]

[C.no. 521A] from the Officer in Charge of the Bpt. Gedt. no 255 dy 21.2.18

Mr Jacob, Engineer, Sachin State, Surat has offered Rs 15,000 for the lime-Saved-brick plant (of the plant) Subject to his inspection before the second week in March. Mr Jones (States that he) is awaiting this inspection before submitting a fecial report to Govt. Submitted the file may lie over till the middle of March.

25.2.18

C.No. 791A. from the Officer in charge of the Dept. of Bd. Ec. 255 dated 3.3.18

p. 62 of C.F.

Mr Jones states that he has received

NOTES.

received a definite offer of Rs 15,000 for the lime brick plant from the Gwalior State Trust, and he requests sanction for the disposal of the plant at this price. As there is no scope for lime-brick experiment in this Presidency and as the present offer is the highest that has been received in response to an advertisement in the leading newspapers & technical journals the proposal to sell the plant may be approved.

p. 62 of cf.

2. Mr Innes also requests that he may be authorised to agree to bear half the cost of dismantling and the machinery and placing it on rails. This may also be approved. When the hydraulic oil mill was sold last year the whole cost of dismantling the machinery and placing it on rails was met from Govt. funds.

f. No. 370 (H) 16.3.17

3. With reference to H.E. the Governor's note on page 41 ante the file may be submitted

to

to His Excellency through H.H. (Industries). Mr Innes has already been told in O.M. No 1882 A-9 dated the 1st August 1917, that the bulletin on the lime-brick experiment should be submitted for the approval of the Govt before publication.

4. A draft order is submitted for approval. It may be sent to the Irrl. Deptt for acceptance please see that Deptt note on page 46 ante.

SK
20.3.18.

Ik.
20.3.18

S
Irrl. u.o.
20.3.18.

Irrl. Dept (uo)
LDJ
20.3.18

Financial Dept

ASSISTANT SECRETARY
21 MAR 1918
GOVT OF MADRAS

CHIEF SECTT
MADRAS GOVT

p. 46 ante cf.

Revenue 1882 A/6-11
20.3.18

CURRENT NO.
2557

For the H.S.

A
Rcpd: 20.3.18 A

G.O. 1472. Revenue 28.12.14 sanctioned the manufacture of lime-bricks by the Department of Industries as an experimental measure. The estimated cost of the plant required for the experiment was put at Rs 35,250 (Page 1 K.F.). The experiment has not been an entirely successful one and Govt have decided to discontinue it. Vide page 46 K.F. The value of the plant

A
Page 7 of 8/1472 G.O.
1472-14

actually obtained is Rs 24.738- Vide bottom of page 23. C.F. Reasons can be found for the plant and the best offer made for its purchase is from the Swahin Sâli Trust for Rs 15.000. (Page 62. C.F.) The question as to the incidence of the cost of dismantling the machinery and placing it on rails remains to be settled but the Director of Industries wants to be authorised to agree to bear half the cost of dismantling and placing the plant on rails. What the cost will be is not known.

Financial is asked to agree to the proposal and this is, it is felt, no help in the matter. The proposal may be agreed to

TAD 21-3-18

S. 21-3-18

Accepted. (Ind. not P.W.D. see also)
in Ind. 22-3-18

Home M.

Home (Edn) Deptt.

Submitted that the P.W.D have already stated that they do not require the plant. When the file was sent to them they did not express any opinion as to the price at which the plant might be sold. It does not appear that they should again

GOVERNMENT OF INDIA
22 MAR 1918
LONDON

I no 257-1
22-3-18

see ante pages 46 to 48 Supra

3/4

again be consulted now. for orders.

SK
22.3.18.

JH.
22.3.18

H.M.3
H.E. the Governor
Lds
23.3.18

Draft attached.
Her Imee should be
told d.o. to expedite
the bulletin.

23/3/18

SECRETARY TO GOVERNMENT OF INDIA
26 MAR 1918
HOME DEPARTMENT

26 MAR 1918

[Gov. No. 414 Home. (Epdc), dy 27.3.18]

A draft d.o. is submitted for approval.

SK
28/3/18
NK
1-4-18

offices in cha
and brick f

READ AG

Home (Edn.) Dept.

1882 A16-57-34

D.O.

Dear Innes, 102

Orders have been issued in Go. No. 414 Home (Edn.), dated the 27th March 1918, approving the proposal to sell the lime sand brick plant to the Gwalior State Trust. The Govt. considers that a bulletin on the lime brick experiment should ~~soon~~ as soon as practicable be issued, and I am to request you to expedite its submission to the Govt. for approval after scrutiny by the Principal of the College of Engineering and the Chief Engineer, P.W.D., as proposed in para 3 of your letter G. Cur. No. 5-, dated the 23rd May 1917.

Yours Sincerely

3. C. S.

B.A. Innes Esq., I.C.S.,
Officer in charge
of the Dept. of
Industries.

Proof sent 3.C.S. p. 127 of.

SK 28/3/18 NK 1-4-18

officer in charge of the Dept^t of Industries to sell the lime and brick plant to the Gwalior State Trust Ltd. for Rs 15,000.

103

READ AGAIN G.O. No. ..... , dated ..... 191 .

" " " " ..... , " ..... 191 .

READ ALSO:—

C. No. 3593/16 From the Officer in charge of the Dept^s of Ind^s G. cur No. 5, dated the 29. 9. 1916.
3648/16 " " " " 11. 10. 16.
" " 2151A/17 " " " " " 23. 5. 1917.
" " 2696A. From to Dy No 1882A-9 & Ret. 8. 17.
" " 3448A. " " " G. cur^s 210 & 255 " the 15. 8. 17.
C-21A/18 " " " " 9. 11. 1917.
791A/18 " " " " 21. 2. 18.
" " " " 15. 3. 18.

ORDER.

No. 414, dated 27. 3. 1918.

The Govt approve the proposal to sell the lime sand brick plant to the Gwalior State Trust Ltd for Rs. 15,000. The Officer in charge of the Dept^t of Industries is authorised to agree to bear half the cost of dismantling the machinery and placing it on rails.

81K
20/3/18

To The Officer in charge of the Dept^t of Industries
" Financial Secretary through Financial Dept^t

JK. 20.3.18

Leds 20.3.18.

mined
ned

191 .

G.O. No.
191 .
, DATED

RRENT No.

NCLOSURES TO C. No.

ORDER OF GOVERNMENT	A	A	A	A	A	A	A	
LETTER OF GOVERNMENT								
STATEMENT WITH LETTO.								

E NOT FILED UP, BEING MEANT FOR DESPATCH
ORIGINAL.