Archives I—10,006—16-8 77.

(1) Number of pages 58

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(3) Initials of the Referencer

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Public Works DEPARTMENT

G.O. No. / B.P. No. 2045 W   Press. / Mis.

Dated 30 . 8 . 1880 ~~197~~.

Not to be folded or roughly handled

2045
1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

30th August 1880, No. 2,045 W.

Buildings and Roads.
Civil Works.

Read the following papers :—

No. 86. Endorsement of the Chief Secretary to Government, Judicial Department, dated Ootacamund, 11th June 1880, No. 1,223.

From E. C. G. THOMAS, Esq., M.C.S., Vizagapatam, to the Chief Secretary to Government, Fort St. George, dated 20th May 1880.

I HAVE the honor to lay before Government a proposal regarding jail manufactures that the condition of the Vizagapatam Jail has suggested.

2. I find that there have been in this jail in 1878 an average of 530 prisoners; that they cost Rs. 42,923, or an average of Rs. 80-10-1 each; and that they earned in the same period an average of Rs. 353, or Annas 10-8 each, *i.e.*, about $\frac{1}{121}$ of their cost.

3. Turning to the General Table of the Jails of the Presidency, I find that the sum total shows 62,124 prisoners, costing Rs. 16,86,658 and earning Rs. 1,41,791, *i.e.*, about one-eleventh of their maintenance.

4. It would seem at first sight that when we have the absolute command of the services of a healthy man there should not be the slightest doubt of our compelling him to earn considerably more than his bare subsistence.

5. The question of prison manufactures is not entirely simple, and has troubled other nations besides ourselves; the Swiss being, I believe, the only race that has so managed as actually to make a profit out of the labor of their convicts.

6. This is, however, no reason why the goal ever placed before Jail Superintendents should not be to make expenditure and income at least balance each other.

7. In India we have the advantage of a climate which saves us the cost of artificial warmth and much clothing; thus aided, Indian jails may fairly be called on to support themselves.

8. The question then arises of what prison labor is to be expended on. This depends partly on the class of prisoners. In the Vizagapatam Prison, where only short-sentence men are kept, the manufacture must be either some trade they are already accustomed to, or can be quickly taught. If possible, it should not be anything that interferes with honest industry outside the walls. It must be saleable.

9. The only work at present done by the prisoners is stone-breaking. In this they interfere with the gains of the poorest of their honest neighbours. They learn no trade that may assist them hereafter in keeping out of jail; and they naturally earn the very smallest return for their very low class of labor—not even $\frac{1}{100}$th of their maintenance. I conceive it is the most clumsy application possible of the principle of making prison labor remunerative, and I think an effort should be made to introduce a manufacture that should come less into competition with the honest poor, be more remunerative, and be a permanent industrial boon to those who leave the jail with the knowledge of one more art.

2

10. In the jail compound is loam of which a few bricks are sometimes made, and just outside it is the soil now used in the making of tiles. There can be no difficulty in procuring close at hand any amount of soil that, with a little tempering and puddling, would form excellent potter's clay; and there is plenty of water in the jail wells and in the adjacent tank.

11. I propose that with these materials the jail should turn out what are sometimes styled Syrian tiles.

12. Their form and method of manufacture are described at page 384 of the Roorkee Manual. They are hexagonal and hollow, and almost without mortar, fall into position, and form a self-supporting arched roof, in which wood may be entirely dispensed with. They should not cost more than one rupee a hundred. Manifestly a large number of them may be put up in a short time. At page 385 of the Roorkee Manual it is stated that two men roofed a room of a bungalow 18 × 22 feet in two days, and as the area of the roof would have been about 400 square feet, it would have cost about Rs. 32. The cost of mortar would be very low, as the space left between the tiles is very small; it is clear that this solid arched roof (proof against sun, rain, fire or white-ants) cannot cost more than about Rs. 8 per 100 square feet, very much less than what many an inferior and temporary roof amounts to. They can be put up without a centreing and by comparatively unskilled workmen. The arch when constructed is so light (being hollow) that thinner walls than usual will support it, and the thrust is slight. They form the usual roof in parts of Northern India and in Syria.

13. I beg to recall attention to what appears to me their greatest recommendation, viz., that they are *white-ant proof.* The white-ant probably destroys more buildings in India than all other causes put together. I observe that the sum spent by the Government on repairs in 1877-78 was Rs. 4,95,213. Is it an unreasonable conclusion that half of this, or Rs. 2,47,606, was due to the ravages of white-ants, and might have been saved if the roofs had been arches of Syrian tiles, or bee-pots as they are called here from their form?

14. The sepoy lines in Vizagapatam were recently burned down, and they are usually so destroyed annually with much loss of property and occasional loss of life. The mud walls still stand unroofed, and the sepoys and their families are housed as well as may be in the out-houses of a generous native neighbour.* If the Government contemplate the reconstruction, which the sepoys evidently shrink from, I take the liberty of suggesting the use of these arched pot roofs as by far the most permanent and economical covering that can be erected. The mud walls, if saved from the effects of rain by chunam plastering, would bear this light arch, and a light rent would quickly repay Government for such an expenditure on lines anywhere. The boon to the sepoys would be *great.*

15. The introduction of this form of roof would be as great an advantage to the public, in many a bazaar that is now annually burnt down, as to the Government.

16. I have the honor to suggest that this very simple manufacture should at once be commenced in the Vizagapatam Jail.

17. If found to answer here, the same industry in other jails would doubtless go far towards making them self-supporting, and at the same time supply Government and the public with an admirable new roofing material as far as the cost of carriage from each factory will permit.

18. I take the liberty of enclosing photographs of two out of four small buildings that I have had roofed in this way with bee-pots made to my order here, with the hope of inducing my native neighbours to do likewise.

19. If my proposal was thoroughly carried out, I venture to believe that the gain to Government—besides that to the public—would amount to a saving of half the present cost of prisoners and half the sum now spent annually on repairs; total Rs. 10,90,935, or ten lakhs annually.

P.S.—I have sent four specimens in a box by steamer.

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* Mr. G. L. Narsing Row.

2045
2

REFERRED to the Inspector-General of Jails for his remarks.

Copy will also be furnished to the Public Works Department.

(Signed) R. DAVIDSON,
Chief Secretary.

No. 86-A. Endorsement of the Chief Secretary to Government, Judicial Department, dated Ootacamund, 17th June 1880, No. 1,264.

From Lieutenant-Colonel T. E. TENNANT, Inspector-General of Jails, to the Chief Secretary to Government, dated Ootacamund, 12th June 1880, No. 150.

I HAVE the honor to return Mr. E. C. G. Thomas' letter, dated 20th May 1880, referred to me with your endorsement, No. 1,223, of the 11th instant.

2. The Syrian or pot cylinder tile is well known in the North-West Provinces, and I believe is used sometimes in this Presidency for roofs. There is, I understand, no great difficulty in the manufacture, the tile being made on an ordinary potter's wheel. I have little doubt that this description of tile might be made by prisoners in jails, if it were thought expedient to introduce the manufacture, and a sale could be obtained for the article when made. If Mr. Thomas will give the Jail Department a large order (say one or two lakhs) for these tiles, I will endeavor to undertake the manufacture, but I am not prepared to run the risk of making this description of tile unless there is a prospect of a ready sale.

3. As regards the adoption of this description of roof for jail buildings, I am doubtful of its answering. In some localities, such as the Ceded Districts and Coimbatore, where the rainfall is light, an arched roof of hollow (Syrian) tiles might be used successfully; but unless the roof is very carefully constructed, the water during heavy rains is apt to lodge in the cylinder, keeping the roof damp.

4. When in the North-West Provinces I visited some prisons where this description of roof had been used for separate cells. But the Superintendents whom I consulted did not, for the most part, approve of these roofs, stating that they were not secure against escapes.

FORWARDED to the Chief Engineer for his opinion.

(Signed) R. DAVIDSON,
Chief Secretary.

No. 86-B. From Major H.M. VIBART, R.E., Superintendent of Works, Presidency, to the Chief Engineer, Public Works Department, dated Bangalore, 15th July 1880, No. 1,520.

WITH reference to your letter, No. 156, dated 15th June 1880, regarding Syrian roofs, I have the honor to state that I went to the Medical School, Madras, to inspect and make inquiries regarding the Syrian roof built there many years ago. The dome was 32 or 33 feet diameter. It would seem that the room covered by this dome was subsequently found of insufficient dimensions for the purpose intended (a lecture hall I believe); the roof was accordingly removed, the room enlarged, and the new roof supported by trusses somewhat similar to those in your office. I also inspected the Ice House Syrian roof. The Agent of the Tudor Company told me that it was built nearly fifty years ago and answered admirably, requiring but little if any repair. As it covers a room immediately over the ice vault, and has not been objected to on the score of heat, I presume that it would be suitable for a dwelling house. A long time ago there was a crack on the west side near the springing, but this was repaired, and since then had not given trouble.

2. Dr. Orr informs me that the Syrian roofs in his house are excellent. They were built also nearly fifty years ago and require but little repair. He told me since he

had been in the house he had not spent 50 rupees on repairs to them, and moreover mentioned that he considered the rooms cooler than any of the same size in Bangalore.

3. It would seem, then, that if well built of good materials the roof is very satisfactory, being cheap, light, and cool; but the cylinders must be of really good quality, and a good deal of care must be required in laying them. The reason it has not generally been adopted, I should imagine, lies in the difficulty in making the cylinders and in the care required in putting the roof together.

4. Under these circumstances, I should think it scarcely a plan which could be adopted generally by the natives of the country. Dr. Orr did not seem to think that any objection could be raised to the roof as regards ventilation and reverberation. This morning I inspected the London Mission Chapel near St. Andrew's Church; the aisles of this chapel are roofed in by Syrian roofs of about 9 feet span. The chapel was built very many years ago. The roofs of the aisles are very badly cracked, and leak considerably. I should attribute this to bad foundations as well as, perhaps, defective construction and indifferent cylinders.

No. 86-C.

Memorandum by the Chief Engineer.

THE subject of adopting for general purposes the so-called Syrian roof, regarding which my report has been called for in the Chief Secretary's endorsement, No. 1,223, of the 11th June, on a proposal made by Mr. E. C. G. Thomas,* M.C.S., is one of considerable interest, not so much in its bearings on the question of how to make prison labor remunerative, but as concerns generally the roofing of buildings, whether constructed by Government or by private individuals.

2. Indeed, so far as Mr. Thomas' contention is concerned, viz., that the manufacture of these pot tiles for Syrian roofs would supply Government with a better means than at present exists for making jail labor remunerative, it appears to me that should it, as he anticipates, turn out a complete success, then by the canon he has himself laid down it must of necessity cease to be a jail manufacture, and that in this respect, therefore, the question is only of secondary importance.

3. His contention is (paragraph 9) that prisoners in jail "learn no trade that may assist them hereafter in keeping out of jail, &c.;" and again, in reference to stone-breaking, &c., that "an effort should be made to introduce a manufacture that should come less into competition with the honest poor."

4. If Syrian tiled roofs come, as he expects, into general use, especially for hut construction, it is reasonable to suppose that not only will the released prisoner, but the "honest poor" who have not been in prison try and profit by the manufacture, but that competition must result in the natural order of things, when, as a matter of principle (as explained by Mr. Thomas himself), the manufacture should cease in the jails.

5. This, however, only goes to show that the manufacture cannot *per se*, even if successful, furnish any more permanent remedy than many other methods which are now followed for counteracting the non-remunerative character of jail labor; at the same time it should clearly stand on the same footing with these others, and be introduced if likely to prove advantageous.

6. Syrian roofs belong essentially to dry climates where timber is scarce, and, as will be observed from the detailed description given at page 92 of Volume I of the Professional Papers of the Madras Engineers by Captain Underwood in 1838 (herewith), that the subject is one which received a good deal of attention at one time.

7. I have been at some pains to ascertain how roofs constructed in this way have answered, and why if successful the method has not been followed up in the construction of our public edifices. I have also had a rough memorandum drawn up showing relative cost of different descriptions of roofing as now employed so as to give the comparative cost in a general way.

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*Letter to the Chief Secretary of 29th May 1880.

2045
3

8. Major Vibart's letter, No. 1,520, of 16th July 1880, shows that the roofs of the Ice House at Madras and of the house now occupied by Dr. Orr (President of the Municipality) at Bangalore, each said to have been constructed fifty years ago, have been most successful.

9. At the same time it is to be observed that, for some unexplained reason, this method of construction was not followed when the old Syrian roof of the Medical School at Madras was reconstructed; and again that the roofs of this character over the aisles of the London Mission Chapel at Madras, built very many years ago, "are very badly cracked, and leak considerably."

10. Captain Underwood, in his paper above adverted to, shows that much care is required, not only with reference to the manufacture of the tiles themselves, but also in putting together the roof. "The centreings should not," he says, "be removed before the arch is thoroughly dry, for, the materials being slight and fragile while *wet*, a sudden settlement at that time is dangerous, &c.;" adding "The centreings used at Bangalore were of the roughest kind, and apparently very weak; indeed, on one occasion during my absence so careless were the workmen on this point that a failure of one before the work was dry caused the ruin of a large arch, and the irreparable injury of the outer verandah."

11. Major Vibart's observation, paragraph 3, is probably correct, viz., "if built of good materials the roof is very satisfactory, being cheap, light, and cool; but the cylinders must be of really good quality, and a good deal of care must be required in laying them;" and Colonel Tennant accurately remarks in paragraph 3 of his No. 150, of 12th June 1880, that "unless the roof is very carefully constructed, the water during heavy rains is apt to lodge in the cylinders, keeping the roof damp."

12. It is clear, therefore, that more than ordinary risks attend the construction of this mode of roofing, and that these are of a character likely to discourage its general adoption among people who are either insufficiently skilled themselves, or who cannot afford to pay for skilled supervision.

13. In Afghanistan it is true that domed roofs are universal with all classes of dwellings, the great majority of these being constructed with simple sun-dried tiles, and without the employment of any centreing. These arches rest on thick mud walls, and every man in the country apparently is skilled in this class of work; but it must be borne in mind, *1st*, that there is hardly a stick of timber to be got in Afghanistan (I am speaking chiefly of South Afghanistan); *2nd*, that climate is dry; *3rd*, that the earth is so tenacious that in four days after moulding the tiles are very nearly as hard with drying in the sun as ours when burnt in a kiln.

14. Dispensing with centreings is moreover rendered possible by (1) the peculiarly adhesive character of the mud used in setting the tiles in the arches, (2) by the material of the latter being necessarily much less fragile than the Syrian pot tile, and (3) by a peculiar way of radiating the courses adopted in construction which, though possible with the Afghan flat tile, would be out of the question with the other. It is in fact a very perfect adaptation of the only materials at their disposal to a specific end, which, though perfect as a system under the surrounding circumstances, would to a great extent be quite inapplicable elsewhere.

15. So also in Mysore; the people have found that by burning splitting off by fire applied to the parent rock of slabs of gneiss, and again cleaving these by wedges, they can use not only rough stone posts spaced at intervals in the mud walls of huts, but roof girders, which, with the addition of bamboos laid across and a peculiar kind of felspathic earth tamped above, forms fairly good roofs of a cheap and suitable character in all, or nearly all the maidan taluks.

16. And in Vizagapatam, on the other hand, the poorer classes find in the cadjan leaf an invaluable and very cheap material for roof covering.

17. The people have in fact from necessity devised everywhere that kind of construction which suits them best; and I should very much doubt whether it would be possible for Government to bring about a change in these respects such as appears to be considered feasible by Mr. Thomas, particularly as special skill is needed for the

Syrian roofs, and as buildings thus constructed would certainly cost very much more in first outlay than with the present rude but effective huts.

18. These arguments do not of course apply to buildings of a more pretentious character, whether public or private; and here it seems to me that we might occasionally have to deal with requirements (as in the case of godowns, &c.,) where Syrian roofs might with advantage be adopted.

19. From the details given in the attached calculations, paper A, it will be seen that the relative cost of roofing of different descriptions of 100 square feet stands somewhat as follows, viz.:—

	RS.
I. Syrian roofs	34
II. Terrace roofs	52
III. Bengal terrace	41
IV. Common tiles with couples	40

20. These rates do not, it is true, give an altogether fair comparison, as owing to the thrust of the arch in the Syrian roof not only would rather thicker walls be required, and certainly so at the points where the binding arches are needed, but there would be some items to be added which would in all probability make the cost much the same as that for Bengal terrace and common tiles, though less than for ordinary terracing or iron roofing. Where in other respects applicable I cannot myself see any reason against its adoption.

21. I observe that Dr. Orr considers that there is no objectionable reverberation, but on this point I should doubt whether others would be disposed entirely to agree with him. So far as I am personally concerned, I cannot but consider that the reverberation which is inseparable from all arched roofs makes them very disagreeable for dwelling houses. In fact, there is always to my mind an oppressive feeling in living under a bombproof or arched roof of any kind.

22. The semi-circular form (it cannot be segmental from the thrust exerted unless iron tie rods are inserted) does not again readily lend itself to any well-recognized form of architecture. Left in its bald form, excepting in domes, the arch is so displeasing to the eye that expedients which must add considerably to the expense must be adopted to counteract the effect, and there are certainly other drawbacks, *e.g.*, the necessity of breaking into the roof whenever punkahs, lamps, &c., have to be hung from fresh points of suspension, which taken together make it extremely doubtful to me whether this style of roof would commend itself for adoption in any general way.

(Signed) R. H. SANKEY, Colonel, R.E.,
20th August 1880. Chief Engineer, P.W.D.

No. 87. ORDER THEREON, 30th August 1880, No. 2,045 W.

COMMUNICATED to the Judicial Department.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Judicial Department.
" Consulting Architect.

Exd. A. F. Goodall.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of 1880 Madras.

PUBLIC WORKS.

To

The JUDICIAL DEPARTMENT,

&c., &c., &c.

Dated August 30th.

Issued

Recd. Encl.

G. O., 30th August 1880, No. 2,045 W.

AUGUST.

Nos. 86-87.

Syrian Roof.—Papers on the subject of the adoption of — for general purposes, communicated to the Judicial Department.

2045/5

Memo: No. 156 d/15th June

To ~~the S E II~~
The Supt of Works &c

Sir

In forwarding copy of a letter dated 20th ulto. from Mr. E C G Thomas M.C.S. on the subject of Syrian roofs I have the honor to request ~~that~~ you will have enquiries made from the present owners of certain buildings in the Presidency which have been so roofed as to their durability &c as well as their general ~~suitability~~ for dwelling houses –

In the Profl. papers of the Madras Engineers

...ubt of our compelling him to take
Considerabl

it is stated that
the Ice house and
Medical School Madras
also the London Mission
[illegible] Chapel and
private houses at Ban-
galore had been so
roofed

The house at the latter
place Bangalore now
occupied by Dr. Orr is
I am aware roofed in
this way, but the walls
are much thicker than
usual, and there are
certain inconveniences as
regards want of ventilation
the reverberation of sounds
&c. but these objections
may not after all be
very material; what
however is more to the
point is that [illegible]
[illegible] the roofing
of the godowns of Dr.

Orr's house proved
as I understand
untrustworthy and
had to be replaced
with an ordinary flat
roof

It will be well therefore
to ascertain the facts
connected with this as
it would appear to point
to certain difficulties
either as regards the
manufacture of the
Cylinders so as to make
them sufficiently reliable,
or as regards the putting
together of the roof,
which would seem rather
to invalidate the
adoption of a mode
of construction which
though apparently
simple & economical
has not certainly
met with general

ult of our Compelling him to case
Considerabl

adoption excepting
in countries which
are at once dry
and have little
or no timber for
roofing

13.6.80

With one Enclosure to be
returned -

2045W

A

Comparative Statement
shewing the Cost of differen
kinds of Roofs at
Madras.

Vizagapatam
20th May ~~April~~ 1880

20.45/8

From C. C. G. Thomas Esquire
M. C. S.
Vizagapatam

To
The Honorable R. Davidson
C. S. I.
Chief Secretary to Governm
Fort Saint George

Sir
I have the honor to lay before Government a proposal regarding Jail manufactures that the condition of the Vizagapatam Jail has sug-gested.

2. I find that there have been in this Jail in 1878 an average of 530 prisoners, that they cost Rs 42923 or an average of Rs 80-10-1 each, and that they earned in the same period each an average of Rs 353 or Rs –-10-8, i.e. about $\frac{1}{121}$ of their cost.

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I have the honor to be
Sir
your most obedient servant
E. J. Thomas
M.C.S.

P.S.
I have sent 4 specimens in a box by Steamer.

Indexed R[illegible] / Reporter
23 MAY 80
(Jails)

~~From~~

E. C. G. Thomas Esquire
M. C. S.
Vizagapatam

To
The Chief Secretary
to Government
Fort Saint George

Dated 20 ~~April~~ May } 1880.
Recd 23 — — }

No.

No: 1816

Proposing the introduction of a new form of roofing for buildings and showing the benefit thereof

No. 1223.

Referred to the Inspector General of Jails for his remarks.
Copy will also be forwarded to the D.P.W.

R. Davidson
Chief Secretary

Ootacamund }
11th June 1880. }
To the Inspector General of Jails

P6

2045/12

No 150

Ootacamund 12th June 1880

From
Lt Colonel J. E. Tennant
Inspector General of Jails
To
R. Davidson Esq C.S.I.
Chief Secretary to Government
Ootacamund

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the tile being made on an ordinary potters wheel. I have little doubt that this description of tile might be made by prisoners in jails if it were thought expedient to introduce the manufacture and a sale could be obtained for the article when made. If Mr Thomas will give the Jail Department a large order (say one or two lacs) for these tiles, I will endeavor to undertake the manufacture, but I am not prepared to run the risk of making this description of tile unless there is a prospect of a ready sale.

3. As regards the adoption of this description of roof for jail buildings I am doubtful of its answering. In some localities such as the Ceded Districts and Coimbatore where the rain fall is light an arched roof of hollow (Syrian) tiles might be used successfully, but unless the roof is very carefully constructed the water during heavy rains is apt to lodge in the cylinder keeping the roof damp.

4. When in the North West Provinces I visited some prisons where this description of roof had been used for separate cells. But the Superintendents whom I consulted did not, for the most part, approve of these roofs stating that they were not

secure

s against escapes.

I have the honor to be

Sir

Your most Obedient Servant

T. E. Tennant

Inspector General of Jails

c1616
R17/16

No. 1264

Forwarded to the Chief Engineer for his opinion.

S. Vandon
Chief Secretary

Ootacamund
17 June 1880.
To the Chief Engineer. P. W. Department.

~~Proceedings (1880) Department~~
Crimi (Jails) 14 JUN 80
The Inspector
7. General of Jails
The Chief Secretary
to Government
Ootacamund
Dated 12th June 1880.
Recd 14 " "
No 150.
No 2002
(Re to ~~Sanitary~~ 1116 returned)
Reporting on the
manufacture of
Syrian cylinder
tiles in the Jails of
this Presidency.
With enclosure.

O. L. sheet 97 June.

R.G. 2016/15

No. 1520

MADRAS,
Camp. Bangalore 15 July 1880.
Despatched 16 Do

From

THE SUPERINTENDENT OF WORKS,
PRESIDENCY,

To

The Chief Engineer
Public Works Department
Madras

Sir,

closures. 1

With reference to your letter No. 156 dated 15th June 1880, regarding Syrian roofs, I have the honor to state that I went to the Medical School, Madras, to inspect and make enquiries regarding the Syrian roof built there many years ago. The dome was 32 or 33 feet diameter. It would seem that the room covered by this dome was subsequently found of insufficient dimensions for the purpose intended (a lecture hall I believe) - the roof was accordingly removed, the room enlarged and the new roof supported by trusses somewhat similar to those in your Office. I also inspected the Ice House Syrian roof. The Agent of the Indo Company told me that it was built nearly 50 years ago and answered admirably, requiring but little if any repair. As it covers a room immediately over the Ice Vault and has not been objected to on the score of heat, I presume that it would be suitable for a dwelling house. A long time ago, there was a crack on the West side near the springing but this was repaired and since then had not given trouble.

2 Dr Orr informs me that the Syrian roofs in his house are excellent. They were built also nearly 50 years ago and require but little repair. He told me since he had been in the house, he had not spent 50 Rupees on repairs to them, and moreover mentioned that he considered the rooms cooler than any of the same size in Bangalore.

3 It would seem then, that if well built of good materials, the roof is very satisfactory being cheap, light and cool - but the Cylinders must be of really good quality and a good deal of care must be required in laying them. The reason it has not been generally been adopted, I should imagine, lies in the difficulty in making the Cylinders and in the care required in putting the roof together.

4. Under these circumstances I should think it scarcely a plan which could be adopted generally by the Natives of the country. Dr Orr did not seem to think that any objection could be raised to the roof as regards ventilation and reverberation. This morning I inspected the London Mission Chapel near Saint Andrew's Church - the aisles of this Chapel are roofed in by Syrian roofs of about 9 feet span. The Chapel was built very many years ago. The roofs of the Aisles are very badly cracked and leak considerably. I should attribute this to bad foundations as well as perhaps defect construction and

indifferent Cylinder.

I have the honor to be
Sir
Your most Obdt Servant
[illegible] Vibart Major R.E.
Superintendent of Works

SP 11
2045
17

Letter from E. C. G. Thomas Esqre: M. C. S. Vizagapatam, to the Chief Secretary to Government Fort Saint George dated Vizagapatam, 20th May 1880.

I have the honor to lay before Government a proposal regarding Jail manufactures that the condition of the Vizagapatam Jail has suggested.

2. I find that there have been in this Jail in 1878 an average of 530 prisoners, that they cost Rs. 42923 or an average of Rs. 80-10-1 each, and that they earned in the same period an average of Rs. 353 or Rs. 0-10-8 each, i.e. about 1/121 of their cost.

3. Turning to the General Table of the Jails of the Presidency, I find that the sum total shows 62124 prisoners costing Rs. 1,686,658 and earning Rs. 141,791; i.e. about 1/11th of their maintenance.

4. It would seem at first sight that when we have the absolute command of the services of a healthy man there should not be the slightest doubt of our compelling him to earn considerably more than his bare subsistence.

5. The question of prison manufactures is not entirely simple and has troubled other nations besides ourselves — the Swiss being, I believe, the only race that has so managed as actually to make a profit out of the labor of their convicts.

The

6. This is, however, no reason why the goal ever placed before Jail Superintendents should not be to make expenditure and income at least balance each other.

7. In India we have the advantage of a climate which saves us the cost of artificial warmth and much clothing; thus aided Indian Jails may fairly be called on to support themselves.

8. The question then arises of what Prison labor is to be expended on. This depends partly on the class of prisoners. In the Vizagapatam Prison where only short sentence men are kept the manufacture must be either some trade they are already accustomed to, or can be quickly taught. If possible it should not be anything that interferes with honest industry outside the walls. It must be saleable.

9. The only work at present done by the prisoners is Stone-breaking. In this they interfere with the gains of the poorest of their honest neighbours. They learn no trade that may assist them hereafter in keeping out of Jail; and they naturally earn the very smallest return for their very low class of labor – not even $\frac{1}{100}$th of their maintenance. I conceive it is the most clumsy application possible of the principle of making prison labor remunerative and I think an effort should be made to introduce a manufacture that should come less into competition with the honest poor, be more remunerative, and be a permanent industrial boon to those who leave the Jail with the knowledge of one more art.

In

1812
2045/18

10. In the Jail Compound is loam of which a few bricks are sometimes made and just outside it is the soil now used in the making of tiles. There can be no difficulty in procuring close at hand any amount of soil that with a little tempering and puddling would form excellent potter's clay; and there is plenty of water in the Jail wells, and in the adjacent tank.

11. I propose that with these materials the Jail should turn out what are sometimes styled Syrian tiles.

12. Their form and method of manufacture are described at page 384 of the Roorkee Manual. They are hexagonal and hollow and almost without mortar fall into position and form a self supporting arched roof in which wood may be entirely dispensed with. They should not cost more than Re: 1 a hundred. Manifestly a large number of them may be put up in a short time. At page 385 of the Roorkee Manual it is stated that two men roofed a room of a bungalow 18×22 feet in two days and as the area of the roof would have been about 400 square feet it would have cost about Rs: 32, The cost of mortar would be very low as the space left between the tiles is very small, it is clear that this solid arched roof (proof against sun, rain, fire or white-ants) cannot cost more than about Rs: 8 per 100 square feet; very much less than what many an inferior and temporary roof amounts to. They can be put up without a centering and by comparatively unskilled workmen.

The arch when constructed is so light (being hollow) that thinner walls than usual will support it and the thrust is slight. They form the usual roofs in parts of Northern India and in Syria.

13. I beg to recall attention to what appears to me their greatest recommendation — viz, that they are *white-ant proof*. The white-ant probably destroys more buildings in India than all other causes put together. I observe that the sum spent by the Government on repairs in 1877-78 was Rs: 4,95,213. Is it an unreasonable conclusion that half of this or Rs: 247,606 was due to the ravages of white-ants and might have been saved if the roofs &c had been arches of Syrian tiles, or 'Bee-pots' as they are called here from their form?

14 – The Sepoy-lines in Vizagapatam were recently burned down, and they are usually so destroyed annually with much loss of property and occasional loss of life — The mud walls still stand unroofed and the Sepoys and their families are housed as well as may be in the out-houses of a generous native neighbour* If the Government contemplate the reconstruction which the sepoys evidently shrink from, I take the liberty of suggesting the use of these arched pot-roofs as by far the most permanent and economical covering that can be erected. The mud walls, if saved from the effects of rain by chunnam plastering, would bear this light arch, and a light rent would quickly repay Government for such an expenditure on lines any where. The boon to the sepoys would be *great*.

15. The introduction of this form of roof would be as great an advantage to the public in many a bazaar that is now annual burnt down as to the Government.

16. I have the honor to suggest that this very simple manufacture should at once be commenced in the Vizagapatam Jail.

17 – If found to answer here, the same industry in other Jails would doubtless go far towards making them self-supporting, and at the same time supply Government and the public with an admirable new roofing material as far as the cost of carriage from each factory will permit –

18 – I take the liberty of enclosing photographs of two, out of four small buildings, that I have had roofed in this way with Bee-pots made to my order here, with the hope of inducing my native neighbours to do likewise.

19 – If my proposal was thoroughly carried out I venture to believe that the gain to Government – besides that to the public – would amount to a saving of 1/2 the present cost of prisoners and 1/2 the sum now spent annually on repairs total Rs: 10,90,935 or ten lakhs annually.

Endorsement:– Jud.l Dept.

No: 1223.

Referred to the Inspector General

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* Mr: G. L. Narasing Row.

of Jails for his remarks.

2. Copy will also be furnished to the Public Works Department.

R. Davidson
Chief Secretary

Ootacamund }
11th June 1880 }

To
The Public Works Departt.

1/1964/80

P.W.D.
17 JUL 80
No 4588

TO BE RETURNED
WITH REPLY.

Cr. 155. 15.6.80

X

P.W.D.
17 JUL 80
No. 4588

From
The Supdt of Works,
Presidency.

No. 1520
Dated 16
Recd 17th of July 1880

Enc: 1.

Syrian roofs.—

Submits report upon —

Cr. 20. 8. 80. ~~Rtd~~ 27. 8. 80
D. r. Sheet 30 Augt
Sent again 13/8/80
Cr. 6. 8. 80
Retd. again 30/8/80.
Cr. 17. 7. 80

P.W.D.

No.

2045/22

Memo: by the Chief Engineer.

The subject of adopting for general purposes the so called Syrian roof regarding which my report has been called for in the Chief Secretary's endorsement, No. 1223 of the 11th of June, on a proposal made by Mr. E. C. G. Thomas* M.C.S. is one of considerable interest not ~~only~~ so much in its bearings on the question of how to make prison labour remunerative, but as concerns generally the roofing of buildings whether constructed by Government or by private individuals.

2. Indeed so far as Mr. Thomas's contention is concerned viz. that the manufacture of these pot tiles for Syrian roofs would supply Government with a better means than at present exists for making jail labour remunerative, it appears to me that should it as he anticipates, turn out a complete success then by the canon he ha

* Letter to the Chief Secretary of 20th May 1880.

himself laid down it must of necessity cease to be a jail manufacture, and that in this respect therefore the question is only of secondary importance.

3. His contention is (para 9) that prisoners in jail "learn no trade that may "assist them hereafter in keeping out of jail &c" and again in reference to stone breaking &c that "an effort should be made to intro-"duce a manufacture that should come less "into competition with the honest poor."

4. If Syrian tiled roofs come as he expects into ~~[illegible]~~ general use, especially for ~~that~~ hut construction it is ~~not~~ reasonable to suppose that not only will the released prisoner, but the "honest poor" who have not been in prison ~~will~~ try and profit by the manufacture ~~and~~ but that competition must result in the natural order of things; when as a matter of principle (as explained by Mr Thomas himself) the manufacture should cease in the jails.

5. This however only goes to shew that the manufacture cannot "per se," even if successful, furnish any more permanent remedy than many other methods which are now followed for counteracting the non-remunerative character of jail labour, at the same time it should clearly stand on the same footing with these others and be introduced if likely to prove advantageous.

6. Syrian roofs belong essentially to dry climates where timber is scarce, and as will be observed from the detailed description given at page 92 of Vol: I of the Professional Papers of the Madras Engineers by Captain Underwood in 1838, (herewith) that the subject is one which received a good deal of attention at one time.

7. I have been at some pains to ascertain how roofs constructed in this way have answered, and why if successful the method has not been followed up in the construction of our public edifices. I have also had a rough memo drawn up shewing relative cost of different descriptions of roofing as now employed so as to give the comparative cost in a general way.

8. Major Vibarts letter No 1520 of —

16th July 1880 shews that the roofs of the Ice house at Madras, and of the house now occupied by Dr Orr (President of the Municipality) at Bangalore, each said to have been constructed 50 years ago, have been most successful.

9. At the same time it is to be observed that for some unexplained reason this method of construction was not followed when the old Syrian roof of the Medical School at Madras was reconstructed, and again that the roofs of this character over the aisles of the London Mission Chapel at Madras, built very many years ago, "are very badly cracked and "leak considerably"

10. Captain Underwood in his paper above adverted to shews that much care is required not only with reference to the manufacture of the tiles themselves, but also in putting together the roof. "The centerings "should not" he says "be removed before the "arch is thoroughly dry, for the materials being "slight and fragile while wet, a sudden "settlement at that time is dangerous &ca adding "The centerings used at Bangalore "were of the roughest kind, and apparently "very weak; indeed on one occasion during "my absence so careless were the workmen "on this point that a failure of one before the "work was dry caused the ruin of a large "arch, and the irreparable injury of the outer "verandah".

11. Major Vibart's observation, para 3, is probably correct viz "if built of good "materials the roof is very satisfactory, "being cheap, light, and cool; but the "cylenders must be of really good quality "and a good deal of care must be required "in laying them"; and Colonel Tennant accurately remarks in para 3 of his No 150 of 12th June 1880 that "unless the roof "is very carefully constructed the water "during heavy rains is apt to lodge in "the cylenders keeping the roof damp".

12. It is clear therefore that more than ordinary risks attend the construction of this mode of roofing and that these are of a

character likely to discourage its general adoption among people who ~~were~~ are either insufficiently skilled themselves, or who ~~could~~ can not afford to pay for skilled supervision.

13. In Afghanistan it is true that domed roofs are universal with all classes of dwellings, ~~all~~ the great majority of these being constructed with simple sun-dried tiles, and without the employment of any centering. These arches rest on thick mud walls and every man in the country apparently is skilled in this class of work; but it must be borne in mind, 1st that there is hardly a stick of timber to be got in Afghanistan (I am speaking chiefly of South Afghanistan) 2nd that climate is dry, 3rd that the earth is so tenacious that in four days after moulding the tiles are very nearly as hard with drying in the sun as ours when burnt in a kiln.

14. Dispensing with centerings is moreover rendered possible by (1) the peculiarly adhesive character of the mud used in setting the tiles in the arches (2) by the material of the latter being necessarily much

less fragile than the Syrian pot tile, and (3) by a peculiar way of radiating the courses adopted in construction which though possible with the Afghan flat tile would be out of the question with the other. It is in fact a very perfect adaptation of the only materials at their disposal to a specific end, which though perfect as a system under the surrounding circumstances would ~~be~~ to a great extent be quite inapplicable elsewhere.

15. So also in Mysore the people have found that by ~~burning off~~ splitting off by fire applied to the parent rock of slabs of gneiss ~~rock~~ and again ~~splitting~~ cleaving these by wedges, they can use not only rough stone posts spaced at intervals in the mud walls of huts, but roof girders, which with the addition of bamboos laid across and a peculiar kind of felspathic earth rammed above forms fairly good roofs of a cheap and suitable character in all, or nearly all the maidan taluqs.

16. And in Vizagapatam on the other hand, the poorer classes find in the

cajan leaf an invaluable and very cheap material for roof covering.

17. The people have in fact from necessity devised everywhere that kind of construction ~~that~~ which suits them best; and I should very much doubt whether it would be possible for Government to bring about a change in these respects such as appears to be considered feasible by Mr. Thomas particularly as special skill is needed for these ~~[illegible]~~ Syrian roofs and as buildings thus ~~[illegible]~~ constructed would certainly cost very much more in first outlay than with the present rude, but ~~sufficiently~~ effective huts.

18. These arguments do not of course apply to buildings of a more pretentious character whether public or private, and here it seems to me that we might occasionally have to deal with requirements (as in the case of godowns &c.) where Syrian roofs might with advantage be adopted.

19. From the details given in the attached calculations, paper A it will be seen

2045/30

that the relative cost of roofing of different descriptions of 100 square feet, stands somewhat as follows viz:

		Rs
I	Syrian roofs	34
II	Terrace — do	52
III	Bengal terrace	41
IV	Common tiles with couples	40.

20. These rates do not it is true give an altogether fair comparison as owing to the thrust of the arch in the Syrian roof not only would rather thicker walls be required, and certainly so at the points where the binding arches are needed, but there would be some items to be added which would in all probability make the cost much the same as that for Bengal terrace, and common tiles, though less than for ordinary terracing or iron roofing. Where in other respects applicable I cannot myself see any reason against its adoption.

21. I observe that Dr. Orr considers

that there is no objectionable reverberation, but on this point I should doubt whether others would be disposed entirely to agree with him. So far as I am personally concerned, I cannot but consider that the reverberation which is inseparable from all arched roofs makes them very disagreeable for dwelling houses. In fact there is always to my mind an oppressive feeling in living under a bombproof or arched roof of any kind.

22. The semicircular form (it cannot be segmental from the thrust exerted unless iron tie rods are inserted,) does not again readily lend itself to any well recognized form of architecture. Left in its bald form excepting in domes the arch is so displeasing to the eye that expedients which must add considerably to the expense must be adopted to counteract the effect, and there are certainly other drawbacks e.g. the necessity of breaking into the roof whenever punkahs, lamps &c. have to be hung from fresh

points of suspension, which taken togeth make it extremely doubtful to me whether this style of roof would com mend itself for adoption in any genera way.

R. H. Sankey Col: R.E.

20th August 1880.

Chief Engr. P.W.D.

Cir 20.8.80 Retd 27.8.80
O.L. Shel 36 Augt

2065/28

PUBLIC WORKS DEPARTMENT.

Endorsement in the Judicial Dept.
No. 1223 d/ 11th June 1880.
— do — do — No. 1264 d/ 17th June 1880.
Letter from S.W. Presidency, No. 1520 d/ 16th July /80.
Memo: by Chief Engr. P.W.D. d/ 20th Augt /80.

FOR ORDERS.

Col R.E.
20-8-80

Commt. 2 Judl
[illegible]
[illegible]
[illegible]
[illegible] that the
assumes that [illegible]
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FOR ORDERS.

21

[illegible] 27/8

No: 2045 W
d/ 30th Augt/80
issued

the judicial dept.

~~C.E.E.~~

~~Secy. P.~~

~~Exd. P.W. Dept.~~

H.P.
27/8

Judl. dept. ✓
Gov. Architect ✓
Desd 13-9-80

~~[illegible]~~

27/8/80

Cir 20.8.80 Pta 27.8.80
O.S. Sheet 3.6 Augt

2045/29

1588
3899 A.

Govt. of Madras

PUBLIC WORKS.

To

Dated

Issued

Recd. Encl.

G. O. 31st Aug 1879, No. 2045 W.

Nos. 86-87

Syrian Roofs.

Papers on the subject of the adoption of — for general purposes, commund. to the Jud'l Dept.

3/8