

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	374	Press Mis.
230-231		
Dated	13 th February	1967.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue, Department,
13th February 1869.*

No. 230. Read the following Proceedings of the Board of Revenue, dated 11th December 1868, No. 8,703 :—

Read the following letter from the Acting Collector of Madras, to the Acting Secretary to the Board of Revenue, dated Sydapet, 27th October 1868, No. 356.

1. I have the honor to forward, for the Board's orders, a report* and plans from Mr. Fraser, Executive Engineer, East Coast Canal, on the proposed new Salt Pans at Vichur and some other works.

* Original, to be returned, with enclosures.

2. The Vichur Channels were estimated by Mr. Fraser to cost 4,965 Rupees, and that sum was entered in the Budget. The estimate now submitted after actual survey and certain necessary extension amounts to Rupees 11,255. The plan of the channels appears to meet the wants of the place entirely. The number of pans should not be less than 300, and the ground as stated by Mr. Fraser will admit of 372 being laid out if required.

3. The proposal of Mr. Fraser to deepen the branch of the Cortilliar, west of the new pans, would be advantageous as regards the guarding of the pans, but is not needed for navigation, as the new channels will afford access to every part. I am informed by Mr. Smith that the land is liable to floods from the Cortilliar, and it is not desirable, therefore, to afford any additional facility for the influx of water in that direction ; the proposal does not, therefore, require immediate attention.

4. The extension of the mouth of the channel to the main backwater is highly desirable, and if the additional width allowed will check silting, it will be well worth the extra cost.

5. The estimates for the Cutcherry is far beyond what was contemplated, and the cost of providing accommodation at all the pans, at this rate, will be very great. I should be glad, if the Board approve, to see a trial made of the *pise* work alluded to.

6. I have myself seen an old Fort to all appearance constructed in the manner described, the walls of which had acquired almost the hardness of stone. Concole, in Gudiwadah Talook, Kistna District. The success of the measure would, however, depend on the quality of the earth and on the manner of mixing it.

7. The bridge now proposed also is no doubt a great improvement on those constructed before, but the cost is more than double. I would recommend that as many as can be provided from the grant of the current year should be at once constructed by Mr. Fraser. I would strongly advise the purchase of a Tube Well for use in the pans. Fresh water is surely needed by all concerned in the Salt manufacture, and, as shown by Mr. Fraser, the cost of searching for it by digging wells in many places is so great that it practically stops all action in that direction.

8. The estimates for Vallur and Voyalur are also largely in excess of Mr. Fraser's former estimates. If all the works in the Budget have been alike underestimated, it will, I fear, be necessary to postpone many of the works till next year. I have put some of the most urgent works in hand in anticipation of the Government sanction to the Budget, which I trust may soon be received, as the time for completing the works is now very short.

*Proceedings of the Madras Government, Revenue Department,
13th February 1869.*

ENCLOSURE No. 1.

From W. FRASER, Esq., C. E., Executive Engineer, to the Collector of Madras, dated Mount Road, 29th September 1868, No. 143.

1. I have the honor to forward the following plans and other documents :—
VICHUR.—Figure No. I.—Map of the land proposed to be converted into Salt Pans, shewing the proposed channels, and the position of the other proposed works.
 Figures Nos. II, III, IV, and V.—Longitudinal sections of the channels.
 Figure No. VI.—General cross section for all the channels.
 Figures Nos. VII, VIII, and IX.—Plans of proposed Cutcherry.
 Do. X, XI, and XII.—Plans of proposed Cooily-shed.
 Figure No. XIII.—Elevation of proposed Foot Bridges.
 Do. XIV.—Eight Estimates and Specifications for the above.
VALLUR.—Figure No. XV.—Section of proposed extension of Channel No. 5.
 Do. XVI.—Estimate and Specification for do.
 Do. XVII.—Longitudinal section of proposed extension of Channel No. 9.
 Do. XVIII.—Estimate and Specification for do.
VOYALUR.—Figure No. XIX.—Longitudinal section of proposed new channel (No. 9), on the west and north of the present pans.
 Do. XX.—Estimate and Specification for the same.

2. In a former letter, No. 131, dated 10th instant, I informed you that I considered it best to have a proper Map of the Vichur lands prepared before laying out the channels, so that the greatest amount of accommodation should be afforded at the smallest cost. The Map I now furnish is from actual Survey. The dotted line thus, — — — — —, shews the land marked out with flags by the Deputy Collector, and the line shaded with red, shews the limits of the land which is suitable for the manufacture of salt on the east of the shallow branch channel which runs nearly the whole way across from one branch of the Cortilliar to the other. It is now proposed that this cross channel shall form the limit of the salt manufacture on the west side.

3. The area of the land within the dotted line is 95 Cawnies or 190 Pans, being 110 Pans short of the number (300) it was intended to contain.
 The area of the land within the shaded red line (including the land within the dotted line) is 186 Cawnies or 372 Pans, being 72 Pans more than it was originally intended to open at this place.

The additional number of pans will entail no additional trouble in guarding, because even if only the 190 Pans within the dotted line were opened, the whole area within the main backwater on the east, the two branches of the Cortilliar on the north and south, and the cross channel on the west, should be guarded. The cross channel on the west is very shallow, and is now quite dry; but during the time of manufacture there will be water in it. If it were made into a Boat Channel, or even the centre part of it deepened for a few feet in width, and connected with the Cortilliar on the south, these lands would be altogether surrounded by water, and would thus be very easily guarded.

The cost of making it into a Boat Channel would be about 5,000 Rupees.

It is not included in the estimate now forwarded, as it was not considered absolutely essential.

4. The channels marked upon the plan are the result of careful consideration after a close examination of the ground, and consultation with the Superintendent. They are laid out so as to give ample facility for getting water for manufacturing purposes, and also that the salt shall not have to be carried much more than 300 yards to a boat, from any part of the works. During a part of the manufacturing season, portions of the Cortilliar branches, north and south, can be used by boats.

It was not my intention to carry Channel No. 2 into the main navigation, but to stop it where it first enters the backwater at the point marked B, so as to avoid the cost of keeping two entrances open, as all that part of the Canal is being silted up with alluvion brought down by the Cortilliar; but the Deputy Collector Mr. Smith considered it so advantageous to have a second entrance, that

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I have included the cost of the whole line in the estimate. It will, no doubt, facilitate the passage of boats, and be useful as regards the supply of water.

I have estimated these channels at six yards in width at the bottom, instead of five yards which is the usual width given to Salt Channels, but which is much too narrow, and is partly the cause of their rapid silting up.

The channels are drawn, so far as was possible, at right angles to each other to facilitate the marking out of the pans.

6. CUTCERRY.—Between Channels Nos. 1 and 2 there is a piece of high ground upon which a Cutcherry and a Cooily Shed are proposed to be built. I have consulted with the Deputy Collector on this matter, and the plans show what appears to be the smallest amount of accommodation that should be provided. The estimated cost of the Cutcherry is 1,552 Rupees; but this is for pukka brick and chunam work. If built with burned bricks and clay, the cost would be about 1,300 Rs. This latter description of work, if kept carefully repaired, would do very well; but any want of attention would soon lead to its destruction. The cost would be still more reduced if sun-dried brick and clay were used, but the building would be still less substantial and should be renewed in a few years, as no good clay, free from salt, can be had in the locality. The pukka work, with ordinary care, would last practically for ever.

6. COOLY SHED.—A Cooily Shed seems to be absolutely necessary, that the coolies and others having business at the works may have some place in which to get shelter without crowding, as they do elsewhere, into and about the Cutcherry, to the serious prevention of business. By adopting the plan of a series of small arches and two central pillars, thus avoiding altogether the use of timber except in the roof, the required amount of accommodation is obtained at a small cost.

The estimated cost of this building, in pukka work, is 630 Rupees, which would be reduced to 530 Rupees by adopting burned bricks in clay, and which would be further reduced by the use of sun-dried bricks. It is for you to say what description of work shall be adopted.

Screens of doubled bamboo mats well tarred, are to be hung over the openings to give shelter.

7. The question of the quality of work that should be used in buildings of this kind is an important one, when we remember how many Cutcheries, Cooily Sheds and Police huts are to be erected this year. Five or six Cutcheries and Cooily Sheds, and, I believe, nearly 100 Police huts.

The principal causes of expense in pukka built walls are the moulding and burning of bricks, and the carriage and burning of lime. Whatever description of wall is erected, the timber work in roofs, doors, and windows will cost pretty much the same. I have no faith in the use of clay as a cement for bricks burned or unburned. The work is never stronger than the strength of the clay, the full strength of which is even not obtained when it is used in that way; for in drying, it contracts, separates from the bricks, and thus the work is left hollow and unsound; and unless the walls are finished with a course or two of pukka work, and all the joints carefully pointed with lime mortar, and the whole kept in good repair, there can be no certainty that water shall not get in at the top or at the joints, and, by causing the clay to swell, displace the bricks and lead to the destruction of the work. These objections are strengthened with the use of sun-dried bricks, which I look upon as the most unskilful mode of using clay in buildings.

If these buildings are to be erected at a cheap rate, I believe the best result will be obtained by using clay *alone* in the manner known as *pise* work on the Continent, in some parts of which it is used universally for ordinary buildings. There is nothing novel in this mode of building, as it was practiced by the early Romans, and is described by Pliny. I have met with something very like it in some of the old Jungle Forts in this country.

It consists simply of earth carefully prepared and rammed into rough, strong timber cases nine or ten feet in length, three or four in height, with the sides placed so far apart, as the wall is intended to be in thickness. These cases are movable, and are shifted on until the whole wall is raised three or four feet in height, when they are elevated and another course put in all round.

There may, of course, be several such cases so as to admit of a large portion, or the whole of the wall, being raised up simultaneously. Openings for doors and windows may be left as the work proceeds, or the walls may be built solid, and when they are finished the openings can be cut out,

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the door and window frames, or the lintels, having been built in, as the walls were raised. The work is plastered in the usual way.

If carefully done *pise* is said to last for centuries. Rondelet, as quoted by Cresy, says that in the year 1764, and in the department of Ain, he repaired an old Chateau of *pise* work which had stood for upwards of 500 years; that the walls were equal in hardness to ordinary stone; and that when enlarging the doors and windows, the workmen were obliged to use the same tools they used in the quarries.

8. I have gone thus at large into this question, as I believe you are anxious to adopt some substantial but cheap description of work for these Salt buildings. I think we can do nothing better if pukka work be prohibited, than to adopt *pise*, which is much stronger than sun-dried bricks, and I believe much cheaper, though I cannot tell you its cost, as nothing of the kind has been done here. We might, however, erect one Catcherry, that at Vichur, in this way, and according to the result, decide regarding the other buildings. If the result be successful economically, of which I have no doubt, the experiment will be of greater value than as it affects the Madras Salt works only.

In sanctioning the experiment, it must be remembered that the timber cases required for one house could be used in the building of the whole to which their cost should be debited.

There would be some difficulty, at first, in getting this work done; but I have little doubt that, in a short time, I could train a few picked Wudders to do it well.

9. BRIDGES.—The Police, so far as I have seen, are tolerably well satisfied with the present foot-bridges; but others complain of them very much, and I must admit that they are shaky.

This arises, principally, from the very careless way in which those already erected have been built. I have, however, altered the design, and those now estimated for, will be found steady and substantial. I propose to construct them just high enough to pass Top Boats, and to so arrange the centre part that it can be lifted out of the way for the passage of a Badgerow. For the passage of Salt Boats there will be an opening fifteen feet in width, and of sufficient height.

10. WELL.—It is said that good water can be had at Vichur, but the exact spots are not known, and if several trials have to be made in the usual way the cost will be considerable. I need hardly point out to you how much the Coolies, Merasidars, Office people, &c., suffer from the want of water at nearly all the Salt Pans. In almost every instance they have to send for water to the east side of the Canal, although it is believed that at most of the pans good water exists, but no one knows exactly where; and as many trials might have to be made, no one will incur the expense. Under all these circumstances, I am disposed to recommend the purchase of a few of the smallest sized American Tube Wells, say three to begin with, and search with them for good water. I believe that the use of these Tube Wells would confer a great boon on all the parties connected with the Salt works, whether at the Pans or at the Madras Cotaurs. I believe the cost would not exceed 120 Rs. each, and I would willingly superintend the first trials so as to make their use understood. I have included 120 Rupees in the estimate for one Tube Well at Vichur.

11. As the estimates now forwarded for Vichur exceed that furnished last year, I have put the main Channel (No. 1) only in hands, with directions that the amount sanctioned, 4,965 Rupees, only shall be expended until a decision has been come to on the other works.

Mr. Smith considered it necessary that this part of the work should be proceeded with immediately so as to get water to enable the cultivators to prepare the pans, and as you had sanctioned the original estimate, I proceeded with that part of the work.

12. With regard to the cost of the proposed works at Vichur, I would draw your attention to the fact, that in three years time when the pans may be expected to have reached their full powers of production, they will yield to the Government a net revenue of nearly 3½ lacs of Rupees, on which amount the entire cost of the works would be only about four per cent. per annum. Affording facilities for manufacturing salt will, undoubtedly, increase the production, and thus directly increase the revenue.

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13. Upon the Map a bund is shewn at the place marked A. across an arm of the backwater. This is merely to indicate what might be done in the way of forming a Reservoir for the concentration of water, by putting in a bund with self-acting sluices, which would let the tide flow in, but prevent it from running out. Something of the same kind might be done by bunding across the mouth of the shallow channel on the west side. I have not estimated for these bunds, as I understand such works are undertaken by the manufacturers.

14. VALLUR.—Longitudinal Sections, Estimates, and Specifications are sent up for extending Channels Nos. 5 and 9 at Vallur. No. 5 is being proceeded with on your sanction; but No. 9, which, Mr. Smith says, is as emergent as No. 5, will not be commenced until your sanction is obtained.

15. VOYALUR.—A Longitudinal Section, Estimate, and Specification are forwarded for a new channel around the west and north sides of the Pans at Voyalur. You have sanctioned the expenditure of the amount of the original estimate 6,580 Rupees. The present estimate amounts to Rupees 9,105, and the difference has arisen thus:—

The original estimate was prepared from dimensions given by the Salt Department, because at the time we were called upon to prepare it, the ground was under water and could not be surveyed.

The length of the channel when levelled now, turns out about 400 yards longer than their measurements, and this, along with some alterations now required, in the direction of the line, has occasioned the difference of the estimates.

Under these circumstances, and as the Deputy Collector considered it essential to proceed with the work at once, I put the most necessary part of the work in hands, but with directions that the original estimate should not be exceeded until your sanction is obtained.

16. I would draw your attention to how very unsatisfactory it is to lay out an estimate for works of this kind over an extensive congeries of Salt Pans, without the aid of a Map of any kind to guide one as to how the Channel should be run so as to give the greatest amount of accommodation at the smallest cost.

In the case of Voyalur, when I was there some days ago, the Superintendent was absent, sick I believe, and the Deputy could give me no information; and eventually, I was obliged to go by that supplied by a Goomastah and one of the Peons. An accurate Map, such as that supplied now of Vichur, would enable me to check at once any error or want of judgment on the part of these officers, and it would, I am certain, be satisfactory to the Board of Revenue to see how the Channels and other works were laid out. I think I could get the whole of the northern Pans surveyed, and have two fair copies of the Plans prepared, one for your office and one for the Board of Revenue, for under 1,000 Rupees. I believe that such a survey would lead to a saving of a much larger amount in a short time.

ENCLOSURES Nos. 2 to 13.—Estimates.

ENCLOSURE No. 14.—Specification.

ENCLOSURE No. 15.—Plan.

THE cost of the works specified in the above report very considerably exceeds the estimate in each case, but the difference is accounted for and the works must be completed as early as possible, in order that the stock of Salt in the Madras District may be always equal to the demand. The cost of the works will, moreover, when the pans are in producing the full amount of Salt, be trifling in comparison with the return on the outlay.

2. The estimated cost for excavating the channels at Vichur, as entered in the Salt Budget, is Rupees 4,965; the revised estimate drawn up after careful

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survey amounts to Rupees 11,255. The completion of these channels should be proceeded with as rapidly as possible, less emergent works being postponed.

3. The Board recommend that the estimate for a Salt Cutcherry of brick laid in lime be sanctioned. The locality is not favorable for an experiment of *pise* work. Good clay would probably have to be brought from some distance, and buildings near Salt Pans are exceptionally exposed to the influences of the weather.

4. Protection of some sort must be provided for the coolies employed about the pans, and the Board are prepared to approve the construction of a common shed thatched with palmyra leaves, which will suffice for the present.

5. The Board approve Mr. Fraser's suggestion to purchase three Norton's Tube Wells for use at the Salt Pans, and request that he will superintend their introduction, and explain their use to the people. Application will be made to Government for sanction for the cost of these Tube Wells from the sum of Rupees 13,878, which is available for supplemental Salt Works, as stated in the Order of Government, 3rd October 1868, No. 2,547.

6. The five foot-bridges required at Vichur are now estimated to cost Rupees 150 each. Mr. Fraser will, as suggested by Mr. Thornhill, proceed with these where they are most needed, adopting the better and more expensive pattern specified in his letter.

7. The extension of the Boat Channels Nos. 9 and 5 at Vallur was estimated at Rupees 412* and Rupees 1,401,† respectively, and the conversion of a Water Channel into a Boat Channel at Rupees 1,087‡. The present estimated amount is shown in the margin. These channels are necessary, and must be proceeded with at once.

Present estimated cost.
* Rupees 640.
† „ 1,500.
‡ „ 2,140.

8. The amount entered in the Salt Budget for excavating a Boat Channel 2,707 yards long, at Voyalur, is Rupees 6,580, the present estimate is Rupees 9,105; the cause of the increase (Rupees 2,525) is satisfactorily accounted for, and the work must be pushed forward.

9. With the foregoing observations the Board resolve to submit the estimates noted in the margin for the sanction of Government. On receipt of sanction, the Acting Collector will arrange for the execution of the several works by postponing works of less importance, so as to confine the expenditure of the current year to the amount of Rupees 67,053 sanctioned by Government for the Madras District. Should, however, the Collector find that additional sums will be required within the present official year for the completion of the works, application should be made specifying the amounts and the works for which they are required, in view to the sanction of Government being obtained for funds from the surplus available under Petty

For excavating Salt Channel No. 1 at Vichur	Rs. 5,791
Do. „ 2 at do...	2,897
Do. „ 3 at do...	1,227
Do. „ 4 at do...	1,340
Construction of Salt Superintendent's Cutcherry at do. ...	1,672
Do. 5 Timber foot bridges ...	750
For excavating Salt Channel No. 5 at Vallur	1,500
Do. „ 9 at do...	640
Do. „ 9 at Voyalur	9,105
Total ...	24,922

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13th February 1869.*

Construction and Repairs. The Acting Collector has failed to countersign the estimates he has submitted to the Board.

10. The Collector is requested to submit a list of works shewing the re-allotment of the funds already sanctioned.

ORDER THEREON, 13th February 1869, No. 374.

No. 231.

Separate Revenue, No. 9.
Salt.

1. The several estimates for Salt works in the Madras District submitted with the Board's Proceedings above recorded, amounting to Rupees 24,922, are sanctioned.

2. Sanction is also granted for the purchase of three Norton's Tube Wells for use at the Salt Pans, at a cost not exceeding Rupees 360. These wells are to be in addition to the one provided for in the estimate for the Cutcherry at Vichur.

3. The Government concur with the Board of Revenue in considering localities near the sea unsuitable for an experiment of *pise* work. Mr. Fraser's remarks on the subject will, however, receive consideration in the Public Works Department.

(True Extract.)

(Signed) R. A. DALYELL,

Acting Secretary to Government.

To the Board of Revenue.
„ the Public Works Department
„ the Accountant General.

Exd. G. A. Turton.

Revenue Department

W. 374

Proceedings of the Madras Govt
under date the 13th July 1869

Read the following

Proc. of the Bd. of Revenue

Submitting etc.
= matter for certain salt
works, in Madras Dist., & etc.
= requesting authority for pur-
= chase of three of Norton's Tube
pells for use at salt pans.

(M.L. 11th Decr 1868,
No 8703/-)

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at Vichur.

3. The Govt concurs
with the Board of Revenue

W.D. R. 5000. he says the marks.
Is the sum of Rs 360
sufficient for the division
of the salt wells he
affirms without or
driving advantages
W.D.

Govt. of Madras

REVENUE.

THE BOARD OF REVENUE.

Dated February, 1869.

G. O. 13th February 1869, No. 374.

FEBRUARY.

Nos. 230-231.

Saltworks in Madras District.—Estimates
submitted by the Board of Revenue, sanctioned.
The purchase of three Tube Wells for use at the
Salt Pans, authorized.

in considering localities
near the sea unsuitable
for an experiment of
pile work - Mr. Fraser's
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Public Works Dept.

AM

14 Copies to the Hon. Secy of the Interior
21 - Mr. Deft
4 - Mr. Asst. Genl

60
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Spill

203

1

Don't know.

10

7. The extension of the Boat Channels Nos. 9 and 5 at Vallur, was estimated at Rupees 412* and Rupees 1,491,† respectively, and the conversion of a water Channel into a Boat Channel at Rupees 1,087‡. The present estimated amount is shown in the margin. These Channels are necessary and must be proceeded with at once.

Present estimated cost.
* Rupees 610.
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8. The amount entered in the Salt Budget for excavating a Boat Channel 2,707 yards long, at Voyalur, is Rupees 6,580, the present estimate is Rupees 9,105; the cause of the increase (Rupees 2,525) is satisfactorily accounted for, and the work must be pushed forward.

9. With the foregoing observations the Board resolve to submit the estimates noted in the margin for the sanction of Government. On receipt of sanction the Acting Collector will arrange for the execution of the several works by postponing works of less importance, so as to confine the expenditure of the current year to the amount of Rupees 67,053 sanctioned by Government for the Madras District. Should, however, the Collector find that additional sums will be required within the present official year for the completion of the works, application should be made specifying the amounts and the works for which they are required, in view to the sanction of Government being obtained for funds from the surplus available under Petty Construction and Repairs. The Acting Collector has failed to countersign the estimates he has submitted to the Board.

10. The Collector is requested to submit a list of works showing the re-allotment of the funds already sanctioned.

(True Copies and Extract.)

Sub-Secretary.

To the Acting Secretary to Government, Revenue Department,
with 9 Estimates, 2 Abstracts, 1 Specification, and 1 Plan.

Copy to the Acting Collector of Madras,
with Mr. Fraser's letter returned and one Estimate.

.. to W. Fraser, Esq., C. E., Executive Engineer.

Exd. T. Cartledge.

No. 8,703.

PROCEEDINGS OF THE BOARD OF REVENUE, dated 11th December 1868.

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Under these circumstances, and as the Deputy Collector considered it essential to proceed with the work at once, I put the most necessary part of the work in hands, but with directions that the original estimate should not be exceeded until your sanction is obtained.

16. I would draw your attention to how very unsatisfactory it is to lay out and estimate for works of this kind over an extensive congeries of Salt Pans, without the aid of a Map of any kind to guide one as to how the Channel should be run so as to give the greatest amount of accommodation at the smallest cost.

In the case of Voyalur, when I was there some days ago, the Superintendent was absent, sick I believe, and the Deputy could give me no information; and eventually, I was obliged to go by that supplied by a Goomastah and one of the Peons. An accurate Map, such as that supplied now of Vichur, would enable me to check at once any error or want of judgment on the part of these officers, and it would, I am certain, be satisfactory to the Board of Revenue to see how the Channels and other works were laid out. I think I could get the whole of the northern Pans surveyed, and have two fair copies of the Plans prepared, one for your office and one for the Board of Revenue, for under 1,000 Rupees. I believe that such a survey would lead to a saving of a much larger amount in a short time.

ENCLOSURES Nos. 2 to 13.—Estimates.

ENCLOSURE No. 14.—Specification.

ENCLOSURE No. 15.—Plan.

each case, but the difference is accounted for and the works must be completed as early as possible in order that the stock of Salt in the Madras District may be always equal to the demand. The cost of the works will, moreover, when the Pans are in producing the full amount of Salt, be trifling in comparison with the return on the outlay.

2. The estimated cost for excavating the Channels at Vichur, as entered in the Salt Budget, is Rupees 4,965; the revised estimate drawn up after careful survey amounts to Rupees 11,255. The completion of these Channels should be proceeded with as rapidly as possible, less emergent works being postponed.

3. The Board recommend that the estimate for a Salt Cutcherry of brick laid in lime be sanctioned. The locality is not favorable for an experiment of *pise* work. Good clay would probably have to be brought from some distance, and buildings near Salt Pans are exceptionally exposed to the influences of the weather.

4. Protection of some sort must be provided for the coolies employed about the Pans, and the Board are prepared to approve the construction of a common shed thatched with palmyra leaves, which will suffice for the present.

5. The Board approve Mr. Fraser's suggestion to purchase three Norton's Tube Wells for use at the Salt Pans, and request that he will superintend their introduction and explain their use.

VALLUR.—Figure No. XV.—Section of proposed extension of Channel No. 5.

Do. XVI.—Estimate and Specification for do.

10. XVII.—Longitudinal section of proposed extension of Channel No. 9.

Do. XVIII.—Estimate and Specification for do.

VOYALUR.—Figure No. XIX.—Longitudinal section of proposed new Channel (No. 9), on the west and north of the present Pans.

Do. XX.—Estimate and Specification for the same.

2. In a former letter, No. 131, dated 10th instant, I informed you that I considered it best to have a proper Map of the Vichur lands prepared before laying out the Channels, so that the greatest amount of accommodation should be afforded at the smallest cost. The Map I now furnish is from actual Survey. The dotted line thus, — — — — —, shows the land marked out with flags or the shallow branch Channel which runs nearly the whole

way across from one branch of the Cortilliar to the other. It is now proposed that this cross channel shall form the limit of the salt manufacture on the west side.

3. The area of the land within the dotted line is 95 Cawnies or 190 Pans, being 110 Pans short of the number (300) it was intended to contain.

The area of the land within the shaded red line (including the land within the dotted line) is 186 Cawnies or 372 Pans, being 72 Pans more than it was originally intended to open at this place.

The additional number of Pans will entail no additional trouble in guarding, because, even if only the 190 Pans within the dotted line were opened, the whole area within the main backwater on the east, the two branches of the Cortilliar on the north and south, and the cross Channel on the west, should be guarded. The cross Channel on the west is very shallow, and is now quite dry; but during the time of manufacture there will be water in it. If it were made into a Boat Channel, or even the centre part of it deepened for a few feet in width, and connected with the Cortilliar on the south, these lands would be altogether surrounded by water, and would thus be very easily guarded.

The cost of making it into a Boat Channel would be about 5,000 Rupees. It is not included in the estimate now forwarded, as it was not considered absolutely essential.

4. The Channels marked upon the plan are the result of careful consideration after a close examination of the ground, and consultation with the Superintendent. They are laid out so as to give ample facility for getting water for manufacturing purposes, and also that the salt shall not have to be carried much more than 300 yards to a boat, from any part of the works. During a part of the manufacturing season portions of the Cortilliar branches, north and south, can be used by Boats.

It was not my intention to carry Channel No. 2 into the main navigation, but to stop it where it first enters the backwater at the point marked B, so as to avoid the cost of keeping two entrances open, as all that part of the Canal is being silted up with alluvion brought down by the Cortilliar; but the Deputy Collector Mr. Smith considered it so advantageous to have a second entrance, that I have included the cost of the whole line in the estimate. It will, no doubt, facilitate the passage of Boats, and be useful as regards the supply of water.

I have estimated these Channels at six yards in width at the bottom, instead of five yards which is the usual width given to Salt Channels, but which is much too narrow, and is partly the cause

Salt Works—in Madras District.—Estimates of certain, amounting to Rupees 24,922, submitted for sanction of Government and their authority requested for purchase of three of Norton's Tube Wells for use at Salt pans.

DECEMBER
No. 8,703

PROCEEDINGS, 11th DECEMBER 1868, No. 8,703.

BOARD OF REVENUE, MADRAS.
1868.

Revenue Officer
No. 3933

Dec 15-88
Barnard, 1/10

Kelly
Dec 13

Dec 31. 1868

This latter description of work, if kept carefully repaired, would do very well; but any want of attention would soon lead to its destruction. The cost would be still more reduced if sun-dried brick and clay were used, but the building would be still less substantial and should be renewed in a few years, as no good clay free from salt can be had in the locality. The pukka work, with ordinary care, would last practically for ever.

6. COOLY SHED.—A Cooly shed seems to be absolutely necessary that the coolies and others having business at the works may have some place in which to get shelter without crowding, as they do elsewhere, into and about the Cutcherry, to the serious prevention of business. By adopting the plan of a series of small arches and two central pillars, thus avoiding altogether the use of timber except in the roof, the required amount of accommodation is obtained at a small cost.

The estimated cost of this building, in pukka work, is 630 Rupees, which would be reduced to 350 Rupees by adopting burned bricks in clay, and which would be further reduced by the use of sun-dried bricks. It is for you to say what description of work shall be adopted.

7. The question of the quality of work that should be used in buildings of this kind is an important one, when we remember how many Cutcheries, Cooly-sheds and Police huts are to be erected this year. Five or six Cutcheries and Cooly sheds, and, I believe, nearly 100 Police huts.

The principal causes of expense in pukka built walls are the moulding and burning of bricks and the carriage and burning of lime. Whatever description of wall is erected, the timber work in roofs, doors, and windows will cost pretty much the same. I have no faith in the use of clay as a cement for bricks burned or unburned. The work is never stronger than the strength of the clay, the full strength of which is even not obtained when it is used in that way; for in drying, it contracts, separates from the bricks, and thus the work is left hollow and unsound; and unless the walls are finished with a course or two of pukka work, and all the joints carefully pointed with lime mortar, and the whole kept in good repair, there can be no certainty that water shall not get in at the top or at the joints, and, by causing the clay to swell, displace the bricks and lead to the destruction of the work. These objections are strengthened with the use of sun-dried bricks, which I look upon as the most unskilful mode of using clay in buildings.

If these buildings are to be erected at a cheap rate, I believe the best result will be obtained by using clay *alone* in the manner known as *pise* work on the Continent, in some parts of which it is used universally for ordinary buildings. There is nothing novel in this mode of building, as I have met with something very like it in some of the old Jungle Forts in this country.

It consists simply of earth carefully prepared and rammed into rough strong timber cases nine or ten feet in length, three or four in height, with the sides placed so far apart, as the wall is intended to be in thickness. These cases are movable, and are shifted on until the whole wall is raised three or four feet in height, when they are elevated and another course put in all round.

There may, of course, be several such cases so as to admit of a large portion, or the whole of the wall, being raised up simultaneously. Openings for doors and windows may be left as the work proceeds, or the walls may be built solid, and when they are finished the openings can be cut out, the door and window frames, or the lintels, having been built in as the walls were raised. The work is plastered in the usual way.

~~from the quarries and to last for centuries. Rondelet, as quoted by Cresy, says that~~
in the quarries.

8. I have gone thus at large into this question, as I believe you are anxious to adopt some substantial but cheap description of work for these Salt buildings. I think we can do nothing better if pukka work be prohibited, than to adopt *pise*, which is much stronger than sun-dried bricks, and I believe much cheaper, though I cannot tell you its cost, as nothing of the kind has been done here. We might, however, erect one Cutcherry, that at Vichur, in this way, and according to the result decide regarding the other buildings. If the result be successful economically, of which

I have no doubt, the experiment will be of greater value than as it affects the Madras Salt works only. In sanctioning the experiment, it must be remembered that the timber cases required for one house could be used in the building of the whole to which their cost should be debited.

There would be some difficulty, at first, in getting this work done; but I have little doubt that, in a short time, I could train a few picked Wudders to do it well.

9. BRIDGES.—The Police, so far as I have seen, are tolerably well satisfied with the present foot-bridges; but others complain of them very much, and I must admit that they are shaky. This arises, principally, from the very careless way in which those already erected have been built. I have, however, altered the design, and those now estimated for will be found steady and substantial. I propose to construct them just high enough to pass Top Boats, and to so arrange the centre part that it can be lifted out of the way for the passage of a Budgerow. For the passage of Salt Boats there will be an opening fifteen feet in width, and of sufficient height.

10. WELL.—It is said that good water can be had at Vichur, but the exact spots are not known, and if several trials have to be made in the usual way the cost will be considerable. I need hardly point out to you how much the Coolies, Merasidars, office people, etc., suffer from the want of water at nearly all the Salt Pans. In almost every instance they have to send for water to the east side of the Canal; although it is believed that at most of the Pans good water exists, but no one knows exactly where; and as many trials might have to be made, no one will incur the expense. Under all these circumstances, I am disposed to recommend the purchase of a few of the smallest sized American Tube wells, say three to begin with, and search with them for good water. I believe that the use of these Tube wells would confer a great boon on all the parties connected with the Salt works, whether at the Pans or at the Madras Cotaurs. I believe the cost would not exceed 120 Rupees each, and I would willingly superintend the first trials so as to make their use understood. I have included 120 Rupees in the estimate for one Tube well at Vichur.

11. As the estimates now forwarded for Vichur exceed that furnished last year, I have put the main Channel (No. 1) only in hands with directions that the amount sanctioned, 4,965 Rupees, only shall be expended until a decision has been come to on the other works. Mr. Smith considered it necessary that this part of the work should be proceeded with immediately so as to get water to enable the cultivators to prepare the Pans, and as you had sanctioned the original estimate, I proceeded with that part of the work.

12. With regard to the cost of the proposed works at Vichur, I would draw your attention to the fact that in three years time when the Pans may be expected to have reached their full powers of production, they will yield to the Government a net revenue of nearly $3\frac{1}{2}$ lacs of Rupees, on which amount the entire cost of the works would be only about four per cent. per annum. Affording facilities for manufacturing salt will, undoubtedly, increase the production, and thus directly increase the revenue.

13. Upon the Map a bund is shown at the place marked A. across an arm of the backwater. This is merely to indicate what might be done in the way of forming a Reservoir for the concentration of water, by putting in a bund with self-acting sluices, which would let the tide flow in, but prevent it from running out. Something of the same kind might be done by bunding across the mouth of the shallow channel on the west side. I have not estimated for these bunds, as I understand such works are undertaken by the manufacturers.

14. VALLUR.—Longitudinal Sections, Estimates, and Specifications are sent up for extending Channels No. 5 and 9 at Vallur. No. 5 is being proceeded with on your sanction; but No. 9, which, Mr. Smith says, is as emergent as No. 5, has not yet been sanctioned.

15. VOYALUR.—A Longitudinal Section, Estimate, and Specification are forwarded for a new Channel around the west and north sides of the Pans at Voyalur. You have sanctioned the expenditure of the amount of the original estimate 6,580 Rupees. The present estimate amounts to Rupees 9,105, and the difference has arisen thus:—

The original estimate was prepared from dimensions given by the Salt Department, because at the time we were called upon to prepare it the ground was under water and could not be surveyed.

market but to what extent I am unable to determine exactly. It is used in small quantities by the Natives as an astringent.

N^o 3 Nutteparl. This Resin is principally used by the wealthy Natives in fumigating their houses &c. and

~~in small quantities in their Pagodas - it~~
small trade in this article is carried on with persons residing in the British Territory. It is valued at about Rupees Three per Shoolam of 20 Pounds.

N^o 4 Gamboge gum - a considerable quantity of this gum is obtainable ~~but has never been gathered as an article of export.~~

N^o 5 Shelly Black Dammer is procured in considerable quantities by the Forest Produce Contractor the quantity contracted for during the past year being Twenty Three Shoolams valued at Rupees Five and annas Ten (Rupees 5 annas 10) per Shoolam of Twenty (20) pounds. The market rate is about Rupees 7 per Shoolam.

N^o 6 Payen Indian Copal or

White

White Dammer is procurable in small quantities on the Nelliampathy Hills but to what extent or price I have been unable to determine.

Dewan

/ True copy /

Ment
President.

Comp.

Jm D L

Forest Department & Office
 Pichey.
 30th November 1868.

I have the honor to inform you that after making the strictest inquiries, I find that the undermentioned, are some of the principal gums and Resins to be found in the Cochin Forests.

- No. 1. *Persea Britia fruticosa* (Poy)
 " 2. " *Vengierah Pterocarpus Marsupium* (Poy)
 " 3. " *Mutterpal Ailanthus Malabaricus* (DC)
 " 4. " *Kodumfully Garcinia Pictoria* (Poy)
 " 5. " *Shelly Canarium strictum*
 " 6. " *Peyr Vateria Indica*

It is exceedingly difficult to ascertain the probable quantities of each description that is annually gathered and also the market value as there is no regular trade in the above mentioned gums.

No. 1 and 2 yield Kino and are gathered in small quantities for the Cochin Market.

1869.
 Enclosed in a letter from the Resident at Tanjore & Cochin to the Chief Secretary to Government dated 20th Jan'y 1869

Nov: 22/69

Report on the gums & the gums on the Cochin Forests.

Nov: 13th 1869 & 1872.

N^o 5

Resident's Office,

Murkully 20th January 1869.

From

H. C. Newill Esquire

Resident in Spawancore Kochin

To

The Honorable R. S. Ellis Esq.

Chief Secretary to Government

Fort Saint George.

Sir,

Referring to the Proceedings of
the Madras Government, No 2115 of the
7th August 1868, communicated to the
Resident by the Revenue Board, I have
the honor to forward herewith, 2 Reports
on the game to be found on the Spawancore
and Kochin Forests prepared by the
Forest Officers and forwarded to me
by the Revenue Board.

I have the honor to be,
Sir,

Your Most Obedient Servant

M. C. Newill

Resident.

H. C. Newill

P. 222

Conservator's Office,
Quilon 21st November 1868

Sir

I have the honor to acknowledge the receipt of your letter N^o 1756 of the 19th Instant, giving cover to copy of a letter from the British Resident to your address with copies of Proceedings from the Board of Revenue on the subject of gums.

2. I regret that I am unable at this moment to give you the information requested as the collection of Gums from our Forests is very limited either because its use or value being unknown to our local merchants.

3. Gum Kino was last year for the first time collected from our forests by a few timber merchants and taken to Cochin. I have heard that it fetched a very good price in the market.

4. Dammer is collected by the Forest Department and sent to the commercial stores.

1869.

Enclosed is a letter from the British Resident in Cochin to the Chief Secretary to Government dated 15th January 1869.

Nov. 22nd 1869

Conservator's Office

Report on the
Gums to be found on
the Coaruncor Forests.

No. 15th July 1869 L. H. 232

Stores at Allopy. White Dammer is rather
scarce but black plentiful. White Dammer is
used medicinally and also as an incense, black
mixed with oil and Chunam is largely used
for calking ships.

/True Copy/

/Signed/ S. Madava Rao
Dewan.

/True Copy/

Murik

~~at the same place~~

Comp.

S. D. K.

Rev: 1869 Dept.
From W. 228.
The Resident in
Travancore & Cochin.

To The Chief Secretary
to Government
Fort St. George.

Dated 20th } January 1869.
Recd: 27th }

N^o 5
S. A. 11375-13 Feb. 1869.
Enclosures Two.

On the gum to
be found on the tra-
vancore & Cochin
Forests.

only.
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