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MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

Revenue

DEPARTMENT

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*Proceedings of the Madras Government, Revenue Department,
9th October 1875.*

No. 61. Read the following Proceedings of the Board of Revenue, dated 13th July 1875, No. 1,938:—

Read Dr. Ratton's Report on Sites for Salt Manufacture in South Canara and Malabar, dated 7th June 1875, No. 38.

Read also the following letter from J. J. L. RATTON, Esq., M.D., Special Salt Duty, to C. A. GALTON, Esq., Acting Sub-Secretary to the Board of Revenue, dated Ennore, 30th June 1875, No. 42:—

I HAVE the honor to inform you that since sending in my report on the fitness of the West Coast Districts for salt manufacture, I have received registers from Mr. Ball, Deputy-Collector, South Canara, showing the brine supply in the neighbourhood of the new Canara sites to have averaged 2.4° Beaumé during the past season up to the 5th of June.

He also sends a memorandum of experiments made at different parts of the Coast in the month of May to test the rate of evaporation. His experiments show that an inch of brine was evaporated to dryness in 3.3 days. These observations strengthen the conclusions arrived at in my report on Canara and Malabar.

THE Board resolve to refer Dr. Ratton's report to the Collectors of Malabar and South Canara for such remarks as they may have to offer on the general question, and for report on the following points:—

1st.—The suitability or otherwise of the sites selected by Dr. Ratton for remunerative salt manufacture on behalf of Government.

2nd.—Whether the sites, besides affording facilities for actual salt manufacture, are convenient for purposes of distribution, superintendence, and guarding.

3rd.—Whether the land in each case is the property of Government or of private persons, and in the latter event whether it is probable that it can be acquired on fair terms.

4th.—Whether substantial men in the vicinity are likely to be found willing to contract to manufacture on an improved system and on a large scale.

Sketches of the sites approved of by the Collectors should accompany their replies.

2. A copy of the report will also be submitted to Government, and the Board will address them further on receipt of the information now called for.

(A true Copy and Extract.)

(Signed) C. A. GALTON,
Acting Sub-Secretary.

No. 62. ORDER THEREON, 9th October 1875, No. 1,477.

Separate Revenue, No. 11.

Salt.

RECORDED.

(True Extract.)

(Signed) L. A. CAMPBELL,
Under-Secretary to Government.

To the Board of Revenue.

Exd. W. J. Lewis.

ENNORE, 7th June 1875.

No. 38.

From

Surgeon J. J. L. RATTON, M.D.,
On Special Salt Duty,

To

C. A. GALTON, Esq.,
Acting Sub-Secretary to the Board of Revenue.

Sir,

I HAVE the honor to inform you that on the 8th of March last, a week after my return to Madras from privilege leave, I started for the West Coast to carry out the Board's instructions contained in their Proceedings of 20th November 1874, No. 3,343. I first proceeded to South Canara, and having obtained all the necessary information from Mr. McC. Webster, the Collector, I went to Kundapur in the north of the district, and from thence worked south.

2. On the 18th of March I examined at Vaderhobli, a station of the Kundapur Division, the first series of sites described as below by the Deputy Collector:—

Memorandum of Sites, &c., for Salt Manufacture in South Canara District, examined by Surgeon J. J. L. Ratton, M.D.

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depot, Description, &c.	Estimated Superficial Area.	Remarks.
	Taluq.	Magani.	Village.			
1875. March 18th, Thursday.	Kundapur.	Vaderhobli.	Vaderhobli.	Swamp belonging to Vaderhobli Subroya Karanta, north-west of Devaragru Kotars.	ACRES. 9	These sites are situated amongst Subroya Karanta's pans. He is willing to convert them into salt pans.
Do.	Do.	Do.	Do.	Swamp belonging to Vaderhobli Subroya Karanta, near the above.	4	
Do.	Do.	Do.	Do.	Swamp belonging to Vaderhobli Subroya Karanta, east of the above two sites.	4½	
Do.	Do.	Do. and Haludy Balkur.	Do. Balkur, &c.	Swamp extending to the east and north of the existing pans and north of the Arebet and south-west of the Angali Kotars.	83	Belongs to several landholders.
Do.	Do.	Do.	Do.	Sixteen waste pans.	13	The property of several parties; some of them have not been worked for years owing to dissensions between the owners.

REVENUE.

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THE BOARD OF REVENUE.

Dated October, 1875.

A. C. GALTON, Esq., M.A.

OCTOBER.

Nos. 61-62.

Manufacture of Salt in South Canara and Malabar Districts.—Recording Proceedings of the Board of Revenue relating to Dr. Ratton's report on sites for —

3. The old or waste salt-pans above mentioned are, in all respects, similar to those that are being worked at present. They have been abandoned one by one, from time to time, simply owing to irreconcilable differences of opinion amongst their numerous proprietors. They have many faults, which were pointed out in my South Canara Report for 1873, but they can be materially improved now before being reopened for salt-culture. It appears, from statements that have been furnished to me by the Deputy Collector, that they produced salt in former times at the rate of 109 Indian maunds per acre a-month. By rearrangement of plan and careful claying, they may be made to yield more in future.

4. The other sites are Mangrove swamps which border on, and here and there indent, the high ground which surrounds the present pans. They are under water even at low tide, and are covered by at least four feet of running water during the monsoon. They would have to be embanked around in a very solid way to convert them into permanent salt-manufactories, and the expense of pumping them dry and clearing out the Mangrove jungle previous to pan-formation would be unpleasantly great. They would not even then make good salt-pans, but still they would not be much, if at all, inferior to the existing pans, and as the ground-area available for salt-manufacture in the district is barely sufficient for the purpose without these swamps, they must, I suppose, be converted into salt-pans. After all, it is more a question of expense than anything else. I omit the 83-acre swamp from my calculation as, for the present at all events, it is not required. There need be no hesitation, however, in sanctioning the use of the 9-acre swamp belonging to Subroya Karanta for salt-manufacture, as it runs in a loop into the neighbouring high ground, and would have to be embanked only on the side which is now open to the estuary. Besides, the owner, who is also an experienced salt ryot and a capitalist, volunteers to construct the embankment and pans at his own cost, and work them at his own risk.

5. On the 19th of March I examined, at the Angali Station of the Kundapur Division, the sites described in the following specification:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.	Remarks.
	Taluq.	Magani.	Village.			
March 19th, Friday.	Kundapur.	Baseur.	Angali.	Swamp of Mahalinga Shetti, west of Angali Depôt ...	ACRES.	
Do.	Do.	Do.	Do.	Swamp of Manjaiya Shetti, near the above ...	1	Situ-ated amongst the exist-ing pans.
Do.	Do.	Do.	Do.	Swamp of Bilghi Krishta Row, south of old Horisnagara Kotar.	3½	
Do.	Do.	Do.	Do.	Thirteen waste pans...	3 5	
						Waste owing to dissensions between the holders.

6. These swamps differ very much from those at Vaderhobli; they are in small patches scattered through the pans at work, which they resemble in all essential features. They would not require much embankment, trouble, or expense to convert them into salt-beds, nor would they be liable to be broken up in times of flood. I think that they, as well as the old waste pans, might be taken up for the extension of salt-culture at Angali. The waste pans here also have been disused for years owing to dissensions amongst the manufacturers; and there is no hindrance to their being reworked for salt-culture, the difficulty of getting their proprietors to work together in harmony.

7. The following sites were examined at Harnad on the 20th of March:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.	Remarks.
	Taluq.	Magani.	Village.			
March 20th, Saturday.	Kundapur.	Harnad.	Tallur.	Fourteen waste pans ...	6	Waste owing to dissensions between the holders.
Do.	Do.	Hemmady.	Hemmady.	Rice lands and waste amongst salt pans north of Hemmady Kotar... Eight waste pans ...	27 3½	Do. Do.

8. All the waste pans at Harnad are available for salt-culture, and may be brought into use at once if their antagonistic holders can be got to work them. The 27-acre tract is a piece of comparatively high ground bordering on the estuary, and occupied partly by salt-pans in work and waste and partly by saline land, on which some attempts at rice cultivation have been made and have failed owing to the flooding of the tract at spring-tide. This is the best site that I have seen near Kundapur. The surface soil is loamy, its level is a few inches above that of high tide, and the brine in the estuary marks 3° Beaumé. It will have to be embanked, so as to exclude spring-tide inundation; but by means of properly-placed sluice gates, these tides should be made use of to fill prepared reservoirs and so save labor. At other seasons brine will have to be elevated to this tract by means of piccottahs as on the East Coast. Piccottahs for pan-irrigation have not been hitherto used here, as all the sites at work are below high-tide level, and are consequently self-irrigating.

9. None of the Kundapur sites, with the exception of the last perhaps, are what would be called good on the East Coast. They are not such as I would choose if there were any choice in the matter. More salt is urgently required, and unfortunately they are the best sites available on which to make it. They can, however, without doubt, all of them, be worked just as effectively as the present pans, and they are, therefore, calculated to yield about 25 maunds of salt per 10,000 square feet in thirty days, as that is found to be the yield of the present pans.

10. The site briefly described in the subjoined statement was examined on the 24th of March:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.	Remarks.
	Taluq.	Magani.	Village.			
March 24th.	Udipi ...	Kota and Hanehalli.	Hosala, Mudadu, Pandeshwara, &c.	Waste about three miles to the north of the Mabukel Kotars.	160 Acres.	Used as grazing land.

11. This is an extensive level grass-grown swamp situated on the north bank of the river about three miles from the bar. The distance from the bar here is such as, at the onset, to raise a doubt as to the permanency of the brine-supply. I have asked Mr. Ball to keep a register of the density of the brine during the months of April and May. With the register before me, I would

le to report on the capabilities of the site than I can do now; but from the fact that as 2° Beaumé at the time of my visit both in the river and in a tributary tidal stream through the land, and that the natives say that the water is of the same strength during the wetting season, I think it may be assumed that the brine-supply is good enough. In all respects the land is excellently adapted for salt-manufacture. The surface soil consists of a brown, ochreous clay varying in thickness from one foot towards the west to two feet in the east. It is at a most convenient level, being, for the most part, but two or three feet above the high-water mark; indeed, here and there it is flooded for a space at high tide, and it stands well out of the water, so that it can be both irrigated and drained with ease. The land is to be most extensively and substantially embanked, however, as it is flooded at spring-tide, and the water running through the tract, will have either to be embanked on both sides or provided with a channel where it enters the site and its course diverted to the river without the embankment. A channel can be made for it when taking up ground to form the embankments, and this would be preferable as the stream itself winds conveniently through the soil, and in a capital condensing reservoir, carrying brine to the different pans. The site is level, open, uninterrupted by huts or gardens, free from the inroads of crabs and other insects, and easily put into working order, and easily guarded by the Police. It is Government land, and labor is plentiful. It might be put into order in December and January next if funds were available, and salt-manufacture might commence in March at latest. The site is apparently good in all respects even economically; for, from its great area and compactness, the establishment will be debited to a much larger quantity of salt than at most of the other stations.

The following site near the Moulki Sea Customs Office was examined on the 27th of

	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.
	Taluq.	Magani.	Village.		
27th, Monday.	Mangalore.	Bappanad.	Chitrap.	Swamps belonging to Manoel Shanbhag and Lorenzo Shanbhag, about a mile to south of Moulki Kotars.	40 Acres.

This land is divided into two portions, east and west, by a stream and a row of cocoanut trees. The east, about 25 acres in extent, is very well adapted for salt-manufacture; the west, measuring perhaps 15 acres, is not so good, as it is very sandy towards the west, and if clayed, the western portion would, in all respects, equal the other; and as clay is plentiful, the owners are willing to put it down where required, I need not further dwell on this distinction. This site is about half a mile from the bar, about a foot above high-tide level, plentifully supplied with brine at 3° Beaumé and is covered with a stratum of clay varying in thickness from one foot on the south and west to four feet on the north and east. It is level and open, free from cocoanut-trees, or other impediments, and traversed by one or two tidal streams. There are crab-burrows scattered through it, but they are chiefly of the large variety, and are not so numerous as to prevent salt-manufacture. On the whole, as regards natural facilities, this would be a good place at which to manufacture salt. The chief objection to it is that it is almost too small to be opened economically. The interest on the expenditure on public works, and the cost of an establishment charged to the outturn of salt about 32,000 maunds in the year, would make the salt somewhat expensive here. There are, however, some equally small sites on the coast.

14. On the 29th March I examined the site described below:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.
	Taluq.	Magani.	Village.		
March 29th, Monday.	Mangalore.	Panumbur.	Kudamalur.	Government waste, about seven miles from Mangalore Kotar, north-east.	150 Acres.

15. It is a great grass-grown waste or swamp, situated about four miles up from the bar on the north bank of the tidal river which flows past the north side of Mangalore. As in the case of all inland sites located on the banks of tidal rivers, the condition of the brine-supply as to strength and permanency cannot be ascertained with any degree of certainty by one or two observations made with the hydrometer on the same or on a few consecutive days. At the time of my visit the water in the river and in the streams which wind through the site marked 2.5° Beaumé at high, and 2° Beaumé at low, tide. This is, all things considered, a satisfactory strength. It would, if permanent during the season, admit of salt being made here cheaply and abundantly. But its permanency is a question which can only be determined by a series of at least bi-weekly experiments lasting throughout one whole season. Mr. Ball has arranged to ascertain the strength of the river-brine abreast of the site for the remainder of this season. It may prove to have been a little weaker than usual at the time of my visit as storms were visible on the ghats, and the density of the river-brine is rapidly affected by showers on the hills. It may on the other hand prove to have been exceptionally strong. This latter I think unlikely, as the natives say that the water is always salt here in the hot weather. If that be so, this is a capital site for salt-manufacture. It is quite a level, open, continuous plain of great dimension unobstructed by any natural or artificial barrier except at one point near the centre where there is some high ground planted with cocoanut trees, which will do very well as a site for a police observatory, guard-house, and other offices. The soil at the surface is good, firm, tenacious clay, averaging 2½ feet in thickness; the subsoil is grey silt yielding abundant brine 2.5° Beaumé in density. There is an almost total absence of crab-burrows. The levels too are good. The surface of the ground is just about a foot above high-water mark, and it is flooded at spring-tides, so that with proper provision it may be made self-irrigating at spring-tide. It is, of course, inundated to a depth of three or four feet during the monsoon, and it will have to be embanked securely as far as the flood extends. This site is so very extensive, and promises so well, that it is worth a considerable expenditure of care and capital to put it into proper working order.

16. On the 7th of April I examined the site described in the following statement:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.
	Taluq.	Magani.	Village.		
April 7th, Wednesday.	Kasargod.	Alyatnad.	Chittari.	Waste forming portion of estate registered in the name of Hammade; about eleven miles south of Kasargod Depôt, and nine north of Nileshwar Depôt.	24 Acres.

17. It is comparatively a small strip of reedy swamp on the north bank and about two miles up a tidal river, lying between the river's edge and cultivated high ground. The ground slopes somewhat downwards from east to west. The west end is a Mangrove swamp covered by two or three inches of water at high tide. The east end is about eighteen inches above high-water mark, and paddy is grown on it; between the two there is the reedy swamp mentioned, and an old abandoned hut with its accompanying clump of coconut trees. The surface soil over the greater part of the site consists of fair clay to a depth of eighteen inches; beneath the clay there is a loose laterite gravel yielding brine of the river density at the time being. The high ground at the west side is covered with sand, which would have to be removed or clayed over to fit it for salt-manufacture. There are a good many crab-burrows here chiefly near the river, and of the one-armed variety of crab, which is very destructive to salt-works. The brine-supply, as far as I can judge its character from a single observation, is good for this coast; it marked 2.5° Beaumé on the day of my visit. The greater portion of this site, being submerged at high tide, would be self-irrigating.

18. This is the only site adapted to salt-manufacture that I met with in the south of the district, and if it is considered necessary to open a salt station south of Mangalore, pans can be formed here with the prospect of a fair measure of success. I believe the site is capable of yielding salt at the rate of 170 maunds a working month per acre of evaporating surface. But, nevertheless, I would not recommend the site on its own merits. It is not by any means a first-class one, and it is small, too small, to bear economically the outlay on departmental works and establishment. It is, besides, a long way off from head-quarters and from the rest-houses, and I have seen on the East Coast similar insignificant salt stations in distant and isolated positions, wearing, to say the least of it, a less flourishing aspect than those nearer home. No other sites were found in South Canara.

19. Exclusive of the 83-acre swamp at Vaderhobli, I have now reported on $453\frac{1}{2}$ acres of land in South Canara as fit for salt-manufacture. The question next arises, will this area suffice to produce all the salt that is wanted in the district? The quantity of salt of all denominations, inland, home, and export, sold in the district during the past ten years averaged an annual total of 313,600 Indian maunds. To this should be added three per cent. for wastage, which brings the annual requirement up to 323,008 Indian maunds. Of this total, the existing Kundapur salt-pans have hitherto furnished, on the same average, 44,873 Indian maunds per annum, which, being deducted, leaves 278,135 Indian maunds to be provided for by the new sites. Can they provide it?

20. To decide the above very important question, we must first consider what amount of salt we may reasonably expect to get per acre. The amount will differ with the natural facilities for salt-culture at each site. From a statement furnished by Mr. Ball, showing the annual outturn for a period of ten years of one ullum, and that a fair one, at each station of the Kundapur Division, it appears that the rate of produce at Kundapur is 393.9 Indian maunds per acre per season, or, as three months constitute a season, 131.3 Indian maunds per acre per mensem, a poor yield. This may be taken as a measure of the probable yield of the new sites in the Kundapur Division, and it will not, I think, be found to be an exaggeration. The total area of new ground, exclusive of the 83-acre swamp at Kundapur, is $79\frac{1}{2}$ acres. The increase of salt-produce to be looked for annually from the Kundapur Division is, therefore, $79.5 \times 393.9 = 31,315$ Indian maunds. It ought to be more than this, as the large 27-acre plot at Harnad is superior to the existing pans.

21. Considering the lands separately on their own merits, we come next to the large 160-acre tract in the Udipi Taluq. This tract resembles Nowpadah in the Ganjam District with its clay soil and brine supply averaging 2° Beaumé. I see no good reason for assuming that it will be eventually less productive than Nowpadah. There may be a difference in the rate of evaporation on the two coasts; but, from inquiries and experiments I made, I do not think there is. The Nowpadah salt-works produce salt at the rate of 234 Indian maunds an acre a-month. In a

season of four months they would produce something less than four times 234, as that is the average of a longer season, say 800 Indian maunds. I think, then, to keep well within the mark we may fairly claim a probable produce of 700 Indian maunds per acre in each season of four months at Udipi, or 112,000 Indian maunds for the whole area, which is 16,000 Indian maunds less than Nowpadah would yield in the same time for the same area.

22. The Moulki 40-acre plot comes next. When the parts are clayed which require claying, it will be a very good site, possessing a constant supply of brine at 3° Beaumé. With brine one-third stronger than at Nowpadah, it will probably, when seasoned by time, turn out as much salt per acre, or 800 Indian maunds, in the season of four months, giving a total of 32,000 Indian maunds. I purposely a season of four months' duration in framing these estimates, as there is no good reason why salt-manufacture should not begin in January on the West Coast. The next place is the 150-acre plot north of Mangalore. The clay here is just as good as at Udipi, the brine supply seems to be better; yet, as I am anxious to avoid exaggeration, bearing in mind the importance of these estimates, I will calculate its yield as being the same per acre as that of Udipi, which furnishes a total of 105,000 Indian maunds a season. The last site is the 24-acre plot, which will probably produce as much salt per acre as the foregoing, considering that its brine-supply is stronger, I will, therefore, estimate its produce as 16,800 Indian maunds in the season. The united areas of the sites examined are, therefore, capable of yielding 280,315 Indian maunds.

23. From the above calculations it would appear that we have land enough to supply the 278,135 Indian maunds of salt required, and something over. Now this is essentially a practical estimate. Theoretically I have shown—see Board's Proceedings, 11th November 1874, No. 3,247,—that the $453\frac{1}{2}$ acres above should yield 606,306 Indian maunds in the crystallizing season of three months' duration, and this would be the case under ordinary meteorological conditions, evaporating sea-water in a water-tight compartment. The practical estimate, small as it is comparatively, may not, however, be realized for the first year or two.

MALABAR.

24. On the 10th of April the site described below was examined:—

Date of Examination.	SITUATION.			With reference to neighbouring Salt Depôt, Description, &c.	Estimated Superficial Area.
	Taluq.	Amshom.	Deshom.		
10th April.	Cherrakel.	Cherukun-noth.	Cherukun-noth.	To the east of Payangady Ferry.	264 Acres.

25. This large tract is situated on the east side of the Payangady River right opposite the village and police station of Payangady. It is very well adapted to salt-manufacture. Pits sunk in different directions showed a surface stratum, three or four feet in thickness, of unctuous plastic clay most suitable for salt-pans. The Baliapatam road runs from the river in a south-westerly direction almost through the centre of the tract. On either side of the road the land stretches away as an open plain unencumbered except by two or three small cocoanut topes, which can be easily removed. The ground is at a low and convenient level; the river overflows a considerable area of it at high tide. The river-brine marked at the time of my visit 3° Beaumé, and I have reason to believe that that is its normal density. Crab-burrows are almost absent. Labor is abundant, and the people are willing to convert the site into salt-works. I would recommend the whole of this valuable site to be taken up for salt-manufacture.

26. On the 15th of April I examined the sites, a detailed description of which is appended:—

Date of Examination.	SITUATION.				Estimated Superficial Area.
	Taluq.	Amshom.	Deshom.	With reference to neighbouring Salt Depot, Description, &c.	
15th April.	Kotteyam.	Nuttur.	Nuttur.	Pallikunnutoyam Kaipad.	104
Do.	Do.	Dharmapatam and Pinarayi Amshoms.	Palayad.	Andalur and Palayad Pans.	104
Do.	Do.	Do.	Do.	Pinarayi Pan.	33

27. They occupy at intervals the low swampy clay foreshore on the border of a tidal about half a mile north of Tellicherry. These sites were formerly used as salt-pans, and were as well as I can judge by existing appearances, in much the same way as at Kundapur. They are below low-tide level and many of them are always under water, but others are protected from the river by an embankment and cultivated for rice. All are capable of being converted into irrigating salt-pans by means of embankments, and as they are from one to two miles up the river and the soil is good stiff clay, I do not anticipate any evil results from the lowness of the land. The brine in the river at the time of my visit was of the same density as sea-water, and the natives say that it is always very salt. Crab-burrows were rather common, but not so plentiful as to preclude the establishment of good salt-manufactories here. On the whole I think these sites are well adapted to salt manufacture, and I would recommend their being taken up for the purpose, but, as they lie in long belts between the river and the border villages, it would be well, to prevent theft, to have the salt removed as soon as possible to a central storage platform near the Tellicherry end of the river, as is done at the outlying salt-stations of Cuddalore.

28. The next site was examined on the 21st April. The Deputy Collector designates it as follows:—

Date of Examination.	SITUATION.				Estimated Superficial Area.
	Taluq.	Amshom.	Deshom.	With reference to neighbouring Salt Depot, Description, &c.	
21st April.	Ponany.	Pallaprom and Eswaramangalem.	Pallaprom Erikananna.	North to Pulikel Ferry belonging to Tirumanashere Kotta Rajah, &c.	75 Acres

29. This is an extensive, and for the most part cultivated, tract of comparatively high ground on the north bank of the river about two miles from the Ponani bungalow. The soil is loam and of a rather sandy description of loam on the outskirts of the area where rice is grown. Approaching the river, the soil gradually assumes an alluvial composition, and near the river

there is some very fine clay. A good portion of the land lying away from the river would have to be clayed to be converted into salt-pans. The levels are not very good. The ground slopes upwards from the river where it is about a foot above high-water mark to the interior, where it is nearly three feet higher. The site is not worse in this respect, however, than many others now being worked on the East Coast. The place is otherwise flat, unencumbered and adapted to salt-manufacture. There are no crab-burrows except just along the border of the river. The brine marked 3° Beaumé at the time of my visit. The stability of the brine-supply is, of course, a doubtful point, specially as this land is nearly three miles from the sea, but the natives guarantee its strength, and are prepared to use it and convert the land into salt-pans. Taking everything into consideration, I think salt may be advantageously made here though this site is far from being a first-rate one.

30. The sites hereinafter described were examined on the 22nd of April:—

Date of Examination.	SITUATION.				Estimated Superficial Area.
	Taluq.	Amshom.	Deshom.	With reference to neighbouring Salt Depot, &c.	
22nd April.	Ponani.	Vatana-palli.	Kundazhiyin.	Kunda Patanna ...	37
Do.	Do.	Mullashery.	Patur.	Kaka Matu and Pandara Matu.	101

31. Two contiguous islands in the estuary visible from the Chowghat Travellers' Bungalow are included in the statement, showing a plot of 101 acres. These islands are separated only by a long narrow canal which can be easily, and with great profit, closed at both ends and made into a condensing reservoir for the supply of the works. They will then be converted into a single plot, which can be worked as one salt-station in union with the next or 37-acre site, which is on the south bank of the river opposite to, and only about fifty yards from, the islands. All of these lands are low-lying alluvial formations inundated to a great extent at high tide. The soil inclines rather more to sand than to clay in composition, but it is fit for salt-work, and the surface of the ground is even, and, with the exception of one or two small coconut plantations on the 37-acre tract, it is unobstructed. The surface level is a little above that of mean tide, so that most of the ground would be self-irrigating at high tide. There are very few crab-burrows. The brine marked 3° Beaumé at the time examined, and as the sites are not more than half a mile from the bar, a good open one, the supply may be assumed to be constant and abundant. A very fair salt-manufactory can be opened here.

32. The next two sites, as described below, were visited on the 23rd April:—

Date of Examination.	SITUATION.				Estimated Superficial Area.
	Taluq.	Amshom.	Deshom.	With reference to neighbouring Salt Depot, Description, &c.	
23rd April.	Ponany.	Venkidanga.	Logakawn.	Kovilakath Matu Patanna and Payur	97
Do.	Do.	Do.	Do.	Mapula Matu Patanna	13

33. The first of 97 acres includes two adjacent islands in a large spread water, or expansion of the tidal river about four miles from the bar. As in the last case it is possible to unite these islands by means of embankments and so form one large salt station, and this may profitably be done. They are both a little above high-tide level and formed of excellent stiff clay. The surface of the ground is flat and unbroken; it is an uncultivated waste. I did not notice any crab-burrows. The brine in the river was 3° Beaumé. In the absence of proper data, and on the strength of native assurances, taking the brine-supply for granted, these are very good sites for salt-manufacture. The second small plot of thirteen acres is a belt of rather high clay ground on the north bank of the river about a mile nearer to the bar. It is well adapted to salt-manufacture, and might conveniently form a portion of the same salt station with the foregoing and be supervised by the same establishment. This completes the list of sites found in Malabar. The District extends 56 miles further south to Cochin as a narrow, unbroken strip of land between the canal and the sea, which can be easily supplied with salt from Chowghat either by sea-going dhonies or canal boats. The manufacture of sea-salt is not practically expedient between the two points, as the canal water is nearly fresh marking, but 5° Beaumé at Madaligam, a point about midway between the two.

34. I have now reported on 848 acres of land as fit for salt-manufacture in Malabar. Will this acreage suffice for the manufacture of the salt required in the district? In time I believe it will. The quantity of salt required is 580,673 Indian maunds, made up as follows:—Average annual sale, home and inland, during the last five years, 563,762 Indian maunds; 3 per cent. for wastage, 16,911 Indian maunds; total 580,673 Indian maunds. There is no need here to consider the salt-producing power of the sites separately. They are all, if their brine-supplies endure for a season of three months as I found them, well adapted to salt-manufacture, in some respects more so than the general run of sites on the East Coast. They may be fairly compared, therefore, in point of produce, with an eastern station of medium-producing power like Nowpadah. As before stated, Nowpadah yields 234 Indian maunds of salt per acre per mensem inclusive of the preparation month, or at the rate of 936 Indian maunds in a four months' season. I will be well on the safe side then in estimating the Malabar produce at 700 Indian maunds in the season, which gives a yield of 593,600 Indian maunds from 848 acres, or 12,970 Indian maunds more than is apparently required.

35. Lest it may be supposed that, in taking Nowpadah as the standard of comparison for Canara and Malabar, I have chosen an exceptionally old and well-established East Coast station, and I know that the Nowpadah pans stand in deservedly high repute, I here subjoin a list of stations, which are not in better plight as regards natural facilities for salt-culture than the West Coast sites now reported upon, yet which produce a larger quantity of salt per acre per mensem than do the Nowpadah lands, as Kurasa in the Vizagapatam District, Nizampatam in the Kistna, Vattanam in the Madura, and Kuthankuli in the Tinnevely, District this last producing at the rate of 1,460 Indian maunds in a four months' season, or more than double the rate allowed in my estimates; so that it is quite possible that the estimate may be exceeded after a time, in good years. Also the limit of time adopted, three months, for salt formation and one month for getting ready the pans, is not an extravagant one. There is no reason why salt-crystallization should not begin with the month of February, and there will be seasons when it can be continued till near the end of May, but a prolongation of the season by half a month would make a difference of 98,368 Indian maunds in excess in Malabar and Canara.

36. Before dismissing the question of supply, another point of practical importance, which I have not hitherto raised, has to be considered, and that is the possibility of the suppression of the so-called illicit manufacture of salt in these districts, and its effect in increasing existing demands on Government stores. It becomes an important matter now to estimate, as accurately as possible, the amount of illicit salt made in the districts. One way of shaping this inquiry would be to compare the purchases from Government stores for home-

consumption with the population so as to see whether the people, presuming that they do get their full share of salt somehow, get the whole of it, or only a part of it, from Government. It is assumed, I believe, that the consumption of salt in the Presidency is at the rate of 12 lbs. per head per annum. The population of Malabar, according to the last census, is 2,261,250. These data give us $2,261,250 \times 12 = 27,135,000$ lbs. of salt as the normal consumption of the district per annum. Turning to the official records, I find that the average quantity of salt sold in Malabar for home-consumption during the last five years was 421,761 Indian maunds, or 34,710,930 lbs., so that every one of the inhabitants was presumably supplied with 15.3 lbs. of Government salt, which is 3.3 lbs. per head more than is estimated they needed. This would lead one to suppose that the manufacture of illicit salt in the district was not very great, but, after all this method of inquiry, is attended with negative results. Earth-salt may have been smuggled inland, displacing Government sales under the head of inland consumption. Cart-loads of it are from time to time discovered and confiscated on the roads leading east. I don't see how the extent of this trade can be ascertained; but, as the business is distinctly contraband, it ought not to be supposed to flourish to any great extent in a district efficiently served by its Police.

37. Another and direct way of estimating the produce of earth-salt would be to commission a trustworthy person to visit the bays and inlets and salt-swamps of the whole coast, and measure up the area of ground devoted to this manufacture. Then the length of season being known, a good practical estimate of the salt outturn might be made. As far as I know, this has never yet been done, though the importance of the subject has been recognized and guess-estimates have been made. When on the West Coast I did all I could, without deviating from the line of work laid down for me, to gather information on this subject, I had an exceptionally good opportunity of doing so, as my own work took me into the neighbourhood of all the important earth-salt manufacturing localities. I observed that, as compared with Malabar, there is very little earth-salt made in Canara. In Malabar the manufacture is carried on methodically without the least attempt at concealment, and the illicit pans, as they are called, are so scattered over the face of the land at certain places, such as Kavoi, Ponani, and Chowghat that none but a blind man could miss seeing them.

38. I noted the following facts in the course of my investigations. The pans average, omitting decimals, 342 square feet in area. They are made in February, and salt-manufacture begins on them about the beginning of March. They produce seventy measures of salt a-day in favorable weather, but not half that in cloudy weather, and they are shut up for quite a week after a heavy shower of rain. Besides, they are not worked constantly even in favorable weather, but intermittently according to the moods or exigencies of their owners; so that an amount of outturn equal to the produce of thirty days' favorable work, is the most that can be allowed them in an estimate. The salt made is very light, thirty-two measures of it weigh one maund, whereas 25.25 measures of Bombay salt weigh the same. One more factor if known would now enable us to form a good idea of the quantity of illicit salt made, and that is the number of pans. The then Collector of Malabar—see Board's Proceedings, No. 421, dated 6th March 1872—estimated the number at 3,000 at least. Accepting his figures for the moment, we get a possible produce of 6,562 maunds a-day for thirty days, or 196,860 Indian maunds in the season. Now, this estimate seems to me somehow too high, first, because it would give the people, inclusive of Government sales, 22lb. 6 oz. of salt per head per annum each down to the youngest, an amount which it is scarcely likely they either want or use; and, secondly, because, though searching through the salt swamps of the district, I am quite sure I did not myself see 500 illicit pans all told. Taking 1,000 swamps of the district, as a compromise, we get 65,620 Indian maunds additional to be provided for whenever the number as a compromise, we get 65,620 Indian maunds additional to be provided for whenever the manufacture of earth-salt shall be suppressed. To meet this there are 12,970 Indian maunds, which it is calculated the new lands will produce over and above ordinary demands, and again there is a piece of land, 80 acres in extent, not reported upon, because not visited, or heard of, by me until too late, but which, judging from the Deputy Collector's description, is very good ground, capable

of producing 56,000 Indian maunds of salt in the season. On the whole, then, there need be no fear of scarcity of salt in Malabar in future when the new pans are opened.

39. As regards Canara, I did not notice many illicit pans in that district, in fact they are comparatively very scarce there, and the people too look upon illicit salt-manufacture in the light of an illegal act, so that a man has assured me positively that he did not know to whom a salt-pan constructed at his own door belonged, and that he had not noticed it before, and that he was quite sure that it was not his property. Moreover, the population, 918,362 in number, buy annually 159,402 Indian maunds of salt from Government for home consumption, which gives them over fourteen pounds per head per annum each, and they do not probably require more.

40. There are some points in connexion with the opening of salt-manufactories in these districts to which I would like to draw attention. One is the evil resulting from the system of parcelling out the salt lands in small allotments to weak holders, an evil exemplified in the 27½ acres of waste pans in the Kundapur Division. There is a splendid opportunity now on the West Coast, not only for inaugurating a better system of manufacture, but also, and as a preliminary, for entrusting the contracts to a few respectable, enlightened, and substantial men. The two things must go hand in hand, for no improvement in the method of salt-culture ever will be initiated by the present race of contractors, who are natives of a low caste, low type of intelligence, and without means.

41. Another important matter is that, not only the native officials, but the salt coolies of Malabar and of the south part of Canara are utterly ignorant of the manufacture of salt from sea-water. What they have hitherto seen has been the production of salt in a trumpery way from salt earth brine exposed in small artificially-raised and clayed pans. Some of them will have either to be sent to the East Coast to learn the work, or else skilled labor will have to be imported. I fear that merely bringing the Deputy Collectors over to Madras, as has been arranged, will not suffice to enable them, in the absence of experienced workmen, to introduce practically a new system of salt-culture at home.

42. I was again very much struck by the wretched physical characteristics of the salt in store at Kundapur. Independent of its chemical composition, which has been shown to be most impure, it is so dirty, friable, and moist that it is positively a disgrace to the civilization of the country. If nothing can be done in the way of improving the manufacture, by reports and suggestions, surely the cupidity of the ryot might be acted upon by offering a premium for a better article. Since I was last at Kundapur, the rate of kudivarum has been very nearly doubled. Government now pays Rupees 22-8-0 for a garce of salt. I do not know why the contract rate was increased, but at all events, as long as it is paid indiscriminately for whatever salt offers, it will not avail anything towards stimulating the natives to improve their make of salt. A sliding scale of payment according to the quality of the article, either taking Rupees 22-8-0 a-garce as the maximum, or adding on a few Rupees to that, would, I believe, more effectively rouse the contractors to bestir themselves than any other thing. This suggestion is not primarily my own. It is one that was brought to the notice of a former Collector of South Canara by Mr. Ball, the present Deputy Collector.

43. Finally the risk of salt-manufacture at most of the sites noticed in the foregoing report will, owing to their distance from the sea and the peculiarity of the climate, be much greater than on the East Coast, and the salt season being much shorter, I think that the contractors ought to be more liberally treated in the matter of kudivarum, though I consider that a rate of Rupees 22-8-0 a-garce would admit of a sub-scale having a fixed minimum at Rupees 15 a-garce, yielding a profit to the contractors.

1477/9

No. 1,938.

PROCEEDINGS OF THE BOARD OF REVENUE, dated 13th July 1875.

Read Dr. Ratton's Report on Sites for Salt Manufacture in South Canara and Malabar, dated 7th June 1875, No. 38.

Read also the following letter from J. J. L. RATTON, Esq., M.B., Special Salt Duty, to C. A. GALTON, Esq., Acting Sub-Secretary to the Board of Revenue, dated Ennore, 30th June 1875, No. 42:—

I HAVE the honor to inform you that since sending in my report on the fitness of the West Coast Districts for salt manufacture, I have received registers from Mr. Ball, Deputy-Collector, South Canara, showing the brine supply in the neighbourhood of the new Canara sites to have averaged 2.4° Beaumé during the past season up to the 5th of June.

2. He also sends a memorandum of experiments made at different parts of the Coast in the month of May to test the rate of evaporation. His experiments show that an inch of brine was evaporated to dryness in 3.3 days. These observations strengthen the conclusions arrived at in my report on Canara and Malabar.

THE Board resolve to refer Dr. Ratton's report to the Collectors of Malabar and South Canara for such remarks as they may have to offer on the general question, and for report on the following points:—

1st.—The suitability or otherwise of the sites selected by Dr. Ratton for remunerative salt manufacture on behalf of Government.

2nd.—Whether the sites, besides affording facilities for actual salt manufacture, are convenient for purposes of distribution, superintendence, and guarding.

3rd.—Whether the land in each case is the property of Government or of private persons, and in the latter event whether it is probable that it can be acquired on fair terms.

4th.—Whether substantial men in the vicinity are likely to be found willing to contract to manufacture on an improved system and on a large scale.

Sketches of the sites approved of by the Collectors should accompany their replies.

2. A copy of the report will also be submitted to Government, and the Board will address them further on receipt of the information now called for.

(A true Copy and Extract.)

C. A. Galton
Acting Sub-Secretary.

To the Collector of South Canara, with copy of Dr. Ratton's Report.
„ the Collector of Malabar, with do.
„ the Acting Secretary to Government, Revenue Department, with do.
Copy to Dr. Ratton.

Exd. J. W. Lewis.

Adm 10th 23

Rev 762/75

Rev 2863/75

9th Oct^r/75 N-61-62

9/10/01 300 N-477

1875.
BOARD OF REVENUE,
MADRAS.

PROCEEDINGS, 18TH JULY 1876, No. 1,938.

Copy 27 July 1875
Encl. 1

JULY.
No. 1,938.

Received 222 Aug

Manufacture of Salt—in South Canara and Malabar Districts.—Dr. Patton's report on sites for —, referred to Collectors concerned for necessary remarks.—Copy of the report also submitted to Government.

11/14/77
Beardsley

9/24/75