

THE
BARAMAHAL RECORDS

SECTION IV
PRODUCTS



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MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

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THE BÂRAMAHAL RECORDS.

SECTION IV.

PRODUCTS.

I

INQUIRY INTO THE CULTURE AND MANUFACTURE OF SUGARCANES IN THE BÂRAMAHAL.

Denominations.—There are five sorts of sugarcane in the Bâramahal which are denominated in the languages spoken here as follows :—

Sugarcane
cultivation
in the Bâra-
mahal.

Tamil.

1. Nâmakkarumbu.
2. Senkarumbu.
3. Vellai Karumbu.
4. Nânalkarumbu.
5. Vellai Karumbu.

Telugu.

1. Râma Rasadâli.
2. Yerracheruku.
3. Tella Rasadâli.
4. Kurudambi Rasadâli.
5. Taila Cheruku.

Canarese.

1. Râma Rasadâli.
2. Kempu Rasadâli.
3. Bili Rasadâli.
4. Hullu Kabbu.
5. Mara Kabbu.

Mahrâti.

1. Pattâ Patti.
2. Kempu Rastâli.
3. Pandra Rastâli.
4. Chetti Wûsa.
5. Lakrasta Wûsa.

Moorish.

1. Bommani Gannâ.
2. Lâl Rastâli.
3. Safaid Rastâli.
4. Barra Gannâ.
5. Shakri Gannâ.

English.

1. Streaked cane.
2. Red cane
3. Yellow cane.
4. Reed cane.
5. Hard cane.

Estimates.—As the easiest method of exhibiting the information acquired concerning all those kinds in one statement, estimates of the whole expense and produce of each are comprised in the annexed table No. 1*, the following notes containing the averages only of what can be expressed under both those heads in figures, with other particulars relating to the culture and manufacture of the several denominations. The paragraphs of this detail answer to the columns in the table* of estimates.

Soil.—To give an idea of the kind required for sugarcane, it is first necessary to observe that everywhere the natives class ground according to its infinitely various degrees for agriculture into the 1st, 2nd, 3rd and 4th classes and grow the different productions in such as they require, as for example, râgi in the 1st, sâmai in the 2nd, ulundu in the 3rd and kollu in the 4th. Thus are the fields of every village classed, but the soil of any two villages is so different, that what is denominated the 1st in one may be the 2nd or even the 4th in another, for these are only the local divisions made by the farmers in appropriating the best soil to the most valuable and the worst soil to the least valuable productions they intend to cultivate. Those which like kollu or gram are always grown in the 4th denomination would of course grow better in the 1st or best, but such as like râgi require a good soil, would perish in that which in some villages is denominated the 1st and produces very thin crops in soil which in other places is of that denomination. The same economy being of course observed in other parts of the world, and probably without those distinctions, I apprehend they have originated here in the appreciating land to regulate annual assessments.

Sugarcanes requiring the best kind of soil wherever they may be cultivated, that denominated the 1st is necessarily allotted for them, but what is so in different

* The table is indecipherable.

Sugarcane
cultivation
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mahal.

parts of the country comprehends, it appears, a great variety in respect to properties. Hence a scale is formed of it by the farmers here to include that class throughout the district which they suppose divided into four parts and they say the canes may be grown in 3 of the 4, that is, in three-fourths of the lands that are denominated in this district the 1st sort, which may be a twentieth part of the whole. That, however, being only a vague guess, those divisions of it in the statement No. 1* serve more to show that a farmer who intends to cultivate every kind of the cane may allot the 2nd and 3rd denominations of the ground he deems proper for them, for the reed and the hard kinds, because an inferior soil will do for them and that he should plant the other three kinds in the 1st or 2nd denominations, as they require the best; but in the 3rd also, if he does not propose to cultivate the inferior sorts.

The particular descriptions of the soil required for the streaked, red, and white canes, is that called by the natives achchukattu or régada, and, as I conceive, must be a proper mixture of brown loam, clay and sand. The reed and wood canes grow best in such soil, because the richest, but a due mixture of clay and sand with red loam is reckoned sufficiently good for them. They say they all require it to be two feet deep (though their ploughs never penetrate 9 inches); entirely free of gravel, chunam or saltpetre, so situated as to be occasionally watered and drained and consequently free of springs. Sugarcanes are said to exhaust the soil so much that they never grow two successive years on the same ground, but the practice in Bâlâghât is different. The average rents of 100 guntas or 2½ acres of the aforesaid descriptions of land are—

	P.	F.	C.
For the streaked	12	22	40
„ red	12	22	40
„ yellow	12	22	40
„ reed	11	20	50
„ hard	9	16	70

Ploughing.—From the beginning to the end of January is esteemed the proper season to prepare the ground for the streaked, red and yellow canes, and that for the reed and hard should be prepared in February. The extent of plantations depending much on the ability of the farmer, they are from 1 to 100 guntas, 40 of which make an acre. The ground requiring to be well pulverized, it is commonly ploughed ten times and the clods that remain are afterwards broken into pieces by billets of wood. It is then laid out into plots with roads between them, and the plots are divided into furrows or trenches each a foot in breadth and that distance from each other, extending to canals by the sides of the roads whence they are occasionally watered. The expense of ploughing and laying out 100 guntas which make a cawny and are equal to two acres and a half, being estimated at 5 gold fanams per time, comes to star pagodas 4-7-40.

Manures.—Sheep-dung, bottoms of tanks and hills, the leaves of the banyan or pesalu and street ashes are all accounted proper manure for sugarcanes and to be so in the above order. Some farmers spread it between the last ploughings and others when the ploughings are over. The dung of 1,000 sheep for ten days is said to be sufficient for a cawny, and 1 rupee being commonly paid for cooping a flock of that number three nights on a field, the expense at that rate amounts to pagodas 1-30-0.

Plants.—The plants or cuttings for seed usually consist of 4 joints and never less than 3. No one part of the cane is thought better than another for that purpose, but the tops are preferred, because they are more watery than the rest of it. The estimated number and cost of them severally are :—

Of the streaked 15,000 at 7 gold fanams per mille	...	Pags.	8	33	60
„ red 15,000 at 6	„	„	7	22	40
„ yellow 15,000 at 6	„	„	7	22	40
„ reed 15,000 at 5	„	„	6	11	20
„ hard 15,000 at 5	„	„	6	11	20

Planting.—The streaked, red and white are planted in February and the other two kinds in March, in order that they may be ripe when the weather is always fair and the farmers have the least to do; on this account those months are the

* Vide foot-note on page 1.

most convenient for their manufacture. The trenches being then filled with water, the bottoms of them are well stirred and mixed with the hand into a consistence, when the plants (brought in baskets) are laid along them end to end but at the distance of four fingers from each other and pressed down at the same time into the mud as deep as they will go, after which they are equally covered by the mud about them. The doing this work in two rows at a time requires a man to carry the basket, two to lay and press down the plants, and two to smooth the mud which at a fanam a day comes to 20 silver fanams to a cawny.

Sugarcane cultivation in the Bâra mahal.

Hedging.—A good hedge being necessary round a plantation of sugarcanes to keep out both cattle and thieves, the bush called by the Tamilians valâri is preferred to every other and the expense of hedging a cawny is estimated at pagodas 2.

Watering.—The streaked, red and white canes are watered the 4th or 5th day, the reed and hard kinds the 15th day after planting, and that must not be done in great abundance. After that, the first three are watered every ten days; the last two, once a fortnight, and that may be dispensed with when the rains are regular. If supplied by a running stream or reservoir, a man at 1 fanam per day is sufficient to water a whole cawny, but if the water must be raised by picottas, four are necessary. Supposing a plantation to be under a tank moderately supplied, one man will serve for six months in the year, which comes to pagodas 4 and four men to raise water the other six months comes to 16 pagodas. Total, pagodas 20.

Stirrings.—A few days after the shoots make their appearance, the ground about them is well loosened by means of a small hoe like a carpenter's adze, and the weeds are at the same time buried in the earth. That is done a second or a third time in the course of the two first months. When all the shoots are out, the first about two feet and the last about a span in height, the intermediate ridges are thrown into the furrows by means of mamuties which converts them to ridges, and the ground between them into water trenches; any stirring after that is thought unnecessary. Supposing a man to perform $2\frac{1}{2}$ guntas of such work a day, the whole expense of these stirrings is estimated at star pagodas 2-22-40.

Top dressing.—By the time shoots make their appearance, farmers who are diligent, prepare a quantity of dried cow-dung well crumbled into a powder and that being taken in baskets is scattered over them. The people who attend and water the plantation can do that without additional expense.

Disorders.—The principal one to which the canes are subject is the worm called by the Tamilians the tâl puzhu or plant worm from its generating in the root and attacking the plants; it appears within the first two months; it is so destructive that in a few days after its appearing, its effects are visible over a whole plantation of whatever extent, and if not remedied, the canes all die within a month. The only method known here to stop their depredations is to water the canes plentifully every four or five days. White-ants, which are likewise destructive, breed in soil that is sandy during the dry weather, but watering as above soon kills or dispels them. A very rainy season overcharging the canes, renders them watery and unfit for sugar, and there is no other cure for that, but by constant attention to the draining them.

Binding.—The streaked, red and white canes not being strong enough to support their own weight during the blowy weather, they are attached to each other two and two if they happen to grow near one another. When about 3 feet high and 4 months old watering is repeated the following month. The sixth or seventh month they are bound as they grow to bamboos which are extended along them, horizontally, end to end and about breast high from the ground. Single bamboos or even half ones are sufficient, as they are only enabling the strong canes to support the weak and prevent their being laid. The reed and hard canes not being so high as the others are strong enough to stand without mutual support; the binding them together is unnecessary. Supposing four men be required ten days, each time 1 fanam per day, their hire will amount to pagodas 2-30-0 and 300 bamboos at 5 per fanam will cost pagodas 1-15-0. Total, pagodas 4.

Growth.—When the season is usually favourable, the young shoots of whatever kind are seen to force their way up through the surface the 11th day after planting at the distance of half a span or 4 inches as under, that is according to the distance of the joints, all but a very few yielding one at first and some a second or a third in

Sugarcane
cultivation
in the Bāra-
mahal.

the course of the first two months. The sixth month they are generally about the height of a man and the tenth or eleventh they are full grown, when the streaked are supposed to be 9 hands or 14 feet in length, having 36 joints, the red and yellow, 7 hands long with 32 joints, the reed and hard each five hands in length, the former with 28 and the latter with 24 joints. Their thickness is observed to be in proportion to their length.

Reaping.—The reaping is never delayed until the canes are quite ripe on account that if they flower before they are gathered in, it is attended by a considerable loss of juice. The reaping is performed by digging them up with a mamuty by the roots for the double purpose of losing none of the canes and clearing the ground of them. They are then dressed by cutting off the roots and the tops with a sickle and tearing off the leaves which is easily done by the hand, when they are tied up in bundles for carrying to the mill. A cawny may be a whole month or two in reaping as the progress of it depends on that of the manufacture. The farmers here reckon two mills necessary for manufacturing the hard in such time to prevent loss by the drying of its juice, and one only sufficient for either of the other four canes. The number of people required to reap a cawny, whatever sort the cane, is nearly the same, but the number of days they must be employed demands according to the kind as in the subjoined estimate :—

					P.	F.	C.
For the streaked,	20 men for 40 days	...	...	...	19	21	40
" red,	20 " for 30 "	...	...	...	12	22	40
" yellow,	20 " for 30 "	...	...	...	12	22	40
" reed,	20 " for 22 "	...	...	...	9	7	40
" hard,	20 " for 19 "	...	...	...	7	0	0

Expense of cultivation.—The foregoing estimates of the expense being calculated for a manufacturer or person supposed to cultivate no other production but sugarcane are much higher than what the culture of them costs a farmer who cultivates every other production of the country, on account that labourers and cattle must either be bought or hired by the farmer for every purpose, and those which the latter has for the various business of his farm are adequate to the ploughing, hedging and watering of the whole, also to the stirring, binding and reaping of at least half of his sugarcane plantation without any additional expense. The great difference is shown in the statements subjoined of their respective disbursements.

The streaked cane.

Heads of disbursements.					Manufacturer.			Farmer.			
Rent	Pags.	12	22	40	12	22	40
Ploughing	"	4	7	40			
Manuring	"	1	30	0	1	30	0
Plants	"	8	33	60	8	33	60
Planting	"	0	20	0			
Hedging	"	2	0	0			
Watering	"	20	0	0			
Stirring	"	2	22	40	1	11	20
Binding	"	4	0	0	2	0	0
Reaping	"	19	21	40	9	33	20
Total					"	75	22	60	35	40	60

The red or yellow cane.

Rent	...	...	...	...	Pags.	12	22	40	12	22	40
Ploughing	...	...	...	...	"	4	7	40			
Manuring	...	...	...	...	"	1	30	0	1	30	0
Plants	...	...	...	...	"	7	22	40	7	22	40
Planting	...	...	...	...	"	0	20	0			
Hedging	...	...	...	...	"	2	0	0			
Watering	...	...	...	...	"	20	0	0			
Stirring	...	...	...	...	"	2	22	40	1	11	20
Binding	...	...	...	...	"	4	0	0	2	0	0
Reaping	...	...	...	...	"	12	2	40	6	11	20
Total					"	67	12	40	31	7	40

The reed cane.

Heads of disbursements.					Manufacturer.			Farmer.			Expenses of sugarcane cultivation in the Bâramahal.
				Pags.							
Rent	11	20	50	11	20	50	
Ploughing	4	7	40	...	...	...
Manuring	1	30	0	1	30	0	
Plants	6	11	20	6	11	20	
Planting	0	20	0	...	...	...
Hedging	2	0	0	...	...	...
Watering	15	0	0	...	...	...
Stirring	2	22	40	1	11	20	
Binding	2	30	0	1	15	0	
Reaping	9	7	40	4	15	0	
Total					55	14	30	26	13	10	

The hard cane.

					Pags.					
Rent	...	...	...	...	9	16	70	9	16	70
Ploughing	...	...	...	...	4	7	40	...	...	...
Manuring	...	...	...	...	1	30	0	1	30	0
Plants	...	...	...	...	6	11	20	6	11	20
Planting	...	...	...	...	0	20	0	...	...	...
Hedging	...	...	...	...	2	0	0	...	...	...
Watering	...	...	...	...	10	0	0	...	...	...
Stirring	...	...	...	...	2	22	40	1	11	20
Binding	...	...	...	...	7	...	...	...	...	...
Reaping	...	...	...	...	7	0	0	3	22	40
Total					43	18	10	22	1	70

Thence it appears that the farmers or ryots in ordinary can cultivate the canes at half the expense of those I have distinguished as manufacturers, and those who have very small plantations may rear them at a still less expense, as their own labourers have leisure enough for the purpose.

Raw produce.—The several kinds of canes are supposed to produce individually as follows:—

One streaked,	9	cuttings for seed or 18 plants.
One red,	8	" " 22 "
One yellow,	8	" " 22 "
One reed,	7	" " 28 "
One hard,	6	" " 24 "

From the above, together with the foregoing estimates may be deduced the following:—

Kinds.	Number of canes grown.		Number that cost		
		in a cawny.	in an acre.	to the farmer.	to the manufacturer.
Streaked	...	27,500	11,000	Pags. 364	Pags. 767
Red	...	36,666	14,666	545	1,181
Yellow	...	36,666	14,666	545	1,181
Reed	...	57,500	23,000	* 1,045	2,200
Hard	...	76,666	30,666	1,750	3,434

The above, it must be considered, are the prime costs not including any allowance as pay to the overseer or maintenance of the farmer, which must therefore be expected from the sales of the canes or manufacture

Jaggery manufacture.—By the time the season arrives for reaping the canes, all the apparatus are prepared for the manufacture of them into jaggery, bellam or gâd, the coarse and the only kind of sugar made at present in the Bâramahal, of which those are the names in the different languages of the country. The several articles are procured of the village handicraftsmen, who are the perpetual servants of the farmers in it and paid in kind, out of the crops, for providing the requisite implements used in cultivating the ordinary native productions. Those which are used

Jaggery
manufacture
in the Bāra-
mahal.

in the manufacture of jaggery not being considered of their number, they are consequently purchased or hired of whoever will provide them.

Carpenter's work.—The main article procured of him is the mill. The exterior of that is a strong square frame consisting of two planks for the top and bottom, each 2 feet broad, 1 thick, 6 long, and two sides 6 feet high exclusive of what is sunk in the ground. That frame is placed upright, to support two cylinders or rollers 9 or 10 inches in diameter, which are posited close to each other, and at equal distances from the sides. As the hardest wood that can be got they are made of the Kantrilla or perma, but the tamarind tree will serve. The lower ends of both rollers rest upon pivots in the bottom plank; the upper end of one of them enters the top plank 2 inches, and the upper end of the other being reduced to a diameter of 8 inches, passes through the top about 3 feet where a lever is fixed for turning it round. The rollers being mutually engrafted 2 feet or about a third of the way below the upper plank of the frame by means of four spiral grooves, with ridges corresponding cut in opposite directions, the short roller thereby turns round with the long one when acted upon by the lever. The lever is made of a crooked piece of wood so shaped that the upper part running out $3\frac{1}{2}$ or 4 feet in an horizontal direction may clear the upper covers of the frame, then it slopes 7 or 8 feet and lastly extends 4 or 5 feet more, parallel with the ground and low enough to rest on the bullocks' necks that work the mill which is done by two at a time. The lower plank is hollowed out into a trough for containing the juice, when it pours down from between the rollers, and thence it runs through a notch and a conductor on one side of it into a receiver that is sunk into the ground and passes a little way below the frame.

The other articles furnished by the carpenter are a totti or trough, to serve as a cooler for the jaggery after it is boiled, which is made out of the trunk of a tree; it is 8 hands or 12 feet in length, 3 hands in width, a span in depth—two khurpās or wooden shovels for stirring about the jaggery while cooling—a roof for a boiling house and handles for hatchets, sickles, &c. The village carpenter usually making up the mill and the cooler for his own emolument, he lets them out to the planters, and attends them during the process to keep them in repair and give the necessary assistance in other matters. The hire of those articles and his labour is commonly half in money and half in jaggery, which is supposed equal to a gold fanam or 3 silver fanams and 60 cash per day, the amount of which is various according to the period required for the manufacture of each sort of cane:—

For the streaked in 47 days, it comes to	...	...	Pags.	3	41	20
„ red in 30 „ to	...	...	„	2	22	40
„ white in 30 „ to	...	...	„	2	22	40
„ reed in 22 „ to	...	...	„	1	37	40
„ hard in 19 „ to	...	...	„	1	26	20

Smith's work.—A karâhi or iron kettle 4 hands wide at the brim, 3 wide at the bottom and one deep, for boiling the juice into jaggery, is the chief article of that description. That being one which exceeds the ability of the village smiths, the farmers who cultivate the sugarcane every year, commonly supply themselves with one or two and let them out to others at the rate of a gold fanam and a seer of jaggery every day which amounts to 4 or 5 pagodas for the season. As such a kettle originally costs only 10 pagodas, and lasts that number of years, it may be supposed that any man who speculates though for a year or two only will provide himself if he can afford it, in preference to the giving such an exorbitant hire and that selling it afterwards at a loss might cost him for one year 2 pagodas more or less.

The village smith supplies kulhârîs or axes, nails and many other things for constructing the mill, two iron scoopers or scrapers for cleaning the wooden shovels when clogged with the jaggery and koyatās or bill-hooks for cutting firewood etc. His perquisite for those articles and repairs during the season is commonly 4 seers of jaggery or 1 fanam and 40 cash per day. The expense of the kettle being added to that will make the whole for smith's work as follows:—

For the stroaked, wages for 47 days	1	25	40,	kettle 2—	Pags.	3	25	40	
„ red „ 30 do.	1	0	0	„	2	„	3	0	0
„ yellow „ 30 do.	1	0	0	„	2	„	3	0	0
„ reed „ 22 do.	0	33	0	„	2	„	2	33	0
„ hard „ 19 do.	0	28	40	„	2	„	2	28	40

Pottery.—The common pottery of the country answers every purpose, and the following are sufficient for use and breakage during the whole process—2 ranjans or receivers of a conical form containing 4 kurunis or 11 gallons, one of which at a time is sunk in the ground below the trough or bottom of the mill-frame for receiving the juice that passes through the conductor—4 gharás or common pots containing 2½ kurunis each for removing the juice from the receivers to the kettle or boiler—10 lotás or small pots of a seer or pint each for emptying the receivers, also for holding chunam, milk, butter and oil used in the manufacture—4 water pots—4 wash-hand basins—a lamp. The village potter supplies all these articles and more of the kind, if required, for 2½ seers of jaggery—equal to Pagodas 0-0-64 per day which for the different canes comes—

Jaggery manufacture in the Baramshal.

For the streaked in 47 days to	...	...	...	...	Pags.	0	44	5
„ red in 30 „ to	...	...	...	...	„	0	28	10
„ yellow in 30 „ to	...	...	...	...	„	0	28	10
„ reed in 22 „ to	...	...	...	...	„	0	20	50
„ hard in 19 „ to	...	...	...	...	„	0	17	46

Building.—When any is erected, it is only a slight shed consisting of a mud wall, the height of a man, 6 bams or 37½ feet in length, 2½ bams wide with a slight roof of bamboos and thatched with straw, grass or canes. The furnace is a circular wall of 3 feet in height and diameter, and half that distance from the wall with two holes in front, and one behind or next to the wall, in which there is one corresponding, through which the fire is supplied with fuel. The expense of the carpenter's work is included in his allowance for the season, and that of the mud work if erected by hired coolies, may be estimated at 2 pagodas.

Ingredients.—The ingredients used in the manufacture are these: 2 seers of milk, ½ seer of butter, ¼ seer of oil and a pice weight of chunam daily, the cost of which is estimated at 1 fanam and 70 cash per day and total as follows:—

For the streaked in 47 days	...	...	...	...	Pags.	1	44	5
„ red in 30 „	...	...	...	...	„	1	11	20
„ yellow in 30 „	...	...	...	...	„	1	11	20
„ reed in 22 „	...	...	...	...	„	0	41	20
„ hard in 19 „	...	...	...	...	„	0	35	50

Labourers.—Some farmers not being perfectly acquainted with the whole process and others from necessity or choice not attending constantly, an overseer is commonly employed to direct it. Another person is likewise appointed to feed the furnace for the time. Three are required at the mill and another to drive the cattle that work it. The wages of the overseer and stoker is usually 5 seers of jaggery equal to half a gold fanam, or 1 silver fanam and 70 cash each, and that of the others is gold fanams among 8 men or 10 women, the number required for reliefs which is altogether 9 fanams 30 cash per day. To the amount of each sort of cane may be added 25 seers of jaggery, or its equivalent 9 fanams 30 cash, which is allowed for every plantation of 100 guntas as a douceur to the karnam or accountant of the village. Thus the wages of all the people employed in the manufactory will amount as follows.—

Canes.	No. of days.	Wages.			Accountant.			Total.		
		P.	F.	C.	P.	F.	C.	P.	F.	C.
Streaked	47	9	35	50	0	9	30	10	0	0
Red	30	6	11	20	0	9	30	6	20	50
Yellow	30	6	11	20	0	9	30	6	20	50
Reed	22	4	26	20	0	9	30	4	35	50
Hard	19	3	43	10	0	9	30	4	7	40

Cattle.—Planters who cultivate the ordinary productions of the country use their own cattle and drivers to work their mills and consequently do not incur the expense of purchasing or hiring any for the purpose, which others must. The day being divided in India into 8 pahars of 3 hours each, the mills are said to be worked 7 of those pahars or 21 hours in the 24, being only the pahar after sunset at rest. Bullocks are always preferred to buffaloes and eight pairs are necessary. They are

Jaggery
manufacture
in the
Baramahal.

hired for $\frac{1}{4}$ of a gold fanam or 75 cash a day per pair, which is 7 fanams 40 cash for the whole. Hence the amounts:—

For the streaked 47 days	...	...	...	...	Pags.	7	37	40
„ red	30	„	...	...	„	5	0	0
„ yellow	30	„	...	...	„	5	0	0
„ reed	22	„	...	...	„	3	30	0
„ hard	19	„	...	...	„	3	7	40

Firewood.—The trash of the canes partly serves to boil the juice. The farmers and their servants supply the deficiency when they manufacture them, by bringing wood themselves from the jungle, but others must necessarily incur a small expense on that account, probably 2 pagodas every cawny.

Process.—The canes being brought to the mill by the reapers, one man cuts them in halves, a second hands them to the person who feeds the mill, a third on the opposite side receives the canes, as they pass through between the cylinders and a fourth drives the cattle which work the mill. When the canes thus ground make a certain quantity, the person who fed the mill with it, receives them back through between the cylinders and passes them the third time which extracts all their juice. The juice pouring down the mill into the receiver is taken thence in quantities of 4 kurunis which are about 11 gallons, at a time, and deposited in the boiler. It is commonly boiled 3 hours more or less. A diminution of its ferment, its becoming of a red colour, its diffusing a strong smell, its not mixing with cold water and forming into a lump when thrown into it are the proofs of its being sufficiently boiled.

When that is done, the kettle is taken off the fire and carried to the cooler into which the jaggery is poured. While cooling, it is stirred about by the wooden shovel to prevent the grosser parts falling to the bottom, and keep the whole of an equal consistence and fineness. More than a third of it is dirt, from its never being strained, skimmed or clarified. While a little warm and soft, it is taken out of the cooler and formed into balls, or square lumps of about a pound each for sale.

The moment the kettle is emptied into the cooler, it is carried back and put again on the fire, when about an ounce of butter is put into it and spread quickly over the bottom, then a little milk, with a seer of the juice of the cane, all of which is to prevent the kettle from burning or cracking. By the time one kettle of juice is boiled and the above preparation made for another, a sufficient quantity is collected in the receiver whence 4 gallons more are brought and put into it, to undergo the same process. That is repeated 8 times in the 21 hours which makes the quantity boiled every day 32 kurunis equal to 91 gallons 3 pints, and the quantity of jaggery that it produces is commonly . maunds or . lbs. avoirdupois. One kettle is sufficient to boil at that rate all the juice that a country mill can produce.

Expense of manufacture.—For the reason already assigned, there must be a considerable difference between the expense incurred by the common farmer and manufacturer (as heretofore distinguished) in making the jaggery, as well as in cultivating the cane, as appears in the subjoined statements of the respective disbursements:—

The streaked cane.

Heads of Disbursements.				Manufacturer.			Farmer.			
Carpenter's work	Pags.	3	41	20	3	41	20
Smith's work	„	3	25	40	3	25	40
Pottery	„	0	44	5	0	44	5
Building	„	2	0	0	...	...	...
Ingredients	„	1	44	5	0	44	42
Labourers	„	10	0	0	0	9	30
Cattle	„	7	37	40	...	...	...
Firewood	„	2	0	0	...	...	...
Total				„	32	12	30	9	29	57

PRODUCTS—SUGAR.

9

The red or yellow cane.

Heads of Disbursements.				Manufacturer.			Farmer.			Expenses of Jaggery manufacture in the Bāremahal.
	...	...	Pags.						
Carpenter's work	...	...	2	22	40	2	22	40	
Smith's work	...	...	3	0	0	3	0	0	
Pottery	...	...	0	28	10	0	28	10	
Building	...	...	2	0	0	...	...	...
Ingredients	...	...	1	11	20	0	28	10	
Labourers	...	...	6	20	50	0	9	30	
Cattle	...	...	5	0	0	...	...	...
Firewood	...	...	2	0	0	...	...	...
Total				22	37	40	6	43	10	

The reed cane.

	...	...	Pags.						
Carpenter's work	...	...	1	37	40	1	37	40	
Smith's work	...	...	2	33	0	2	33	0	
Pottery	...	...	0	20	50	0	20	50	
Building	...	...	2	0	0	...	...	...
Ingredients	...	...	0	41	20	0	20	50	
Labourers	...	...	4	35	50	0	9	30	
Cattle	...	...	3	30	0	...	...	...
Firewood	...	...	2	0	0	...	...	...
Total				18	18	0	5	31	10	

The hard cane.

	...	...	Pags.						
Carpenter's work	...	...	1	26	20	1	26	20	
Smith's work	...	...	2	28	40	2	28	40	
Pottery	...	...	0	17	46	0	17	46	
Building	...	...	2	0	0	...	...	...
Ingredients	...	...	0	35	50	0	17	65	
Labourers	...	...	4	7	40	0	9	30	
Cattle	...	...	3	7	40	...	...	...
Firewood	...	...	2	0	0	...	...	...
Total				16	32	76	5	9	41	

From the above it appears the cultivators of ordinary productions can manufacture the canes into jaggery for a quarter, or a third of the sum it would cost planters of canes only, which as well as the estimate of their respective disbursements in rearing them, shews that any person who may propose to establish a sugarcane plantation must cultivate all or several of the native productions. By that means his labourers and cattle, like those of other farmers, could cultivate and manufacture the canes when there would be nothing else to do, and have sufficient work all the rest of the year.

The present disadvantage may, however, be obviated by planting and reaping the canes every month in the year, which is the practice at Seringapatam as in many other parts of the world; but as canes for seed must be nearly ripe, and it is only in February and March they can at present be found here in that state, it would require a few years to procure a succession of crops, unless cuttings fit for seed can be procured every month in the Carnatic or brought by stealth from Bālāghât.

Manufactured produce.—A notable and experienced farmer can tell with tolerable exactness the number (good or otherwise) of cawnies that sugarcane plantations in different years have contained, the number of cuttings planted in each, the number of canes they have produced, the number of days they have severally taken to make into jaggery, and the quantity of it he received from each. These points, together with the quantity manufactured daily which, as observed in the process, is generally the same and specific, and the usual price of jaggery, constitute data for the following estimates of the produce in canes of a certain extent of ground and of the number of canes or extent of ground required to produce a specific

Estimates of manufacturing Jaggery in the Baramahal.

quantity of juice or jaggery, which may be useful to those who desire to make a plantation or who wish to purchase the canes of the planters for the manufacture of sugar :—

	Heads.	Streamed.	Red.	Yellow.	Reed.	Hard.		
Produce of a cawny or 100 guntas.	Number of canes	27,500	36,666	36,666	57,500	76,666		
	Quantity ... {	of juice ... {	in candies ...	150	96	96	70	60
			in gallons ...	8,978	5,745	5,745	4,190	3,591
			of jaggery. {	in maunds ...	375	300	300	262½	262½
			in cwts. lbs.	68-84	55-11½	55-11½	48-10½	48-10½
	Value of jaggery	125-0-0	100-0-0	100-0-0	87-22-40	87-22-40		
Deduct ... {	Manufacturer's disbursements.	107-35-15	90-0-0	90-0-0	73-32-30	60-24-66		
		Farmer's disbursements ...	45-25-42	38-5-50	38-5-50	31-24-20	27-20-11	
Remainder. {	Manufacturer's profit ...	17-9-65	9-40-20	9-40-20	13-35-10	26-42-54		
		Farmer's profit	79-19-38	61-39-30	61-39-30	55-23-20	60-2-29	
Produce of an acre or 40 guntas.	Number of canes	11,000	14,666	14,666	23,000	30,666		
	Quantity ... {	of juice ... {	in candies ...	60-0-0	38-8-0	38-8-0	28-0-0	24-0-0
			in gallons ...	3,591	2,298	2,298	1,676	1,436
			of jaggery. {	in maunds ...	150	120	120	105	105
			in cwts. lbs.	27-33½	22-2	22-2	18-63	18-63
	Value of jaggery	50	40	40	35	35		
Deduct ... {	Manufacturer's disbursements.	43-5-6	36-1-72	36-1-72	29-21-76	24-9-74		
		Farmer's disbursements...	18-10-16	15-11-20	15-11-20	12-35-56	20-44-4	
Remainder. {	Manufacturer's profit ...	6-39-74	3-43-8	3-43-8	6-23-4	10-35-6		
		Farmer's profit	31-34-64	24-33-60	24-33-60	22-9-24	14-0-76	
Produce of 1,000 canes.	Quantity of juice. {	in seers	3,491	1,676	1,676	779	497	
		in pints	2,523	1,210	1,210	562	359	
	Produce of jaggery. {	in seers	544	320½	320½	182	136½	
		in lbs.	273	160	160	91	68	
	Amount in money. {	in star pagodas ...	4-24-30	2-30-2	2-30-2	1-22-56	1-6-12	
		in £ sterling	1-16-4	1-1-3½	1-1-3½	0-12-½	0-9-1	
Akruput of juice.	Requires ... {	Ground in guntas ..	10 ² / ₃₂	20 ² / ₃₂	20 ² / ₃₂	41 ² / ₃₂	72 ² / ₃₂	
		Number of canes	10	20	20	41	72	
	Produces ... {	jaggery. {	in seers	5	6½	6½	7½	8½
			in lbs.	2½	3 ² / ₁₆	3 ² / ₁₆	3 ² / ₁₆	4½
			in star pagodas.	0-1-70	0-0-25	0-2-25	0-2-65	0-3-25
			in £ sterling.	0-0-4	0-4-4½	0-4-4½	0-0-7½	
A gallon of juice.	Requires ... {	ground in guntas...	7 ⁶ / ₁₅	8 ¹⁴ / ₁₅	8 ¹⁴ / ₁₅	16 ²⁰ / ₁₅	24 ²⁴ / ₁₅	
		Number of canes...	4	8	8	16	24	
	Produces ... {	jaggery. {	in seers	1 ⁸⁰ / ₁₀₀	2 ²⁰ / ₁₀₀	2 ²⁰ / ₁₀₀	2 ²⁰ / ₁₀₀	3 ²⁰ / ₁₀₀
			in lbs.	1 ²⁰ / ₁₀₀				
			in star pagodas.	0-0-54	0-0-67½	0-0-67½	0-1-1	0-1-14½
			in £ sterling.	...	...	...	...
A maund of jaggery.	Requires ... {	ground in guntas ...	7½	125 ² / ₃₂	125 ² / ₃₂	219 ² / ₃₂	330 ² / ₃₂	
		Number of canes	78	125	125	219	330	
	Quantity ... {	in seers	256	204	204	170	144	
		in pints	185	147	147	145	104	
	Produces in money. {	in star pagodas ...	0-15-0	0-15-0	0-15-0	0-15-0	0-15-0	
		in £ sterling	0-2-8	0-2-8	0-2-8	0-2-8	0-2-8	
A cwt. of 112 lbs.	Requires ... {	ground in guntas ...	11½	13½	13½	18½	23½	
		Number of canes	448	896	896	1,792	2,688	
	Quantity ... {	in seers	201	252	252	208	352	
		in pints	145	182	182	218	264	
	Produces in money. {	in star pagodas ...	0-11-60	0-14-60	0-14-60	0-17-54	0-20-4	
		in £ sterling	0-2-0	0-2-7½	0-2-7½	0-3-1½	0-3-0	

II

PROCESS OF MANUFACTURE OF SUGARS IN BĀLĀGHĀT.

The juice being extracted from the cane as in the Bāramahal, the different kinds of sugar are made from it, severally denominated, Kākambi, Rāb, Rāypudi, Bûrâ, Misri, Chînf. Manufacture of sugars in Bâlaghât.

The first operation being performed by the farmers who cultivate the canes, they convert into—

Kākambi.—When the juice begins to boil, a quantity of milk is mixed with it, in the proportion of 8 kachcha seers to every 10 kurunis or 1 to 40 with a quantity of the ashes of the shrub called in Gentoo, uttarêni, and in Malabar nâyurivi, in the proportion of 1 rupee weight to every 10 kurunis or 28 gallons, and they are stirred about together. These ingredients are . . . temper to separate grosser parts from . . . forming at top in . . . are skimmed off . . . vessel. When the juice is boiled to a proper consistence which is known by its colour, smell and gluey appearance, it is taken out and poured in kuḍvais or earthen pots containing about 2½ kurunis or 7 gallons. It is then rather thicker than before and by concreting towards the top, it becomes as solid there as the jaggery or common sugar and proportionably thin towards the bottom where all the liquid subsides. Thereafter, it is kept as the more the solid, and the liquid parts separate as it dries up. The manufacturers procure it of the farmers in this state at the same price as jaggery and take it to the maligés or boiling houses where they first make it into—

Rāb.—The kākambi being sufficiently prepared by the farmers for refining, the manufacturers place it in the pots, they boil it and lay it upon . . bamboos to it are placed . . or small tanks . . . and drains through holes previously perforated . . and consolidated . . constructed of brick and chunam 8 or 10 feet square and 6 feet deep and will hold 64 if there be room for 8 pots and 81 if there be room for 9 in every row. The pots remain there till they cease to dry which is commonly in 8 or 10 days; then the drainings or molasses being collected is sold to the distillers. The sugar being taken out of the pots and laid upon a chunam floor, it is then broken and pounded for use and answers to what is called in the West Indies muscovado or coarse brown sugar. By this process, the kākambi is reduced a quarter in quantity, and when that sells at 4 kantarai fanams per maund, the rāb sells at . . . In the second stage of the . . progress it is denominated—

Rāypudi.—Round baskets being prepared whose diameters are equal to . . breadths of the tanks they are placed upon the bamboos laid across it and 50 maunds of the rāb are poured into each, on which men get with the baskets and trample it till such time as it becomes solid and . . a layer of the aqueous plant . . called by the natives tigapāchi . . fingers deep, is then spread upon the top to purge it of its impurities. The 5th or 6th day, the layer is taken off, when, the grosser parts being precipitated, the upper part for about four finger deep is found to be perfectly refined. That is all taken off and being laid upon a coarse cloth spread in the sun, it is here trampled by men's feet till it acquires the appearance of fine sand. And the molasses or treacle that remains at the bottom is either made into other descriptions of sugar or distilled. The above operation produces what is called in the . . the clayed or this . . for the day. It reduces . . a third and the kākambi half, but so improves the quality that when the latter sells for . . kantarai fanams, the rāypudi sells . . In the succeeding state of improvements it is called—

Bûrâ.—It is brought to that by cooling every 3 maunds or 20 lbs. avoidupois of the rāypudi with 30 seers of milk and ¼ of a seer or a quart nearly of ghee until it becomes white and diffuses a pleasant smell, when it is taken off the fire and poured into a cooler. There it is stirred about till it gets quite cool and much whiter, when it is denominated bûrâ, and is the same as the single refined in Europe . . the milk and ghee being substituted for the whites and shells of eggs, lime, alum water and bullock's blood. This operation reduces the rāypudi, one-eighth, the rāb two-thirds and the kākambi eleven-twentieths, when the jaggery sells for 4 kantarai fanams and the bûrâ sells for 14. The fourth description of sugar is the—

Manufacture
of Sugars in
Bâlaghât.

Misri.—The above proportion of milk and ghee are mixed together till the heat of the fire subsides, when the liquid is taken off the fire, and poured into coolers, where it remains till a man can just bear his hands in it when it is put into gharâs or small pots that have 3 or 4 sticks in them reaching from side to side. Those pots being filled are covered with cloth and tied up when they are protected from chaff, spread on the floor rather deeper than the pots that they may be completely covered with it. In 40 days, the purified part of the sugar is completely candied and separated from the rest which falls to the bottom of the pots; a hole being then made through the sugar of every pot, they are turned with their mouths downwards and kept so, till they cease to drop, which is for 5 or 6 hours. The pots are then piled up in a heap and a great quantity of cold water poured over them which makes the sugarcandy separate from the sides of the pots without which it would be almost necessary to break them. The . . . they are piled up one above the other in the sun for the purpose of drying them. Thirdly, that ends the process of making sugarcandy and it is kept in those pots for sale. The . . . of quantity is more than . . . and increase of price from . . . is quadruple. The last kind of sugar is the—

Chîni.—This is made from the drainings or the molasses of the misri. Fifty maunds of the râypudi commonly yields about 6 of the molasses, which being mixed with 12 seers of milk and no ghee, is manufactured, as previously done in the process for the misri but it does not Being made from a finer kind of syrup it probably approaches the double refined of Europe. The process being thus repeated, 50 maunds of râypudi, yields 27 of misri and of chîni which last sells for 16½ when the misri sells for 16.

Comparison of the decrease in the quantities and increase of prices and amount of every kind with the kâkambi or jaggery.

Kinds.	Original quantity.	Original price.	Reduced quantity.	Increased price.
	MDS.	FANG.	MDS.	FANG.
Kâkambi	100	4	100	4
Râb	100	4	75	7
Râypudi	100	4	50	11
Burâ	100	4	44	14
Misri	100	4	27	16
Chîni	100	4	5½	16½

III

THE MODE OF CULTIVATING SUGARCANES AND MANUFACTURING THEM INTO SUGAR AT BARBADOES.

Sugarcane
cultivation in
Barbadoes.

Cultivation.—The land being properly cleared of the shrubs and weeds, it is generally made out into fields of 10 acres each more or less agreeable to the situation in which the field is laid out by farmers who line into squares of 4 feet each, and then clear a spot in the middle of it each about 200 feet square about 20 feet wide . . . so as to allow waggons or carts to pass each other, which are immediately employed in bringing dirt and rubbish from the buildings to assist . . . some rich mould in making . . . for the horned cattle belonging to the plantations which are immediately tied to stakes, whilst the slaves are forming the above squares into holes of 8 or 10 inches deep, leaving a distance between each hole of about 6 or 8 inches; the cattle generally remain in the pen all night until the digging the holes in the field is finished and sometimes longer, if required.

This field being done, the same process is carried on with another of the same kind until the planter has finished holing all the lands he intends to plant for that year. He then returns again to the first field to manure it, which is done by putting a basket holding about 25 lbs. of the manure of these pens into each hole and so keeps on until he has finished manuring; both the holing and manuring is done between the months of April and September.

Planting.—The month of October is generally the time when they begin to plant all the plants, which are either ratoons . . . the tops of first crop canes for the manufactory are from 1 foot to 18 inches long and contain from 4 to 6 eyes, of which 3 are put into each hole and lightly covered over with some of the ground that was dug out of the hole and they keep on this method until the whole is planted. The plants, if good and assisted with showers of rain, will begin to make their appearance out of the ground in 8 or 10 days; if not, they will take a few days longer. As soon as the eyes begin to appear above the ground, they are weeded with the hand or small hoe, and the ground well loosened about them to allow them free vegetation. Manure is seldom any more done until they are about 2 or 3 months old, when they are again weeded and some more of the ground placed about their roots. They are then left to remain until they are 5 or 6 months old, when they are again weeded and the dry trash stripped from about them and the mud heaped about them for 6 or 8 inches above the surface.

Sugarcane cultivation in Barbadoes.

The whole of the labour is now done and nothing more required than the care of their not being destroyed by thieves or cattle, to prevent which there is one of the most trusty slaves excused from all duty and put to watch the field, who in his leisure hours makes a kind of fence to hinder the cattle from breaking in. Having thus ended the mode of cultivation, we shall return to the manufacture which generally begins in 14 months after the first canes are planted.

Manufacture.—When the canes are to be cut, some of the strongest of the slaves are supplied with bill-hooks, either one man or woman to each row to cut, and some of the weaker to tie up and pick out all disordered canes, such as have been eaten by rats or other vermin, which are apt to spoil the sugar; after the canes are cut and picked out they are conveyed to the mill by waggons or carts to be ground. The mill which generally works by wind is a strong one and is planted near a brick wall which supports the iron cylinders which the canes are put through twice (*i.e.*,) the canes are put in from one side and . . . returned from the other, the juice falling on a platform covered with a sheet of lead and runs into a receiver or cistern holding from 300 to 700 gallons, generally made of strong plank lined with lead; and with a good breeze the men will fill one of the largest descriptions in two hours. From this it is conveyed into the boiling house by means of a leaden pipe or wooden gutter and there runs into a large boiler called the clarifier, where there is added to it a small quantity of quicklime and fire is put underneath; and by the time the cistern is full again it has boiled, and the first scum is taken off, which is then called clarified liquor, from which the boiler takes its name. It is then hove over by ladles into a box placed between the clarifier and the next boiler to it covered over with a coarse blanket or hair cloth which it runs through and by a hole in the bottom of the box runs into the copper; and this process is followed until it gets to the *tayche* or . . . the boiler in which it is boiled to the substance of sugar. Here the sugar boiler cannot pay too much attention to it. . . for it to examine whether it is properly tempered, which is done by the dipping your skimmer in the syrup and taking it out and twirling it round; hold the skimmer perpendicularly; if the syrup runs off and breaks short, the liquor is properly tempered, but if it runs long and stringy, some strong lime-water must be added; keep constantly trying until you perceive it break short, then you may be assured it is properly tempered.

Sugar manufacture in Barbadoes.

The next thing to be observed is when it is sufficiently boiled; in which there are several modes, but for my part, I believe there are none equal to that of trying it with cold water, *i.e.*, by taking a few drops and dropping them into a little cold water, and as soon as you can take it out without dissolving, it is sufficiently boiled and immediately struck off into a cooler, but this is not the mode most commonly followed at Barbadoes, as the people from long experience go entirely by the sight and smell, and by looking on the back of the ladle, perceive a small grain running down and immediately strike it off into a cooler. But this method, I am confident, does not agree with all kinds of canes.

As soon as the sugar begins to show the grain perfectly in the cooler, it is taken away into the curing house and put into pots of a conical form holding from 12 to 15 gallons each with a small hole in the bottom for letting the molasses run out, which is at first stopped up until the sugar has got into a body and you perceive it sunk in the middle; then draw out the stopper and let the

Sugar manu-
facture in
Barbadoes.

molasses run into other pots placed for that purpose, and after remaining 15 or 22 hours will be sufficiently cured for muscovado and is then rammed into hogsheads holding from 12 to 15 cwts. each for the London and other markets, but if it is intended for any particular use, a layer of clay is put on the top of the pot which extracts some more of the molasses from it, when it is called clayed sugar.

IV

MODE OF THE CULTIVATION OF SUGARCANES AND MANUFACTURING THEM INTO SUGAR AS PRACTISED ON THE COMPANY'S PLANTATIONS AT TIRUPPATTŪR.

Sugarcane
cultivation at
TiruppattŪr.

Cultivation.—The lands which are at present occupied by canes on the Company's plantations are those which have been under cultivation for rearing paddy for many years. It is therefore needless my pointing out their situation further than they are situated where a command of water may be had in the dry season; but notwithstanding the sugarcane requires a good deal of water, it is not in every situation this article may be had in a quantity that will answer. It must be particularly remarked that ground which is springy or that is situated so low that the superfluity of water that may be occasioned from heavy rains or leaks from the tanks cannot be drained off, is unsuitable; the higher the ground can be got the better, provided there is water at command, and the soil is neither stony nor saltish.

Preparing the land.—When a field is intended to be planted with sugarcane it is first overflowed with water so as to soften the soil and permit the ploughs to penetrate through it; but this is not done immediately after the ground is made wet, nor until it is very near dry again, but as wet as if there had been a smart shower of rain, which if we are fortunate enough to get, saves a good deal of labour and the soil turns over far better than if it had been overflowed. When the ground is fit for ploughing, the ploughs pass backwards and forwards over it, four or six times; then the ploughs stop and the field allowed to dry for a few days and the large lumps of earth are broken either by a number of people with stones, or by the help of a roller; but the latter has been of late introduced and the former, far more common. After all the large lumps are broken, the ploughs are again set to work, and plough the field over six times more, making on the whole ten times, which is very necessary; and oftener if time can be spared is very recommendable, as the oftener the ground is turned over and pulverized, the better the canes will be, and the planter will get a better return for his labour. The ground being now as well prepared as can be done with a plough, it is laid out in rows and small trenches of about 8 inches deep, and as many wide and at the distance of two and half feet from each other, for laying in the plant, which ends the preparation.

Planting.—The plants, which are the tops of canes used for manufacture, or the whole canes cut into pieces of about twelve or eighteen inches long, and containing from 4 to 6 eyes, are laid into the trench carefully, taking care in what manner they are laid, *i.e.*, not to lay any of the eyes down, which are very apt to fail if this care is not taken; and the ground laid lightly over, not exceeding two inches thick, and immediately after they are covered, the trenches should be let full of water, and kept so for the first day, after which any water that may be remaining above the surface of the trench should be let off, and the field allowed to dry for eight or ten days, during which period a quantity of manure, about four pounds for each plant, should be spread along the trench and mixed up along with the earth that covered the plant by means of a small hoe.

Season for planting.—It may be necessary to remark that since the commencement of the plantations here, we have been confined to plant in the same season which the natives do, which, though it answers very well, I cannot recommend, as their season is the months of March, April and May which are the three hottest months throughout the year; we are, however, somewhat better off at present, as being able to supply ourselves; in November last, we planted a small field which is now in a very flourishing way; we have also planted some canes (more or less) in every month since that, and they all seem to do well, so that I

would recommend to plant the cane in every month in the year, in case land could be got to suit the season, *i.e.*, on high land in the wet season and low land in the dry. This would be of great importance, as it would keep the manufactory employed all the year, excepting when there may be so much rain as to overflow the field, but this has seldom been the case, since the commencement of the plantations, so that I have not the least doubt of its answering very well.

Sugarcane
cultivation
at Tirup-
pattūr.

Growth, watering and weeding.—The plants good and season favourable, they will begin to show their eyes through the surface in 10 or 12 days; at other times it will require more, when, as soon as they do, the whole of the field should be dug over with pickaxes or tools called by the natives *kôdâlies*, so as to give the plants free vegetation, and the water courses should now be formed between the rows so as to prevent any of the young shoots or leaves being destroyed by the run of water. The canes will now require no more labour than watering for three months, but in case you are not favoured by rains, particular care must be taken that this is done every eight days, for neglecting this part of the business is very bad management, particularly in the hot season. When the canes are three feet high, they should be then weeded, and the ground loosened about the roots and half the water course is filled up, forming a double row, *i.e.*, for every two rows of canes one water course, but these should be pretty deep so as to answer for drains in the wet season, and the earth taken out of them laid on the roots of the canes, which is commonly called moulding. There is never more labour required than to take care that a fence is made and kept in good order to prevent thieves or cattle from destroying the canes, which are now fit to be eaten, and in twelve months from their first being planted they will be ripe, when they are in length, the red from 7 to 9 feet, and the white from 4 to 7, and they are now fit to be manufactured.

Manufacture.—When the canes are to be cut for manufacturing, a number of people are supplied with bill and grass hooks, the former for cutting and the latter for cleaning the canes; and this being done, they are brought in carts to the mill to be pressed, which is done by passing them through the rollers 6 times, which is twice more than would be required if the cylinders were of iron, as in the West Indies, but these being only of wood, cause a great deal more labour and expense. The juice from the canes is carried into the boiling house, where it is put into a boiler, of which there are four, but as they are very improperly all of one size, I can neither call them clarifiers nor *tayches*, for they are commonly used in both cases. The juice being put into one of those boilers which hold about 100 gallons each, the quantity of a pint of lime, such as the natives use with their betel, is thrown into it, and a fire is put underneath; it is then made to boil, and when the scum rises, it is taken off with a skimmer, and the liquor being pretty well clarified, it is ho've into a tank or cistern made of brick and chunam, where it is allowed to settle for 4 hours, or until by drawing off a little of the fluid by means of a hole about one inch above the bottom of the tank, you see it run clear off, resembling the colour of Madeira and very near as clear. It is now drawn off and put into one of the boilers and a strong fire is put under it; in four hours it will be very near the point of being sugar, when it must be tried whether it is properly tempered or not by letting it run off from your skimmer; if it breaks short at the edge of the skimmer, it is sufficiently tempered, but if it runs off in long strings, you must immediately add some strong lime-water and keep trying until it breaks short, when it is sufficiently tempered; a steady and smart fire is now kept up until it is sugar, which is known by taking a few drops of it, and dropping it into cold water, and when you can take it out in a lump without losing any of it in the water, it is sufficiently boiled, and no time should be lost in taking it out and putting it into the cooler; you then keep stirring it, but slowly so as not to hurt the grain, and when you find it is inclined to crust on the top of the cooler, it should be taken out and put into conical pots, or forms, holding about 12 or 14 gallons each, with a hole at the bottom which must be stopped up for the first 5 or 6 days when the sugar will be in a body; the hole is then opened for the molasses to drain from it, and in fifteen days it will be in a state similar to what is called in the West Indies muscovado. If you wish to make it more clear or similar to what is called clayed sugar, as there is no proper clay to be had, a kind of grass, called by the Tamils *tîgapâchi* may be used, or the bark of the plantain tree, which I find to answer the purpose very well, by laying a layer of about 2 inches thick on the

Sugar manu-
facture
at Tirup-
pattûr.

top of the pot when it is wet, the water of which, draining through the sugar, and carrying with it all the molasses, leaves the sugar in a state similar to what is called single clayed sugar. After the grass is dry, the sugar is shaken out of the pots, and is fit for packing, unless you wish to have it more clear; if so, another layer of grass should be laid on as before, which when dry will leave it equal to double clayed and is fit for either the Europe or native markets.

Distilling of rum.—Rum is distilled from a composition of acids extracted from the sugar, *i.e.*, the skimmings or dirt which is scum from the sugar while boiling, second, molasses or the drainings from sugar, third, the water which washes the mill and boilers, fourth, lees, dunder, or returns, the remains from the still of a single distillery. It must now be remarked that at the beginning of a crop, the planter has neither molasses nor lees, which two very principal articles must be accounted for in some other way. It is therefore recommended to set your skimmings alone, until you can get molasses, and then distil them, which will also supply you with some very good lees, so that you can then set properly to work, as you have all the articles mentioned above. But if the planter wishes to make pleasant and mild spirits, I will by no means recommend him to make use of the lees, but to set in the following manner—allowing his fermenting vats to hold 100 gallons, lay 60 gallons of skimmings, 30 gallons of water, and when it begins to ferment put 10 gallons of molasses which makes on the whole 100 gallons, which, with the common stills that we have here, yields about $7\frac{1}{2}$ gallons of good spirit, but there is at least 5 per cent. lost on account of fermenting in earthen pots, and the want of a good still. But in case you mean to make what is called common rum, by all means make use of the lees, as you save a great deal of skimmings by setting it in the following manner—the vat holding 100 gallons, lees 40, water 40, skimmings 10, and molasses 10, which is 100 on the whole, which will yield equal to the former and full as strong, so that the planter saves, by using the lees, 50 per cent. skimmings, which is equal to 6 gallons of molasses, but his rum is not near so mild and pleasant; at the latter end of the distilling part of the crop, the planter will have no skimmings; the sweets of the skimmings must therefore be made up in molasses which is done by setting as follows—vat containing 100 gallons, lay 45 lees, 35 water, 20 molasses; this will yield as well as the others, but the rum hot and fiery and resembles the New England rum, brought out by the Americans for sale at the Indian markets.

Management of the still.—When the liquor is put into the still and the head plastered on with a mixture of cowdung and ashes, a smart fire may be kept until the still head is quite hot, and you find the spirits are nearly coming through the worm; then the fire should be slackened and a slow and steady fire kept under, until the spirits are all off, which you will know by taking a little of it in a proof glass, shaking it and if the bead is large, and remains any time, it is still good spirits, but if it is small and sandy and goes off very quick, the rum is all done running and what runs after is called *low wines*; you may then make up your fire and run the still as long as there is any spirits in it, which is known by taking a $\frac{1}{2}$ pint in a cup in one hand and lighted torch in the other, holding the torch close to the still head, and pouring the low wines on the still head so as to run on the blaze; if it burns, there is still spirit in it, but if it does not, there is none, and it is only wasting fuel and labour to draw off any more, as what runs after is no better than water.

V

INQUIRY INTO THE CULTURE AND MANUFACTURE OF INDIGO IN THE BÂRAMAHAL.

Denominations.—The only kind cultivated in the Bâramahal is that called in all the languages of the natives, *nîl*.

Indigo culti-
vation in the
Bâramahal.

Soil—It requires the richest soil, but waste land will do, provided it has certain properties, otherwise it must be such as has received improvement from tillage. On that account, it is commonly grown in soil on which *râgi* or *bâjra* has been grown. Though that be preferred, the ground which may be converted to the purpose is classed by the natives into four gradations, denominated 1st, 2nd, 3rd and

4th. That taken for the present estimate shall be supposed a târ which is equal to 10 acres of the average or middling sort.

Indigo cultivation in the Bâramahal.

Indigo is cultivated only by the people who manufacture it. They usually rent ground of the ryots which has yielded one of the above sorts of grain for the period required for its culture, which is 15 or 16 months between the 1st November and the 1st of March. The râgi and bājra being often reaped before November, the above period comprehends a part of one year in which fields yielding those kinds of grain are unoccupied, and the whole of the ensuing year. On that account, one quarter rent is commonly given for the portion of the first, and a whole year's rent for the ensuing year, so that if the rent be the same as what the ryot pays to the sarkâr, the quarter rent being the hire of his ground after it has yielded a crop, and for that time in which he could not make any use of it, is entirely his profit exclusive of his own and his cattle's labour which is all saved. The improvement of the soil is another advantage which arises to the ryot from the culture of indigo. The quarter rent is estimated at pagodas 1-14-42, and the year's rent at pagodas 5-14-6, total, pagodas 6-28-48.

Ploughing.—The rent being for the use of the ground only, the renter is obliged to hire people and cattle for all the purposes of cultivation. In the Bâramahal, the ground for indigo is levelled and ploughed the same as for other ordinary dry field productions. The usual hire of a plough with two bullocks to plough a târ or 10 acres once over, is commonly 10 kantarai fanams, or pagodas 0-37-40, and the ground required for indigo should be ploughed five times; the expense is consequently pagodas 4-7-40.

Manures.—Street ashes are found to answer, but sheep dung is found and esteemed the best manure for indigo. The manure is always spread after the third ploughing. The cooping a flock of sheep, supposed to consist of seven hundred or eight hundred, three nights upon a field, costing 1 rupee, and the dung of such a flock for 18 nights being thought sufficient for a târ, the cost of manure amounts to six rupees or pagodas 1-30-0.

Seed.—A candy is esteemed the necessary quantity for a târ. That is about two-thirds of a bushel per acre. The seed is always sown after the manure is spread, that is between the 3rd and 4th ploughing, and broadcast like ragi or other dry grains. A târ yielding at an average about 16 candies, a sixteenth part of the crop is sufficient for seed, but when likely to yield a great proportion of indigo, it is deemed more advisable to buy seed than to reserve any part for that purpose. A candy costs pagodas 5-37-40.

Watering.—The growth of the indigo depends much upon the quantity and regularity of rain the first month after it is sown. A padunu is an estimated quantity of rain equal to a span or 8 inches and that much is deemed necessary the first month to ensure a good crop. It requires the same quantity every month after, but if more or less, the chief consequence is its being sooner or later ripe.

Disorders.—The indigo commonly makes its appearance above ground in a week after it is sown. The second month, when it is three or four inches high, it is liable to suffer from a worm called *painellov*, and the third month from another called *dûdio*. The former is found among the foliage, the latter about the root only in the day time, but both feed on the leaves. The indigo in the Bâramahal never grows higher than three feet, but in ordinary, only half that height.

Weeding.—It requires weeding the third or fourth month. The expense of that depends upon the quantity of weeds, but in common it is found that 20 people are sufficient to weed a târ in 5 days. Their hire at 1 kantarai fanam every 5 days, or 60 cash each, *per diem*, comes to pagodas 1-30-0.

Reaping.—They never begin to reap the indigo in the Bâramahal till the appearance of the blossom, and they continue until it begins to seed. That is always done in the forenoon because the leaves are more juicy than in the afternoon and there is time for boiling, which must not be delayed till next day. The only other rule in reaping is to cut the branches within 3 or 4 inches of the stem. A good year is supposed to yield 5 crops in the following months, March, June, September, December, and March, but sometimes there are only 2 or 3, and 4 is reckoned the average. These are the estimated proportions of the 4 crops in

Indigo cultivation in the Bâramahal.

bundles, 2 hands in length, and as thick as they can be bound tight or measured round by ropes of 3 hands in length, viz. in March 101, in June 203, in September 294, in December 102; total 700. A bundle of that description contains the quantity which every reaper is required to gather as his task for the forenoon. The estimated number of reapers necessary for every crop of a târ is the same, but the number of days is more or less according to the quantities of the crops. Their hire for the half day is a kantarai fanam among 8, or $37\frac{1}{2}$ cash each. Thus to gather in:—

The first	crop,	21	reapers	for	8	days	comes	to	pagodas	...	1	33	60	
The second	"	21	"	for	16	"	"	"	"	...	3	22	40	
The third	"	21	"	for	$6\frac{1}{2}$	"	"	"	"	...	1	16	20	
The fourth	"	21	"	for	$3\frac{1}{2}$	"	"	"	"	...	0	30	50	
Total											...	7	13	10

Expense of cultivation.—The following are the heads of the expense of cultivating a târ or 10 acres of ordinary soil:—

Rent	...	...	...	...	...	...	...	Pags.	6	28	48
Ploughing	...	...	...	...	...	...	...	"	4	7	40
Manure	...	...	...	...	...	...	...	"	1	30	0
Seed	...	...	...	...	...	...	...	"	5	37	40
Weeding	...	...	...	...	...	...	...	"	1	30	0
Reaping	...	...	...	...	...	...	...	"	7	13	10
Total, star pags.									27	11	58

which is 2-32-48 per acre of the same description. It also appears that, a târ yielding 700 bundles, an acre of the same kind of soil will produce 70, and that every 26 cost 1 pagoda without any allowance to the cultivator or overseer. No estimate can be made of the quantity of leaves that a târ or an acre will produce for never being separated from the branches in this country, it has not fallen within the observation of the natives.

Manufacture of Indigo in the Bâramahal.

<i>Apparatus.</i> —The manufacturing of 700 bundles requires the following utensils—30 hauses or vats holding each about 80 or 100 gallons with a hole and plug or cork 8 or 9 inches from the bottom. That is, 20 for constant use, and 10 to supply breakage in the course of 4 years, the time which they are supposed to last. Their cost being 4 fanams 40 cash each, that number amounts to 3 pagodas, and 16 months the time required for one plantation being one-third of 4 years, that proportion of expense is	...	...	...	...	...	...	...	Pags.	1	0	0
94 karâhîs or boilers holding between 6 and 7 gallons each, which is 30 for constant use and 64 for breakage during the process; as they cost 1 fanam 30 cash each, their amount is	...	...	...	...	...	...	...	0	35	12	
14 kumbams or basins with covers being 45 cash each, come to	...	...	...	...	...	...	...	0	7	40	
13 cooly loads of red earth at 75 cash each, amount to	...	...	...	...	...	...	...	0	11	58	
500 bundles of firewood at $33\frac{1}{2}$ cash	...	...	...	...	...	...	...	5	9	30	
4 earthen totties or receivers containing about 2 gallons each, 2 of which are sunk in the ground to keep them steady and the remainder kept in reserve	...	...	...	...	...	...	...	0	7	2	
2 pieces of coarse cloth	...	...	...	...	...	...	...	0	15	0	
These are all the utensils necessary for manufacturing 700 bundles of the plant, and their amount, it appears, is about pagodas	...	...	...	...	...	...	...	7	40	62	

Process.—When the plants are brought to the manufactory, the boilers above mentioned are nearly filled with them, and then water, which must be sweet and clear, is poured in upon them until they are entirely covered. They are then put on the fire and the usual time of their remaining there is said to be a ghadi or 24 minutes.

The water first assumes a green and afterwards a yellowish colour, which is reckoned the time for taking the boilers off the fire. The water is then poured off into the receivers and carried in them to be emptied into the vats. In the meantime, the boilers are filled a second time with fresh water, they are put again upon the fire, and the same process being observed as with the first water, the branches are thrown away.

While the water is yet hot in the vats, they stir it about with a stick 6 or 7 feet long which is wrapped well round with a straw rope. They describe that as

being done in the same manner as milk is churned in making butter, taking care not to touch the bottom of the vat which would easily break. In about half an hour, the water changes its colour from the yellow hue it acquired in the boilers to a dark blue. Manufacture of indigo in the Bâra-mahal.

During this, a pot of red earth and water which is mixed up while the boilers are on fire, is preparing, by the fall of its heavier particles to the bottom; and 6 or 7 quarts of it being taken lightly from the top are put into every vat for the purpose of precipitating the indigo to the bottom and thereby increasing its quantity and weight. A decoction of the bark of the jâmun or jambolan (*Eugenia jambolana*) of the Realla or Cassia, or of the mowa tree would, as I am informed, have the same effect. The indigo in the vats is sufficiently settled by the next day, when the clear water is drawn off by the cock before described in the vats. Then it is taken out of them, put into the basins, and a cloth being previously laid over ashes spread upon the ground, it is put upon that to absorb the water. That is repeated until the indigo be of a proper consistence when it is cut into square pieces and dried in the sun.

Expense of manufacture.—Four men are sufficient for the manufacture. The number of days they are employed depending on the quantity of the plant from every crop the amount required is as follows:—

The 1st crop, 4 men at 1 fan. 39 cash each for 9 days ...	Pags.	1	2	45½
The 2nd „ 4 „ at „ „ „ for 16 „ ...	„	2	5	14½
The 3rd „ 4 „ at „ „ „ for 23 „ ...	„	3	2	65
The 4th „ 4 „ at „ „ „ for 8 „ ...	„	1	2	45½
Total expense of boiling and drying „		7	13	10

Carriage and customs.—The total estimated produce of indigo from 700 bundles being 12½ maunds, the carriage of that to Madras at the rate of 10 maunds per bullock load is pagodas 1-39-30, and the customs thither at the rate of 6 fanams 60 cash per maund is pagodas 1-39-30, which makes the expense of both pagodas 3-33-60.

Produce.—As the indigo produced by this process is 8 pagodas per maund at Madras, it appears the whole being 12½ maunds will amount to ...

Pags.	100	0	0
Deduct Rent and the expense of cultivation...	27	11	58
The amount of utensils ...	7	40	62
The expense of boiling and drying ...	7	13	10
Carriage and customs ...	3	33	60
Net produce ...	53	35	50

VI

Letter—from Messrs. DRING CLELAND & Co.

To—Messrs. DRING, GORDON AND LUSHINGTON.

Dated—Calcutta, the 11th January 1796.

In acknowledging your letter of the 12th ultimo, we stated the causes which made it difficult to obtain for Captain Read the information he wished about indigo. Indigo manufacture in Northern India.

We now enclose copies of five papers which will supply part of that information in a general way. They may not be of much use, but if considered with caution, they can do no harm. The culture of the weed unless in the main article of weeding is left very much to the natives all over this country, and few of the planters, we mean of the gentlemen having factories, possess any accurate information about it. In fact people of this description, we mean the labouring husbandmen in every country, have so little enlargement of mind, and are naturally so indocile, that it is in general best to leave them very much to their own ways, and to attempt improvements very gradually, and only when the received practice is extremely faulty; this caution is particularly necessary here where a difference of language is so great an obstacle to clear communication.

Indigo
manufacture
in Northern
India.

In Bengal, the weed is purchased in quantity. A certain number of bundles of a certain circumference are considered as equal to a punja, and delivered at the factory at a price of about seven sonaut rupees; six, seven or eight times this number are considered as producing in general about a maund of indigo. The agreements are made nominally by the bîghâ, but in fact for the stated number of bundles.

In Behar, Benâres and Oudh, the agreements are for the measured bîghâ. These vary extremely; a bîghâ in Benâres is five times the size of a bîghâ in Oudh. The nature of the agreement varies also; sometimes the planter finds the seed, sometimes the ryot. Sometimes the planter ploughs, weeds and carries it to the factory, sometimes the ryot. When the plant continues three or four years in the ground, the expense of the first year falls heavy, that of the following lighter. The produce of the first year is also less certain. In general it may be stated that on an average the weed which produces a maund of indigo costs at the factory in Bengal from fans. 50 to fans. 60; in Behar and Benâres, from fans. 40 to 50; in Oudh, from fans. 35 to 45.

To the observations on the process of the manufacture little need be added to the enclosed remarks. The packages should be strong, and from 2 to 2½ maunds is reckoned the best size.

In Bengal, all the processes of the manufacture are carried on in one set of buildings, and the indigo is brought in from 6 or 7 coss distance. This facilitates superintendence, but is otherwise, we conceive, very injurious to the proprietor. Indeed those who have settled more lately give in to the Benâres practice.

The Benâres practice is to have complete but small sets of buildings in different parts, so that the weed is seldom carried a coss or a coss and a half. This, however, requires an increased superintendence, and leaves you more at the mercy of your servants. It is otherwise favourable to the produce of the weed, both in quantity and quality.

Both in Bengal and Behar, they use very large vats from 16 to 20 ft. square, up to 25 to 40. These, we believe, answer better than the smaller vats of Oudh, but much must depend on the quantity of land in the neighbourhood, and it is always advisable to have a set of smaller vats, to be used in the beginning and end of the season, when the weed is not received in quantity.

From 6 to 12 sets of these vats with a proportioned drying house and godown make a Bengal factory. Two sets with a small one, perhaps with a drying house and godown in proportion, make a Benâres factory, and of these, each proprietor has 2, 3 or more. The object in Bengal goes in general from 300 to 600 maunds. In Benâres, it is more easily extended and goes from 300 to 800 or 1,000 maunds.

An abundant supply of good water is a very principal consideration. A reservoir of proportional extent should have been included as part of the factory. In Bengal, they are chiefly supplied with tanks, and raise the water by pumps or in the simpler though more laborious modes of the natives. In Benâres, they dig wells to a great depth and of a great circumference, which also constitute part of each factory.

In Oudh, one, two or three sets of small vats, with a well make one part of factory, and these to the number of 50 or 100, and even 150 are scattered over large extent of country from 25 to 30 coss in diameter. At these, only the first parts of the process are performed, that is, the steeping, beating and a slight expression of the water by suspending the substance in bags. Being then nearly of the consistence of jaggery, it is carried on hackeries two or three days' journey, sometimes to the Kârkhâna or principal factory, where it undergoes all the subsequent and tedious operations of pressing and drying. We have been assured that the substance does not suffer from this carriage, and, if so, it seems to be an improvement of the Benâres practice by lessening the expense and difficulties of superintendence, by confining the means of fraud and stealth and by bringing the pressing and drying of the whole under the proprietor's eye. The object in Oudh is very extensive, from 800 to 2,000, or even 3,000 maunds. There are numerous sets of small vats are adapted to the country, where only small and scattered spots of ground are in cultivation.

The change of the seed is an essential observance in the culture of indigo as is all farming in Europe, and this the proprietor of the works attends to, by providing it in quantity and serving it out to the ryots in detail. We are not quite clear

that we are correct in stating 2 seers per Bengal bighâ or about 15 seers of seed for the quantity of ground that will produce weed yielding a maund of indigo to be near the proportion. From recollection, we rather think it is. We shall be happy that this letter and its enclosures prove acceptable to Captain Read.

Indigo manufacture in Northern India.

ENCLOSURE No. 1.*

It appears that for some time past, this branch of commerce (indigo) has been cultivated in Bengal, from whence a great quantity has been sent here, which has been sold at 3s. 6d. to 7s. per lb. according to the quality; but it is evident to myself and others, who have a knowledge of this dye, that the manufacture of it is not yet brought to perfection, and that it is much adulterated by sand and other foreign materials with which it is mixed in the operation. I have certain information from a dyer who is a customer of ours who has made trial of it, that he has extracted from that indigo † $\frac{3}{4}$ lb. of sand, and that what remained of it was of an excellent quality, superior to the best Guatimala indigo.

The method therefore of improving it would be to prevent such adulterations by which means the value would be double, or even three times higher, and the expense of freight much reduced.

Varieties of indigo.

You have herewith two boxes of samples, one called East India indigo containing eight samples as follows:—

No.		1st quality.
1.	Called by the Dutch Cheribon value	11 $\frac{1}{2}$
2.	" Iacala "	10
3.	" Tagal or Tagut "	9 $\frac{1}{2}$
4.	" Cheribon, 2nd quality "	8
5.	" Ioanna "	5 to 5 1 $\frac{1}{2}$
6.	" Iapara "	4 $\frac{1}{2}$ to 5
7.	Name unknown "	6 to 8
8.	A muster of Guatimala "	12 to 12 $\frac{1}{2}$

In the other box, are ten † samples of Carolina indigo—

1.	Fine bright copper value	6 $\frac{1}{2}$
2.	Copper with a purple shade "	5 $\frac{1}{2}$
3.	Good copper "	5 $\frac{1}{2}$
4.	Copper rather black hard "	4 $\frac{1}{2}$
6.	Good blue "	7 $\frac{1}{2}$
7.	" " "	6 $\frac{1}{2}$
8.	Middling blue "	5 $\frac{1}{2}$
9.	Pale blue "	4 $\frac{1}{2}$
10.	Blue rather slate black "	2 $\frac{1}{2}$

It is necessary to observe that one cannot fully instruct by writing, a person not used to this dye, so as to give him a perfect knowledge of its qualities; but the mistakes cannot be very considerable, if proper attention is paid to the following:—

On the beauty and richness of the colour depends the value. In order to have a fine blue, it is requisite in the first place to have the indigo light enough to swim like a cork. Secondly, its colour must be bright, of a velvet appearance, and on the least scraping with the nail or a knife it must shine like fine polished gold. There is no quality of indigo more precarious than blue, in which the smallest shade occasions a great difference in the value. The sky blue, blackish, ash colour, and hard slate are all of a bad quality and may be of no value at all; the blue must be truly fine or it is best not to buy any. The purple indigo to be good must be equally light and bright, as the rich blue; if it is dull or dry it is bad, and the purple indigo must be specifically of that colour, or at least something bordering on copper, very rich and bright.

The copper indigo is naturally weightier and does not swim in water; a pigeon's neck shining in the sun is the best specimen of a fine copper colour, which must blaze like fire, and when broken, look like gold. There are several sorts of it which may be discernible to the eye by the more or less richness and brightness in general; all indigo is good that is obviously of a copper hue without being dull or slaty.

Hence it appears that the sorts to be avoided are the heavy blue without a certain brightness, the sky blue, the ash, slate or black, and the same holds good for the purple, as for the copper colours.

It is observable, that indigo in square lumps, like that of Carolina, is much the more saleable in Europe.

* This was received from a correspondent in England so far back as 1789. The manufacture in this country is very much improved since.

† The amount of indigo which contained $\frac{3}{4}$ lb. of sand has been omitted, presumably by the copyist.

‡ Fifth sample has been omitted in the list.

ENCLOSURE No. 2.

Culture and
manufacture
of Indigo
in Jamaica.

The manufacture of this plant hath formerly greatly contributed to the opulence of this island (Jamaica), but a duty of three shillings and six pence having been imposed upon every pound of this commodity, disheartened the planters, and the culture thereof since that period has been almost entirely annihilated.

Our botanists, whether from system or caprice, or probably to give themselves the character of originality, have differed greatly in the names of this precious plant. The enumeration of the different terms by which they have distinguished it, would be going beyond the limits of this treatise; we shall therefore adhere to the English denominations.

Description of the plant.—The indigo plant is a species of undershrub, little known to the ancients, and a stranger to Europe, from whence is extracted that sediment without which it is impossible to make a fine blue.

The plant is but short lived. Its leaves are ranged in pairs upon a stalk terminated at the extremity by a single leaf. Its blossoms are of the leguminous kind, for the most part disposed in flowers of five petals; the superior petal or standard is larger than any of the other petals; the inferior ones are short and terminated in a point. In the middle part of the flower is the pistil (female organ of flowers) from which comes a formed pod containing in every cell a cylindrical grain exactly formed. They distinguish several kinds of indigo—the franc, the bastard or the savage, the Guatamala or the Mary.

The root of the plant is about the thickness of from three or four lines diameter, and upwards of a foot in length, of a soft smell resembling that of parsley. From this root comes a single stalk nigh to the thickness thereof and about the height of two feet, when it is of the species of the franc, but often passing six feet, if not stopped, when it is of the bastard species. The stalk of the latter is upright, hard, rather woody, covered with a bark slightly cracked, of a grey ash colour towards the root, green in the middle, reddish at the extremity, and without appearance of any substance within. As to the species most convenient for different soils, experience, the only faithful guide, can teach us that with certainty.

There are soils which exclusively agree with the franc; there are others which obstinately refuse it the nourishing juices and which alone will rear the bastard; and there are some lands which produce faithfully the united shoots of these two qualities.

The soil.—This plant requires good rich land wrought as a garden, but not too dry; it ought to be planted by itself. Like a vigorous infant it demands all the nourishment of a whole and robust mother. So soon as you see this plant rise above ground, do not vainly imagine that any further care is unnecessary, but let officious hands remove all parasite plants, which would rob it of that subsistence of which it has need. The planters of this production do not uniformly consult the seasons to plant it. Some wait until the first rains have moistened the earth. Others, more impressed with the desire of a quick harvest, plant in dry weather. There are great inconveniences attending both methods.

Those who wait for rain to sow their fields, render this operation more painful and their harvests later. However, they do not expose themselves to work in vain and to lose their seeds as those do who sow in dry weather, for it often happens that the seed remaining too long in the earth is devoured by insects, or when a passing rain makes it shoot up, but not continuing, the earth gets dry, and the unfortunate sprout perishes. In both ways, the seeds are lost, and it is necessary to labour afresh.*

Three or four days after the seed is in the earth, if the rains assist your endeavours, you will see the plant shoot up; then it is necessary to guard it with extraordinary care, otherwise foreign herbs will rob it of its sustenance. These ungrateful neighbours conceal in their perfidious bosoms cruel insects, whose voracious activity will soon devour all the leaves of this precious plant.†

The moment that the plant shows its head above the earth, it needs only two months to arrive at perfection, although the bastard species is often later.

The indications of maturity are not equivocal; so soon as the leaves begin to flourish, or when pressed, they break between the fingers, then arm your negroes with knives in the form of pruning knives, which can cut the plant neatly from top to bottom in a diagonal line at about the distance of an inch or two above the earth. Six weeks after that, your stems have acquired enough of strength to suffer a second crop, and unless the inconsistency of the weather oppose you, you may continue to cut from every 45 to 50 days of interval, according to the quality of the ground, that is until the end of the second year, in a fine new ground, but only until the end of the first in a moderate or old ground.

Then you must replant if it is the rainy season, or if you have the means of watering your ground, you may; and as soon as the soil is prepared, a barrel of seed is sufficient to sow three acres of land.

* The soil and the circumstances of the season vary so much over this country that it would be mere chance if observations drawn from the experience of any one part would apply to a plantation on the Madras coast and the proper time for planting depending entirely on these is subject to the same variety and consequent uncertainty. The plant in Bengal must be planted anew every year. In the Benâres district, it continues 3 years. In Oudh four. A second and sometimes a third cutting is made in Bengal, but they are comparatively of little value

† Careful incessant weeding at this period must everywhere be indispensable.

The fermentation.—When the plant is cut, it must be carried in bundles to the indigo works, then thrown into the first vat or steeper, which, when the plant is deposited and you would wish to proceed to make the indigo, must be filled with water.

Manufacture
of Indigo in
Jamaica.

Indigo planters differ very much upon the true marks of its being sufficiently fermented; but we shall here content ourselves with giving the process of Messrs. Danglades and Monjon, living inhabitants of Hispaniola.* Seven or eight hours after the herb is in the steeper, or to speak with more precision, when the vat begins to work, draw off from the cock a cup of water, beat it for the space of two or three minutes, and after having let it stand for an equal space of time, you must take some of the liquor with a pen fit to write large characters, or with a small pencil having great care not to lay too much strength upon it, then draw full lines upon a good smooth paper; the first will certainly be of a deep dye; in this case the indigo is not sufficiently fermented; repeat the operation every quarter of an hour sooner or later according as you perceive the operation is advanced; that is when you take another cup of water, of which draw new lines by the side of the former; their diminishing in colour announces the progress of the fermentation, and so soon as the lines you trace, cease to be coloured, it is certain proof that the fermentation is at its true point of perfection; you must then with all possible dispatch draw off the water into the second vat or beater.

Beating of indigo.—When your herb is properly fermented, I say sufficiently fermented, the process of beating is very simple. Several planters have assured me that they never succeeded in their first operation although they strictly followed the process of Danglades and Monjon, but having afterwards been an eye-witness myself of the process, it has always succeeded, and they have afterwards declared that their former attempts only failed through want of attention. It is when the indigo is in the steeper that its fate is to be decided. When the water is drawn off into the beater it must there be stirred and beaten with buckets until you find that the lees are formed into a body, are properly coagulated and the grain is formed; to be certain of this the planters draw a cup-full of water. Grain is known to have the requisite qualities when it is round, well nourished and separates easily from the water and when you can sensibly perceive that copper colour which characterizes the fine indigo. It is known to be sufficiently beaten by the same procedure, that the hue point of fermentation in the steeper is known, that is, when I draw water out of the beater, and trace full lines upon white paper, the moment they are no longer coloured, immediately discontinue beating.

Danglades and Monjon have only made use of this mode to find the exact degree of fermentation in the steeper, but several reasons have induced me to believe that it was applicable to the beater, and repeated experiments have invariably justified this application.†

I have also to mention that the water, so soon as you begin to beat with the buckets, is covered with a scum, more or less thick. It is easily dispersed by throwing with a small brush here and there a little linseed oil, or those who have any Palma Christi, may take a handful of grains of it, bruise them well and scatter them into the vat, and the scum will entirely disappear after beating for a few moments.

Beware of following the blind and prejudicial mode of Americans, who to disperse this scum make use of lime water ‡, which in the first place requires a larger vat, in the second, very often carriage burthensome to the planters. But what is most distressing is, that this voracious and corrosive water devours considerable quantities of this precious commodity, robs it of its beauty and its fine quality, and likewise lessens the value of it a full third.

When you think your vat sufficiently beaten let it rest for two or three § hours, that the lees or the coloured particles may sink to the bottom. This valuable deposit being made, run off your water through different holes of an inch diameter, disposed progressively from the bottom five inches upwards. When you perceive that nothing remains but the indigo or a very liquid lees of a dark blue colour, you then open the holes which are of a level with the bottom; and the negro who is in the vat pushes the sediment through into a vessel constructed below the second vat for receiving it.

After that, the sediment is drained of a great deal of superfluous water in the third and last vat, it is then put into small sacks, containing an ell or an ell and a half of very thick and very close cloth. Some are made in the form of a cone, others in an oblong form; they hang several of them together, that they may press each other, and then they are put separately to dry. Some planters have boxes which they line with thick close cloth, and in them put the indigo to press. The latter method is not expeditious, but the indigo is far from losing any thing by it.

When you observe that your indigo has acquired a consistency, pass your trowel strongly over it, then cut it in a square of three or four inches, and put it out to dry; when it is entirely free of moisture (the smallest degree of which will render it mouldy) pack it up in flour barrels and then the process is completely finished.

* It will naturally occur that this must be the effect of experience, but it is the most important point in the process and requires great attention. It was principally on this account that the first Bengal planter paid very considerable salaries to Frenchmen who were supposed to possess the necessary knack. It is since found that our commonest coolies acquire it in perfection and may be safely trusted to superintend the process. Not every one, however, but very frequently.

† This is very just.

‡ There is a great difference of opinion as to the use of lime water. In general, it is condemned.

§ Some planters let it rest from twelve to fifteen hours, which is not blamable.

ENCLOSURE No. 3.

*The Process of making Indigo.*Indigo
manufacture.

In a warm situation, where it is frequently refreshed with rain, it may be planted at any season of the year; the land is first hoed into small straight trenches about 2 inches deep and 18 inches asunder, and sown as common seed, then gently covered in with earth. If the weather proves warm and serene the plant will appear above ground in a few days, and with moderate showers to bring it forward will be fit to cut in 6 or 7 weeks. The ground must be hoed and cleansed as soon as the young plant begins to appear, and the soil about it loosened to facilitate its growth. In some parts, they do not come to perfection under 2 or 3 months, and are generally observed to answer best when cut in full blossom, as the leaves are then thick and fullest of juice.

The vats for manufacturing it are generally three; when everything is in readiness the plant is cut and regularly laid in the steeper with the stalk upwards (which hastens the fermentation) till this vat is full, a number of rails or planks are then laid on the whole length of the vat, and timbers across to press upon them to prevent them from buoying up, when water is put on; the softest water is the best, and as much water is let in, as the weed will imbibe, covering with a surface of 4 or 5 inches; in this state it is left to ferment,* and in 24 hours if the process goes on well, it will bubble like water in a pot upon the fire, and show a tinge of very dark blue; great nicety is required as well in not letting the tender tops to run into putrefaction, which might spoil the whole as in drawing off the water at the critical moment, for, if it is drawn off two hours too soon,† great part of the pulp will be lost; and if fermentation is kept as much too long, the labour will be lost.

To avoid these disasters, a handful of the weed is frequently taken up, and when the tops are observed to become very pale and tender, and the stronger leaves to change their colour to a less lively pale, this is known to be the proper point, and the liquor must be speedily drawn off into the second vat, there to be thoroughly beaten and incorporated. When the liquor has been by means of a machine well stirred for the space of 15 or 20 minutes, a little of it taken up in a silver cup will appear curdled, or as if full of small grains, the stirring and beating being still continued, and the colour being carefully examined from time to time as the work advances, for the grains pass by degrees from a greenish cast to a fine blue, which is the proper colour; when the liquor has been sufficiently worked an agitation will leave the grains coarse and the water green, while too long continued beating causes it to turn almost black. By examining it therefore repeatedly during the progress in a silver cup, the operator may soon learn to distinguish, whether to have his indigo of a deep copperish blue, or of a pale complexion, as he chooses.

When the liquor wherein the colour swims is quite clear, he may be satisfied it has lime water enough; the lime water must be perfectly clear, or otherwise the indigo will be very much speckled, nor should too large a quantity of it be let in which would render the indigo too hard and of a greyish cast; when the lime water is let in, it must be left to settle, which it will in 2 or 3 hours.

The clear water is then very gently drawn off through plug holes for that purpose a few inches above the floor or bottom, and the sediment which remains behind is carefully strained through a cloth, to render the indigo perfectly clean, and put up to drain out the water, any remains of which would hurt the quality of the dye. The indigo becomes of a fine thick paste; it is then cut into squares of about 2 inches, which are ranged under cover in a free air without exposure to the sun, which would be very hurtful to the colour; whilst it is in the drying house, it should be turned two or three times a day, to prevent its rotting, the flies must be likewise driven from it. Care must be taken to have it thoroughly dry or it will be spoiled. Good indigo is of a fine copperish blue colour, shining with a smooth grain.

ENCLOSURE No. 4.

Indigo in commerce is a preparation of the juices of a plant whose leaves are small, fleshy and soft, of a greenish brown colour on the upper side, pale and as it were silver coloured underneath.

This plant called anil has several slender knotty stalks, which spread into small branches, each clothed with 4 to 10 pairs of these leaves and a single one at the end; it rises to the height of about 2 feet, and produces reddish flowers in shape resembling those of broom but smaller, followed by oblong pods containing the seeds. Labat has given a particular account of this plant and the preparation of the indigo.

The ground being thoroughly cleared from the weeds, one of the principal points in the culture, a number of slaves march across (ranged in a line) making little trenches of the width of their hoes and about 2 or 3 inches deep and a foot distance from one another every way; then returning they drop some seeds in each trench, and afterwards cover them with the earth taken out in moist weather; the plant comes up in 3 or 4 days, and in about 2 months it is fit

* In this country the period required for fermentation is from 11 to 13 hours.

† Here a mistake of ten minutes would be fatal.

for cutting; if suffered to stand till it runs into flower, the leaves become too dry and hard, and the indigo obtained from it proves less in quantity and less beautiful; the true point of maturity is known by the leaves beginning to grow less supple and more brittle. Indigo
manufacture

In the rainy season, the cutting may be separated every 6 weeks; cutting in dry weather kills the plant, which, when that is avoided, continues to afford fresh crops for 2 years.

A large quantity of the herb is put into a cistern of strong mason work, with so much water as is sufficient to cover it, and some wood laid above to prevent its rising up; the matter beginning to ferment sooner or later according to the warmth of the weather and the maturity of the plant, sometimes in 6 or 8 hours, and sometimes not till 20, the liquor grows hot, throws up a plentiful froth, thickens by degrees, and acquires a blue colour, inclining to violet; at this time without touching the herb, the liquor impregnated with its tincture is let out by cocks in the bottom into another vat placed for that purpose.

In the second vat, the liquor is strongly and incessantly beaten, and agitated with a kind of bucket, fixed to poles, till the colouring matter is united into a body; a great deal of nicety is required in hitting this point; if the beating is ceased too soon, part of the tinging matter remains dissolved in the liquor, if continued too long, a part of that which separated is dissolved afresh; the exact time for discontinuing is determined by taking a little of the liquor occasionally in a little cup, and observing whether the blue fecula is disposed to separate in a body; lime or lime water is sometimes employed in the beating to promote the separation of the tinging particles from the water, and the hardness and flintiness of some indigo is owing to an over-proportion of this addition.

The whole being suffered to rest until the blue matter has settled, the clear water is let off by cocks in the side at different heights and the blue parts discharged by a cock in the bottom into another vat; here it is suffered to settle sometime longer, and further drained in cloth bags, then exposed in shallow boxes to the air till thoroughly dry.

The goodness of indigo depends greatly upon the age of the plant; before it is fully ripe the quantity it yields is less, but the colour proportionably more beautiful, so that probably the secret of those whose indigo has been most esteemed, is no other than cutting the herb at the time it yields the finest colour.

ENCLOSURE No. 5.

Method of making Indigo at Singatollah near Maldah in Bengal—September 1790.

The plant is cut when it is well in flower, and when the leaves on squeezing them make a crumpling noise, something like the noise fine paper makes when squeezed in one's hands. It is brought in the forenoon to the indigo house, or as soon after it has been cut as it can be brought; it is then put into the steeping vat, which must be done with all quickness, as the plant suffers much by being kept. The height of plant in a vat, about three English feet by twenty-two square and not much pressed down. After the vat is filled with plant it should be immediately filled with water so as to cover the plant two or three inches; and the water made use of should be the clearest that can be got.

When the fermentation approaches the proper point there will appear here and there on the top of the water, patches of white froth, which has the appearance of wool just sheared from sheep, and with the froth there will also be a thin coppery pellicle connecting the patches of froth together. When the edges and points of this froth are a fine blue colour, then is the time of letting off the vat; if they are dark green, or if they are black in the first instance, the fermentation will have been too little, in the latter too much, and in either case, the quality of the indigo will be bad. It happens sometimes that there is no froth or coppery pellicle on the surface of the vat, when the weather is rainy, and the air very moist, or if the plant has been cut immediately after much rain, also in cold weather. In this case, the vat requires a longer time to ferment, and the only way of knowing the time of letting it off is when the colour of the water in it is a good strong green. By comparing it with what it was when the fermentation was good, it may be ascertained with tolerable accuracy. When it is let run into the battery, we are enabled to judge exactly to what state the fermentation had arrived in the steeper, for if it comes out at first a bright yellow colour, inclining towards a green, it has been properly fermented, but if it be very brown, yellow looking, oily and dark without any tinge of green, it has been too much fermented, and if very green, too little. To manage this part of the business well requires great attention and experience; for a quarter of an hour more or less fermentation will injure the quality of the indigo exceedingly, which cannot be recovered again by any after-process. The beating should be begun immediately that the water is all run off from the steeping vat. After beating sometime, the water gradually turns from green to blue, and quickly after from blue to black. At the time it changes to black, a little should be taken in a shallow silver cup with a flat bottom; after standing a few minutes, if the grains settle to the bottom, and the water remains clear of a yellowish colour resembling pale Madeira it is time to stop beating; but as long as the water retains any green colour in it after the grains have subsided, it is too early to stop. When the beating is stopped, the precipitant is thrown in, and the people who beat, walk round the vat slowly two or three times, in order to mix it well. After the precipitant is mixed in the vat, take off a little of the water in a silver cup, and if the

Indigo Manu-
facture at
Singatollah
in Bengal.

beating has been just, after letting it stand a little, the grains will collect, look large and settle quickly, leaving the water a brownish or pale yellow colour resembling Madeira wine. But if after standing a few minutes the grain appears very small, subsiding slowly, and the water looks dirty and very coppery coloured, the vat has been too much beaten; on the contrary, if, after standing about fifteen minutes, the grains settle and leave the water a strong or a weak green colour, the beating has been stopped too soon. The plant sometimes gives a black hue to this water after the grains are settled, so that it may look like a vat that has been too much beaten when in fact it is not so, except it has a copperish colour likewise. This happens chiefly when the plant has seed on it.

For the precipitant take a quantity of quicklime, and add to it three times its bulk in water, mix them well together two or three days, and let it settle a day before using it. To lime that has been slacked, twice its bulk of water must be added. Take also a quantity of ashes made from refuse indigo plants dried and burnt, add to this twice its bulk in water, mix it two or three days and let it settle a day for use; at the time of beating the vat, draw off one part chunam water, and two parts ash water; as soon as the beating is stopped, throw them into the vat at the same time but separately, as mixing them together has not the proper effect. The quantity of ash water and chunam water to be used must be according to the size of the vat, giving as much as will settle it in the course of one or two hours. Great care should be taken that the chunam and ash waters are well settled and filtered clear of all bits of charcoal, chunam or dirt.

After the battery is settled, which it will be in two hours almost, we begin to draw it off, taking out the uppermost peg first, and so going downwards until the indigo appears, when it is caught in pots and carried immediately to the boilers where it is heated to such a degree as to destroy all the eggs of insects that are in it. It is thence carried when it is cold and strained through a fine sieve into bags of the shape of jelly bags, that are suspended and there it remains to drain; when all the water is drained off, it is put into the presses, one bag to every press, and pressed by degrees for twelve or fourteen hours. It is thence carried to the drying house, taken out of the bags, cut into squares, placed in broad shallow baskets, and put upon the shelves. When the pieces have obtained sufficient hardness to be handled, they are taken out from the baskets and put upon the shelves with sufficient room that the air may have free circulation round them.

When the pieces have grown pretty hard, so as the edges and corners will not break by rubbing, a man goes between the shelves and makes a heap of them, tumbling them over for a considerable time, so that the pieces knock one against the other, by this means killing the insects, and taking off the white skin that adheres to the surface of them.

When the indigo gets to a considerable degree of hardness, say in a month after it is made, it is sweated in boxes, for two or three days, that is, it is put into boxes, and closely closed up from the wind and air; though it was dry to appearance when put in, it comes out quite wet, and is again laid upon the shelves.

The last thing to be done with it before packing is to see if it is sufficiently dried, which is done by sweating as above. If it comes out without any degree of moisture on it, it may be packed, but if the contrary, it must be laid on the shelves once more, and after a proper time tried again.

It is to be noticed that should these rules be exactly observed throughout, yet the indigo will greatly differ in quality; green plant will not give indigo equal in quality to plant that is just on the point of seeding. Nor plant cut soon after heavy rains, and made in rainy, damp weather, to that which is cut after a course of clear sunshine and made in such weather.

N.B.—The plant should be cut from midnight until daylight, but not after.

ENCLOSURE No. 6.

Remarks on the method of advancing and making Indigo by Mr. Robert Heaven—Camp Swarnamukhi.

The size of a bighâ of land is 85 cubits square, and according to the season, soil and situation it will yield from 20 to 50 bundles, measured by a chain 61 inches long, and ought to yield from 11 to 12 lb. good indigo upon an average through the crop for every 50 bundles (or what is called a pucka bighâ). Advance is made to the ryots. First one rupee per bighâ of 85 cubits square. When the season admits of planting, seed is given them—2 seers per bighâ carried to their account at the rate of 8 rupees per maund. When the indigo is ready for weeding, another rupee is advanced them. The ryot gives 10 bundles per rupee measured at the works. We pay for the bringing it. If the ryots choose to bring it themselves, they only give 7 bundles per rupee. We take the second out at 13 bundles; and weed that stands over from one year to another, called old indigo, we take at 15 bundles per rupee; and all the seed they deliver we take at 4 rupees per maund sicca weight. We cut our weed when it begins to blossom, and the leaves on squeezing them make a crackling noise or something like the noise of dry straw. The weed ought to be cut before day and brought to the works as early as possible and put to steep immediately. There are different methods of putting the weeds into the steeper; some lay it down, others put it standing with the stem downwards. When the

fermentation approaches the proper point, there will appear a white froth almost over the cistern with a coppery scum; when that froth begins to get of a bluish colour, then is the time to let it off. Indigo
manufacture.

Weed will not always steep the same time; it varies from 8 to 20 hours; neither will it have the same appearance in the steeper. Experience is required, for the whole art of the manufactory is in the steeping; the sooner it is beaten after letting off, the better.

After beating some time the liquor turns to a fine blue, when a small quantity of it must be taken out in a flat bottomed plate with a little rise in the middle, either of silver or queensware, where the grain will be seen floating about, and when the grain begins to settle, and leaves the water round the edges of a reddish tinge, then it is time to put in the lime water, such quantity as is sufficient to make the grain go to the bottom; the quantity given will be according to the strength of the lime water. Very little experience will teach that part of the business.

When it has stood for two or three hours after being beaten, the water is drawn off, beginning with the upper plug first; when all the water is off, the indigo is put into sand-frames to drain.

The sand-frames are raised about 18 inches from the ground—simply a frame 8 by 6 feet on posts, that frame covered with sticks, those sticks covered with straw tied down, the straw covered with sand about 2½ inches thick, over that a coarse cloth laid, upon that a frame 8 by 6 feet, 6 inches deep and over that frame a sheet of vittry to be made sit close to the cloth over the sand, and the sides of the frame and into that put the liquid indigo from the beater. It will take 10 or 12 hours to drain off all the water, then it is put into presses and pressed till the water is out or it becomes hard.

The presses are made viz.—A frame 3 feet long, 14 inches wide and 4 inches deep (the frame must be 2 inches thick or it will not stand the pressing) is to be put upon a bottom 4 inches longer and wider than the frame. The frame must be kept steady at the bottom (not fixed) with cleats. Over the frame is put a cloth of vittry, the cloth to be long and wide enough to cover the indigo that is taken from the sand frames, and put into those frames and to be covered with a top to be made to fit into the frames. Those frames with bottoms and all to be put in a place to press with 2 levers not less than 9 feet, and three or four hundredweight put upon the end of them.

When sufficiently hard or all the water is out, it is then to be taken from the press. First take the top off, then slip the frame over the cake of indigo, remove the cloth, and rub the cloth marks out with the hand, turn it upon a table, and rub the cloth-marks out on that side, then cut it into pieces 3 inches long 2½ broad, then put it upon shelves to dry, and turn it every other day, when about three-quarters dry, or so hard that the nail will not make an impression, put it into barrels or boxes to sweat; keep each cistern separate; it will in a few days become hot, in a few more days it will become cold again of its own accord, then it must be taken out and put on the shelves to dry again. It will then be fit for packing, but before you pack it brush it to take off the white mould that generally adheres to it in the course of drying. Indigo of one quality must be packed in a box for sale. The above is the method we follow here.

ENCLOSURE No. 7.

Remarks on the process for obtaining a pure colour from the Anil Plant by Mr. Robert Blake.

In the first place, a considerable advantage would be obtained if the plants were placed in the steeping vessel with their stalks uppermost, as the dissolution is known to take place sooner at the bottom and middle of the vessel, than at the surface; the ligneous parts of the plant containing no colour, and the tender parts being less liable to be bruised than by throwing them in promiscuously as is commonly practised. Rain water is the best as the dissolution takes place much sooner in that than in common river water. During the first three or four hours of the process, air considerably purer than that of the atmosphere is emitted as the test of nitrous air fully demonstrates.

When the fermentation has advanced eight or ten hours and the liquor becomes tinged with green, the air collected occasions turbidness when mixed with an equal measure of lime water; but the air collected when the fermentation is a little exceeded, forms white clouds on being thrown into a phial containing marine acid air. These experiments induced me to believe that the colouring principle of the plant is held in solution in the liquor by means of the aerial acid, as I had often observed that a pellicle was formed on lime water in a few minutes after it was held over the agitated liquor in the battery, but lately observing an opinion given that the aerial acid was absorbed from the atmosphere during the agitation process, I was led to make the following experiments to convince myself if this really happened.

I mixed equal measures of the liquor drawn from the steeper, and of aerial acid in a bottle with a ground stopper and kept it agitated one hour but no change of colour took place in the liquor which would have happened in eight or ten minutes had it been agitated in the open air. Nothing happened in this experiment, but an absorption of one-third of the aerial acid.

I also filled a quart bottle with fresh liquor, weight sixty grains, and, stopping the bottle and shaking it until the alkali was dissolved, it acquired a very deep green colour, approaching to blue, and was nearly of the same appearance as the liquor in the battery after the agitation process, and was fully grained; by letting it rest about ten minutes a fine blue precipitate fell down and the water was of a yellowish brown colour. In this experiment, it is evident that the

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alkali had combined with the aerial acid, which kept the colouring matter in solution. I am the more inclined to believe this to be the fact, as the caustic alkali is mixed with indigo to produce the green liquor used by the blue dyers, and this liquor does not become green till it has undergone the fermentation process.

In order that the manufacturer may derive advantage from these experiments, he should know that when the little tufts of froth that are thrown up begin to flatten, or sink down a little, the steep has acquired its full degree of impregnation, after which putrefaction commences, and the volatile alkaline gas is thereby disengaged. This (according to circumstances of temperature of the atmosphere and the maturity of the plants) generally happens in from eleven to fifteen hours' steeping.

The agitation process being continued, till the deep green liquor appears well grained, an alkaline precipitate may be added in the proportion of four or five gallons to every thousand in the battery, and the operation continued only a few minutes to promote its equal distribution. The precipitation will be complete in an hour, or an hour and a half. The fecula obtained by this process may be washed in two or three waters, and it requires no further preparation than draining, pressing and cutting as quickly as possible, to make very fine indigo, though the quality will be very much improved if a dilute acid of vitriol, nitre or salt be added in small quantities and again washed off with pure hot water. If the precipitation be made with lime water, it does not wash so easily, the second precipitation being very slow; keeping the fecula two or three days in a fluid state injures the quality very much.

The alkaline precipitate is prepared as follows:—Dig a round hole in the earth about four feet in diameter and fourteen or sixteen inches deep (the shape of an inverted cone is the best); make a pretty brisk fire in it, so as nearly to fill it with live coals; then throw in a pound or two at a time of common saltpetre, till the coals appear to be nearly consumed. If this is conducted properly, one hundred pounds of saltpetre will produce nearly sixty pounds of dry alkali, which mixed with an equal quantity of quicklime will be sufficient to make one thousand gallons of the precipitate.

ENCLOSURE No. 8.

Flooring of vats.—A layer of coarse khoâ from six inches to one foot in depth according to soil. If stiff clay, four inches ample. A little fine surki. A layer of flat bricks with mortar underneath. A layer of bricks on edge with mortar. A layer of flat bricks. A layer of bricks on edge, flat tiles, the edge ground if requisite, and laid very close together with hot mortar.

Hot mortar.—Keep out $\frac{1}{2}$ chunam and mix the cement as usual. When ready for use, for every eight parts of cement made pretty wet in a gamlâ close to the workmen, add one part of unsacked and very carefully calcined lime. Mix the whole well and use it as soon as possible.*

Pressing.—The best and most expeditious mode of pressing indigo is in square boxes of 3 feet by $1\frac{1}{2}$; which ought to be the largest size, as it has been found from experience that if the dimensions are increased the indigo cannot be either so soon or so evenly pressed, and the latter is of some consequence as the purchasers of indigo value it more or less from the regularity of the cakes. After the mud has become as firm as new-made cheese, it is taken out of the pressing frame and carried upon the bottom part, which forms the pressing box, to a table, where it is cut (upon the frame) with a ruler of 2 inches in breadth and with a round pointed knife, the edge about the tenth part of an inch; it must not be sharper as the cloth upon which the indigo mud lies would otherwise be destroyed. The smallest sized box ought not to be less than 1 foot by 6 inches. Boxes of the above dimensions are absolutely necessary, as it often happens that there is not a sufficiency of indigo mud to fill a large box, and without a small one to press it in, the indigo would be lost to the manufacturer. A block of wood of 6 feet in length and one foot diameter must be very firmly fixed in the earth, so that 2 feet of it may appear above the level; in the centre of that part which is above ground, a pole is made to admit a lever of about 10 feet long, under which the press box is placed and weights put upon the end of the lever by degrees, until the indigo becomes of a proper substance to admit of cutting.

Separating the fecula of the indigo.—All I can observe upon this is that never having used anything but lime water, I am not competent to give my opinion whether decoction of bark or lime is best; but as the manufacturers in Bengal in general use lime, I should think nothing better has yet occurred. The steeping vats in Bengal are of various sizes, from 40 feet to 16 in length and from 20 to 16 in breadth, but I think the best vats are 30 by 18 feet built with the freshest chunam that is to be had and bricks well burnt. In the cement no sand must be used; the materials ought simply to be screened brick dust and chunam; of the former $\frac{2}{3}$, of the latter $\frac{1}{3}$; and a small proportion of jaggery. Wooden vats are used in Bengal, but I believe the brick and chunam ones are most admired and ultimately must prove most profitable, as the latter when well built are permanent and require little or no repairs. The depth of the vats is in general 3 feet. In regard to the number of bundles placed in a vat, the general rule is to leave six inches of water above the surface of the weed.

* N.B.—This cement will grow as hard as a stone under water.

Weed and cutting.—The weed is in general much more productive in August than either before or after; as much work as possible should therefore be crowded into that month. All that is cut before the 8th or 10th August will yield an early second cutting. The late second cutting is seldom worth the expense of making. Much depends on getting the weed very quickly into the vats after cutting.

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Steeping.—The point on which every thing depends is the vats being filled as expeditiously as possible with water. The lowest part of the vat always ferments the soonest. If therefore (in addition to this unavoidable disadvantage) the water is long in filling, either by waiting till the whole vat is sufficiently steeped the lower part becomes quite over-steeped and the quality will be bad, or if it is drawn off when the lower part is ready, the quantity will be small, because the upper part will not be near steeped.

It is I think better to put a first layer perpendicularly with the leaves downwards, and a horizontal layer upon that, as thick as will admit of 6 inches of water being above the weed after the vat is charged.

The plant should be laid horizontally as light as possible; do not suffer them to tread it but lay up the whole of the further part of the vat; then retiring, fill on till the last is thrown in after they have quitted the vat. Let the water cover the weed from 4 to 6 inches clear. Custom and observation can alone give the point for drawing off; while the bubbles continue to rise freely, let the fermentation go on till the liquor is a fine thick rich green. But the moment the bubbles begin to flatten and sink down, it is too much steeped and must be immediately drawn off. In general, the steeping is from 11 to 15 hours. Cold or rainy nights will keep it back, warm sun will much forward it.

Draw off your first vats as soon after 11 hours as you find a fine thick rich green in the liquor when you dash it with a stick. The quantity will soon show you whether to steep a little more, the quality whether you have steeped too much.*

Beating.—Beating with as many men as can be allotted to this part of the business, let them beat gradually and firmly, not languid, nor so violent as to tire them too soon. The liquor will change from bright to deep green, from deep green to blackish, to dirty black, to purplish and lastly to blue; pay no attention to it till the blue appears; then examine it in the plate and vat; look only for colour and do not mind grain. Beat till in the vat it appears a beautiful glowing blue and in the plate a perfectly fine blue, then add lime water just sufficient to make the grains form and fall, and the separated liquor yellow; let the lime be put very gradually, and keep agitating but not beating; while the lime is putting in, take it perpetually up into the plate that you may stop the lime as soon as you find the liquor separated yellowish at the edges.

Drawing off.—If properly beaten and there is sufficient lime, it will subside in half an hour, and as soon as the liquor comes clear from the highest plug, it should be drawn off.

Dripping.—When the refuse water is drawn off as clear as it can be taken, the indigo plug is opened and the mud is taken from the tub and poured into the dripping frames; the dripping must be helped by gently moving the iron ladle, making holes in the mud to drain the liquor quicker. As you neither boil nor wash the indigo nothing need be said of that part, but as this makes it drip not quite so quick, attention is necessary while dripping to give way to the upper water to run off by removing with the ladle the thick mud now and then, to let the thin run into the hollows.

Pressing.—When you judge it dripped enough, it is put into the pressing boxes lined with a pressing cloth or two cloths if they are thin—the object is that the pieces should be as near squares of two inches (rather more than less) as they conveniently can. Attention to the lids being placed even must be paid while pressing, and the weight the greater the better, for much depends on quick pressing.

Drying.—For the first eight days, the less air is suffered to come to the indigo in the drying house the better; when it gets to a consistence of dryness the more air the better till perfectly dry and the colour and grain easily perceived on breaking off a little piece at the corners.

MEMORANDUM.

A principal point is to ascertain both quantity and quality; for this purpose let the weight of each dalf or flat shallow basket (on which the pieces are carried from the cutting board to the shelves or drying stages) be marked upon it. Let each basket be weighed when filled and the weight marked as well as the number of pieces; when all is weighed, a few pieces are taken out and weighed, taking care that the average weight is the same with the whole vat; dry these

* This alone will not however guide you as to steeping, but added to the beating, it will; if the vat beats easily and to your liking, gives good colour, good grain and good precipitation, without your being obliged to put an unusual quantity of lime-water, and you find your quality good, but weight deficient, you did not steep enough, and should try increasing the time of steeping. Beating with difficulty, the black colour remaining very long, the blue continuing very long dull, and not getting to the bright colour you want till very late, and perhaps not at all, are sure signs of over-steeping, and you may find both quality bad and quantity deficient. In general, the quantity to be aimed at is 8 seers for 48 bundles factory weight. At some time in August, you may find as high as 12 seers of fine indigo, and the first few days it may not yield more than 4 to 6 or 7. But the average ought to be at least 7 and from that to 8 seers.

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pieces in a kadjeri pot on the fire in this manner. Take a round piece of thin wood that will just go into the mouth of the kadjeri pot, a hole made in the middle and a piece of wood let in and primed on the other side; if wanted, another plate of wood may be put on at such a distance as to admit the pieces of indigo to be laid on the bottom. A cross bar is tied or nailed to the upright which passes through the middle of the plate or plates, this cross bar resting on the mouth of the pot keeps the shelves suspended in the pot; and then on a common tin or in the oven, pieces of indigo may be completely dried in a few hours; when dry, weigh them; then as the dry weight is to the wet weight of these pieces, so is the wet weight to what will be the dry weight of the whole vat; a paper may be kept when the indigo of that vat is drying, stating date, time of keeping, number of pieces, wet weight and dry weight by the trial.

A book of these in columns is likewise regularly kept, on reference to which you can ascertain every point you may be in doubt about.

This little operation which may seem too minute and trifling, is to me so important that I wish you would appropriate a separate sarkâr solely to this purpose. On comparing the produces thus registered with your examination of quality, you will not have made indigo a week before you will find exactly the point of drawing off, etc.

Besides this, two important objects are gained by this operation of estimated weighing—one that you know exactly what weight of indigo you have which gives a great advantage as to boxes, freight, advice to agents and our own satisfaction, and the other that it will very much check pilfering, because they will all know that it cannot be stolen without your knowing it.

Whenever the beating has been easy and favourable, the quality you find good and the quantity under 6 seers, you should try a little increase of steeping, either till difficulty of beating, or bad quality shows you you have steeped too much. Thus you will soon find, *firstly* the true process, *secondly* where the deficiency arises from the state of the plant, and *thirdly* where the plant yields best, and when you find this, you should press the making as much as possible.

The beating varies from 1 hour, when a fine vat may beat, to 5 hours which a bad one may take; but in general 2 hours may be reckoned the time of beating. When a vat passes 3 and 3½ hours and does not give you the good colour, it will never be good, and it is better to spare the people by putting in at once the lime water (it will take more) till it separates yellow and let it take its chance than to beat on.

In general, the quicker you find your vat beat off, the better the quality will be, but not the quantity. These two, therefore, quick good beating and large quantity (which you will be able a good deal to judge of by the thickness and quantity when you first put into the dripper), are sure signs of proper time of steeping.

Great cleanliness of all the utensils is an immense point; a dirty tub will spoil the quality of a whole vat of indigo, and if not very carefully washed, the indigo mud has such a tendency to putrify, that in one day the putrid mud left round the edges and sides of an unwashed tub will hurt whatever indigo you put into it, disposing the whole to putrify.

A general rule is that it is impossible every operation can be too quickly conducted from the leaving of the beating till the pieces are lodged on the drying shelves. Quick drawing off, quick dripping and quick pressing are all very important to the quality of the indigo.

Let the dripper and presser be washed (in separate tubs kept for the purpose) in hot, or at least warm water, a little lime water put in, and the mud pressed in small pressing boxes; this will be a mixed quality, because it will be the washings of all the vats of the day mixed together. The longer and more the indigo is pressed, so as to be just able to be cut, the less it will crack in drying; small slips of bamboos should be laid across the drying shelves to separate each vat; and the paper marks, a little attention, observation of quantity, quality, time of steeping and beating will make you thoroughly master of the process, which consists almost entirely in judging exactly when a vat is steeped enough; all the rest is perfectly easy.

VII

Letters (3)—from a correspondent.

To—The Conductor of the *Asiatic Mirror*.

Dated—1st, 8th and 15th April 1795, respectively.

(1).

An experience of many years added to much reflection has afforded me no inconsiderable share of information, both in the theory and practice of the manufacture of indigo, from the planting the weed through all its subsequent treatment; and I am enabled to state that, notwithstanding the manufacture of indigo has of late years become so favourite a speculation in this country, notwithstanding the great attention shown to it and the number of treatises and instructions that have been written on the subject, many obviously erroneous practices in the manufacture

of this article still generally prevail, and, sanctioned by custom and general use, they continue to diminish the quantity, and still more injuriously to affect the quality of the drug produced. It may not therefore be an useless thing to point out some of the most generally prevailing of these errors, and, their source being discovered, the remedy will be of easy application. I am fully persuaded that any remarks, whose object is utility, will meet with a candid reception from the public. I, sir, am a plain unlettered man, and can have no vanity to gratify in requesting you to lay my remarks before your readers. If I can afford a useful hint, or suggest an observation that may lead to improvement, my purpose in troubling you will be fully answered. Without further preface then I shall proceed to notice some of the most prevailing errors in the manufacture of indigo.

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manufacture.

The use of a proper precipitant is one of the most essential considerations in the manufacture of indigo. That most commonly employed is lime water, the use of which I condemn as highly injurious to the quality of the drug. It should be understood that indigo as extracted from the steeper, is composed of particles of a blue and yellow colour, precisely as the colour of a green leaf is formed. When the separation of these colours is required, we desire to precipitate the blue and leave the yellow colour in a state of suspension. This is effected by beating or agitation, or by heat; but it is impossible to suppose that the very colours so separated and disengaged ought again to be united, which I maintain is in some measure effected by employing lime water as the precipitant; for repeated observation and experiment warrant me to say that a great part of the yellow colour and mucilage disengaged from the blue by agitation are precipitated by the lime water; hence where it is used, a copperish, hard and cherty indigo is produced. It may be noticed that overbeating has the same effect by disengaging and precipitating the yellow particles which necessarily vitiates the quality of the indigo.

It is received opinion, but nevertheless erroneous, that overbeating breaks the grain of the indigo, for the molecules or atoms cannot be broken. I admit however that they may be separated and that too much beating dissipates so much of the volatile principle, which holds the yellow and gummy matter in suspension, that the two latter precipitate, and form one homogeneous mass with the blue, leaving the water of a blue colour, and producing a drug of a bad quality, being weighty, of a dull colour and flinty consistence.

The same hypothesis holds good in dyeing, as is proved by cloth dipped in fresh precipitated fecula receiving as good a colour as when immersed in the dyer's vat.

The necessary quantity of beating, therefore, is not so well indicated by the formation of the grain as by the colour of the water, which is the best criterion to guide our judgment in this case. But as the colour of the water varies, according to the degree of fermentation which the plant has undergone, an under-fermentation producing a fiery red colour, the proper proportion a golden hue, and when excessive a dirty brown, or dull green or yellow colour, and these circumstances depending on the condition the plant was in when put into the steeper and the time employed in filling it with water, the whole must be taken into consideration, and a due estimation made of each, when the colour of the water is to be used as the rule to determine the quantity of beating.

From some knowledge of dyeing I differ widely in opinion from those who contend that indigo of a common or middling quality is the most profitable; for if they will take the trouble to consider the principles upon which the process of making indigo is conducted, they may easily be convinced that lime water cannot precipitate one particle more of the blue colouring matter, than caustic lee made by depriving an alkali of its fixed air, by means of lime, but that it causes a deposition of much heterogenous matter, highly injurious to the quality of the drug: and I have ascertained by numerous experiments that fine indigo, whether dissolved by alkali or vitriolic acid, when those menstrua are judiciously applied, will go much further, and communicate a more durable and more lively colour than indigo of a common or middling quality: I mean it possesses those advantages beyond the proportion of the difference of expense in the preparation.

I propose to go on with the continuation of my remarks in your ensuing paper.

(2).

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manufacture.

In my former letter I endeavoured to show that it is more advantageous to the manufacturer of indigo to produce a drug of a fine quality by the use of an acid as a precipitant than it is to prepare it of the common or middling sort by a less expensive process. In the first instance all the blue colouring matter which alone is essential to the purpose of dyeing, is preserved without admixture; in the latter it is accompanied by a deposition of much extraneous matter, which is only useless but cannot be otherwise looked upon than as an imposition upon the buyer, who instead of the pure unsophisticated indigo, purchases a quantity of impurities highly detrimental to the success of those operations in the arts which form the object of his speculation. The green colour of plants, it is well known, arises from the union of two distinctive colouring principles, yellow and blue, and the perfect separation of these is all that is necessary to procure the blue colour by itself in a state of concentration. Now this is what may be completely effected by the use of acids in the preparation; it is therefore surprising that, so far from having come into general use, there are still many who carry on the manufacture of indigo on an extensive scale, strongly prejudiced against them.

Let us see what actually happens in the process which I recommend, and perhaps some others may be induced to make the same trials which I have done. Suppose a vat adequate to the produce of sixteen seers of dry indigo. This quantity of fecula well drained requires from one and a half to two ounces of acid sufficiently to purify it. Add two ounces of acid to half a gallon of pure water, mix with this the fecula to be purified; agitate them together and let the mixture stand for ten minutes; then pour on double and treble the quantity of pure water warmed to about 130° Fahrenheit, agitate the whole so as to produce a general diffusion of the colouring matter among the water, and after the vessel has been suffered to remain at rest a sufficient time for the precipitation, draw off the water by a gradation of cocks or plugs, and filter and press the sediment as soon as possible. Care must be taken that the second addition of water be not too hot, for this would prove injurious to the lustre of the drug. The pressure must be strong, and long continued, which will effectually prevent the intrusion of insects, so apt to breed in indigo of a less condensed texture, when this circumstance does not meet with the attention it deserves.

I was formerly of opinion that the vitriolic, nitrous and muriatic acids were equally well calculated to improve the quality of indigo; but this was rather a conjecture of my own than a fact which I had ascertained by experiment. I would not therefore have it depended upon without a sufficient number of trials being made to put the matter beyond a doubt, especially as I find it asserted by a modern chemist of excellent observation, that nitric acid causes a deviation in the colour of indigo towards green. But this is not a point at present worth contending, since we know that vitriolic acid with which all my experiments have been made fully answers our wishes in this respect, and that at all events allowing the results from all the three acids to be equal, the vitriolic must be preferred in the arts on account of its being so much cheaper than the others. Some are of opinion that the use of all acids is improper from an apprehension that they burn the fecula, but the following experiment, which I have repeated many times with the same success, will show that such a supposition is utterly unfounded.

To half a gallon of fecula as drawn from the battery, I added one ounce of vitriolic acid and washed the mixture in two waters, first of a gallon and then of half a gallon; and when the indigo precipitated, filtered and pressed it properly. For fifteen months it retained a pleasant fragrance like that of a ripe apple; its texture and consistence were perfect, and at the end of this time as the smell went off, it appeared to improve in quality equal to 30 per cent. of its first value.

It is almost unnecessary to remark to such as have any knowledge of chemistry that when indigo is to be prepared by the use of acids, wooden boxes or vats must be used instead of pukka buildings: for the vitriolic acid acts powerfully upon the calcareous earth with which the latter are cemented or lined, and forms with it an indissoluble selenite which mixes with the drug, and injures its quality. It cannot indeed be too strongly recommended to substitute wooden, for brick and mortar vats upon all occasions; the former are by far the cleanest, and part with no foreign

PRODUCTS—INDIGO.

matter to contaminate the drug, which it is impossible to prevent by the greatest care, when the beating and washing are performed in receptacles composed of materials, the parts of which are easily disunited by concussion and friction. There are many other circumstances besides the degree of fermentation of the plant and the choice of the proper precipitants, which greatly influence the produce of indigo, both in respect to quantity and quality; and as it is necessary that the manufacturer should be aware of every cause which can either forward or oppose his views, I will in a subsequent letter make a few remarks on such of them as have occurred in the course of my experience.

Indigo
manufacture.

(3).

The preparation of Indigo conducted in the manner I have recommended in my two former letters is a process which requires in the artist not only considerable knowledge of chemical principles, but a minute attention to many adventitious circumstances which frequently occur to frustrate his views in the result of his operations, an acquaintance with which is absolutely necessary to enable him to apply an adequate remedy and secure a successful issue to his labours. To point out the whole of these would exceed the bounds of newspaper communications; I shall therefore only mention one or two of them which I have found to have the greatest effect in counteracting the intentions of the manufacturer, both with respect to the quantity and the quality of the drug produced. In the upper stations from the rains being in some seasons late in setting in, it frequently happens that the plant is of a dwarfish growth, and the leaves of a hard consistence, without the usual proportion of succulence. In this case also the weed requires a long time to arrive at maturity and is seldom ready for cutting before the season is so far advanced that the coldness of the nights retards the fermentation. In the month of October I have known plants steeped for 18 hours, and every phenomenon of a full fermentation, as they are usually estimated, take place, yet in a large proportion of the weed it has been deficient, and its texture not thereby discomposed. Of this fact I have fully assured myself, by drawing off the first extract after it had stood for the time mentioned and adding to the same plant a fresh quantity of water which being allowed to ferment for six hours, also afforded a considerable quantity of fecula, of an inferior quality it is true, but yet fit for the purposes of dyeing. The cause of this is evidently the unequal states of tenacity and hardness of different parts of the plant, those parts which are soft and tender readily giving out their colouring matter to the first fermentation, and those which possess more solidity, obstinately retaining it to the last. Such plant is generally the produce of a sandy soil and a late season. It is of importance to attend to the circumstance of a second fermentation being necessary to withdraw from the weed all the blue it is capable of affording, and of two distinct qualities, since by endeavouring to force by a single maceration all the fecula at once, the quality of the drug must be greatly injured from the mixture of excessive and deficient fermentation; especially as I can venture to assert that the produce of the second fermentation is more than sufficient to defray the expenses of manufacturing the whole. The only difficulty in obtaining the produce of the second fermentation arises from a superabundant quantity of gummy matter which enters into the composition of the finer parts of the leaves, and affords an obstacle to the perfect draining of the fecula. To overcome this adherence the method of draining by absorption appears to me the best calculated. In the manufactories to the northward, sand is commonly used for this purpose, but I think very improperly, since it not only occasions considerable waste of indigo but cannot be prevented from mixing with that which is procured. What I have found the best adapted for this kind of filtration are wooden frames of 3 feet square and 8 inches deep, with a grating of small wooden bars, and a lining of tape to keep the liquor somewhat suspended, having a sliding drawer below to receive the fine fecula that run through the lining until its apertures are closed by the deposition upon its surface; and when the water begins to run clear the contents of the drawer to be emptied again into the frame, by which means not a particle of the indigo is suffered to escape. When sand is used some contend that none of the indigo is lost because they say, we wash the sand once a month, and

Indigo
manufacture.

thereby obtain all the colouring matter it had detained. No doubt by this means they may obtain some indigo but then it will be of a very inferior and unprofitable quality.

Many improvements might still be made in the construction of works for the manufacture of indigo, but as the chief object of these letters has been to point out the circumstances which mostly affect the fermentation and the quantity and quality of the product, I shall conclude with mentioning only one very ill-judged addition to the vats which I see prevail on many manufactories. With a view of rendering a passage to the steeper easy, and of facilitating the filling it with the plant many have thrown up banks of earth along the outside of it so as to form a foot-path, the consequence of which is that by keeping sides of the vat always more cold than the central parts an unequal degree of fermentation takes place, and points out the necessity of having the walls of the vat clear on all sides to its full depth.

I have observed a narrow spirit of mystery prevail among many of our manufacturers; but as I am convinced that neither progress in the arts nor benefit to society can ever arise without general diffusion of knowledge, I should wish to see so selfish a principle give way to the liberality of reciprocal communication. With this view I have offered the few preceding remarks, in the hope of inducing others to come forward with their contributions, which though separately but small, will collectively form a stock of information of the utmost utility to the advancement of so valuable a branch of manufacture.

VIII

THE CULTURE OF "UPPAM PARUTTI," A SPECIES OF COTTON IN THE BĀRAMAHAL.

Culture of
cotton in the
Bāramahal.

Ploughing.—The ground is to be thrice ploughed; when it is a tār or ten acres of land two ploughs sufficient.

Seed.—The seed to be put into a mixture of cowdung and water, and then laid in the sun to dry.

Sowing.—The season for sowing is Âvani or July. Immediately after the seed has been laid under ground, the ploughs are to work twice, first directing their course east and west and then north and south.

Weeding, etc.—The ground is to be weeded a month after sowing. The ground is to be loosened three times in the following five months by ploughing.

Gathering.—The bud of the cotton appears in the month of Tai or January and the gathering of the cotton begins in Mâsi or February; it is gathered once in every three days.

Produce.—A candy of seed will produce 420 tûkams of cotton, including the seed in it. The tûkam is about 20 seers.

	TŪKAMS.					
In Mâsi 20 men gather	100
In Panguni 25 men gather	200
In Chittirai	100
In Vaigâsi
In Âni
In Âvani 5 men gather	20
Total	420

Labourers' wages.—The labourers are paid in cotton at the rate of one tûkam to every 10 men, which comes to 70 tûkams, and people employed in ploughing are allowed a 5th of the produce after deducting the above 70 which comes also to 70; total, 140. Deducting this from the above gross produce remain 280 tûkams which at the rate of 1 Kantarai fanam the tûkam comes to Pagodas 23-15-0.

The expense occurring is as follows :—

Hire of 2 pair of bullocks for 1 year	PAGS.	4	0	0	Culture of cotton in the Bāramahal.	
1 Candy of seed		0	15	0		
Wood and iron for 2 ploughs		0	30	0		
2 men employed in ploughing for 1 year paid a part in grain and part in money—the grain in 2½ candies is ...		2	36	45		
Money		0	22	40		
			3	14		5
Rent		6	30	0		
Carpenters and blacksmiths employed upon occasion		0	15	0		
People employed in weeding the ground		1	11	20		
			16	25		25
Profit, Pagodas		6	34	55		

IX

Letter—from Captain ALEXANDER READ, Superintendent and Collector, Bāramahal.

To—EDWARD SAUNDERS, Esq., President of the Board of Revenue.

Dated—the 17th February 1796.

I have the honour of laying before you a letter from my assistant Mr. Wetherell on the plantations and manufactures on foot in these districts, which may afford you some satisfaction. I think it however proper to observe, that his report of the expected produce of them being the result of investigations only, it will probably exceed that of experience, especially as some failures in the execution have impeded our progress. Nothing however has happened that discourages our endeavours.

The iron of this country not being sufficiently smelted and tempered to answer for gudgeons or axle trees for the sugar mill, and the not having had time to procure proper wood for cogs and to season it, both have broke, which obliges us to use the country mills. These defects will soon be supplied, though they have obliged us to reject a great proportion of the canes we proposed to manufacture; I have no doubt of producing half the quantity of sugar and rum that we had reason at first to expect.

The people who cultivate the indigo have allowed it to seed before they have brought it to the manufactory, which is detrimental to the commodity, but from the experiments that have been made, I entertain very favorable hopes from it.

We shall be able to disseminate the Mauritius cotton over these districts in a short time.

As to the nopal, the culture of the plant requires so little trouble, and the curing of the insect is so easy, that any assurance of success in regard to that article appears unnecessary.

I have engaged in other speculations and propose when other business will permit to report upon them fully. In the meantime I shall carry my disbursements to account, and as no estimates of the expense can be made till experience be acquired, shall trust that, depending on my attention to economy, you will approve and sanction them.

ENCLOSURE.

Letter—from C. WETHERELL, Esq., Assistant Collector.

To—Captain ALEXANDER READ, Superintendent of the Bāramahal and Salem Districts.

Dated—Tiruppattūr, the 14th February 1796.

The Board having required an account of the nopal plantation, and as you have given me the superintendence of it, you may inform them that there are four acres of waste ground planted

Nopal
plantation in
Tiruppattâr.

with it, the insects are now propagating on every bush about Tiruppattâr, and I have spread them on several plants at Mâdapalli, a small village about a mile and an half from hence, where I hope to establish a plantation as there are many inhabitants of that and every adjacent village, who are willing to undertake the propagation of them provided they can find a market for the insect, and here I beg leave to request you will mention to the Board that if a cowle was given offering 3 pagodas a seer or 2 lbs. troy, I am of opinion, it would be a sufficient inducement for almost every inhabitant to undertake it.

Progress in
sugarcane,
cotton, etc.,
plantations.

The sugar, cotton, mulberry and indigo which you have given under my charge are in a fair way of success; and as there has been cowle given for 12 lakhs of canes with the proviso that only as many as may be wanted will be taken, it may reduce the number to about 8 lakhs which will, with a moderate computation yield about 70 or 80 hogsheads of sugar and about 30 or 35 puncheons of rum, and with the West Indian mill and sugar house that have lately been erected, be ready for market in the course of a month or two; so that with good management in the course of a few years when our scale becomes enlarged, I make no doubt but the greatest part of the Coast can be supplied entirely with sugar and rum from the Bâramahal.

There is now about 10 or 12 acres of ground laid out with Mauritius cotton, which most probably, if the seasons prove favourable, will yield about 1,200 lbs. and will supply seed for the whole of the Ceded districts, the inhabitants being very willing to undertake the cultivation of it as there is so little trouble in cleaning it compared to the sort at present made use of. I have now nearly ten acres of land planted with mulberry cuttings which are all thriving and will yield leaves fit for plucking in the course of three or four months, and as soon as Muhammad Arif (the silk man) who is now gone for mulberry cutting returns, I shall begin the filature and worm house.

As for the indigo there can be no doubt of its answering as the expenses of manufacturing it is so little compared to the price it brings at market. Having given cowle for 10,000 bundles we may expect to have ready in a couple of months about 170 maunds and as we are now trying the fermentation, it will be greatly improved in quality and enhanced in value.

Upon the whole I think as we have now got 100 of the felons at work and will soon have from the southward about 200 more (which will give us a great advantage over other plantations in respect to cooly hire, in general the principal expenses incurred) there cannot be the least doubt of any undertaking we have engaged in answering to the utmost of our expectations.

X

Letter—from S. B. LUSHINGTON, Esq., Acting Secretary, Board of Revenue.

To—Captain ALEXANDER READ, Collector in the Bâramahal.

Dated—Fort St. George, the 27th February 1796.

Enquiry into
expenses on
the different
plantations
in the
Bâramahal.

I am directed by the Board to acknowledge the receipt of your letter of the 17th instant with its enclosures.

They are well pleased to observe your endeavours for the introduction of objects of improvement in your districts, but you will no doubt keep in view the importance of inducing the natives to engage in the culture of the valuable articles mentioned by you, as pointed out by Government in their resolutions transmitted to you in August last.

The Board have a full reliance on your attention to economy, but having intimated that you are engaged in other speculations, and proposed to carry the disbursements to account without furnishing any estimates, I am directed to remind you of the regulations which forbid disbursements of the public money, until the sanction of Government be obtained, as without it, they cannot admit your charge, and to desire that you will transmit with as little delay as possible, the best estimate you can form of the probable monthly or annual expense of the various undertakings you have engaged in, together with such observations as you think necessary for the information of Government, whom they wish to be informed on the subject as soon as possible.

XI

Circular—from S. R. LUSHINGTON, Esq., Acting Secretary, Board of Revenue.

To—Captain ALEXANDER READ, Superintendent and Collector of the Baramahal and Salem Districts.

Dated—Fort St. George, the 9th March 1796.

For your information and guidance I transmit the accompanying paper of instructions relative to the culture of the opuntia, and care of the cochineal insects, with a translation in the Malabar language, which you will please to have copied and furnished to such natives as may undertake to cultivate the plants and rear the insects.

Culture of opuntia.

ENCLOSURE.

Instructions for the culture of cochineal on the Coast of Coromandel.

The nâga kalli or nâgadâli kalli of the Tamils is the plant the cochineal insects are reared on; as this plant is found generally in clumps or in the hedges surrounding the little gardens of the natives they should be induced to clear them so that the hand may have access to every part, as it is of the first consequence to have plants well rooted and luxuriant to begin with; if however they should not have this advantage, large plants should be taken up without injury to the roots and planted about 5 feet asunder—if in situations where they can be watered in the hot season, so much the better as they may thereby always be kept succulent, when otherwise they must be much shrivelled although they cannot be destroyed by the longest drought; they require however so seldom water, only twice or thrice in a month even in the hottest weather, that it may be done by pots and the ground where they are planted should never be in danger of being flooded for any length of time; and every plantation of 100 plants should be surrounded with a hedge of odiya cuttings to break the violence of strong winds; the shade of cocconut or palmyra trees where it is partial will be an advantage both for the plant and insect, the plant growing most luxuriantly in such situations.

Culture of cochineal.

2. No insects should be placed on the transplanted nâga kalli till it is sufficiently rooted and the leaves luxuriant.

3. If plants cannot be easily had, leaves may be cut off, the larger and older the leaves the better, and planted placing them on their side two-thirds under ground so as to give the greatest space for roots to shoot out in a direction as to our most prevalent strong winds that one side may be little exposed to them; for which reason they should front the east and at the distance of 5 feet from each as before directed; no insects should be placed on those till they have acquired a considerable size.

4. When plants are thus established, the cultivation of the valuable insect that dyes scarlet, crimson, purple and all the intermediate shades may be begun and is very simple.

5. A few insects placed on a plant or bit of nâga kalli leaf cut off with insects on it pinned by means of the thorns of the plant is sufficient for the breed. Numerous young will soon issue from the larger insects and spread themselves over the plant; the easiest and best method is to pick off the largest insects and by means of their covering of a white silky nature pin them with the thorns of the plant to the leaves of the nâga kalli in places least exposed to the wind and direct rays of the sun and without wounding them which will appear by the issue of their red juice; three or four insects fixed thus at the divisions of the large leaves will soon afford young to cover all above; all the branches should have insects in a similar manner pinned at the under part and in proportion to the number of leaves.

6. When this is done little attention is required except cleanliness about the plants till from the 26th to the 30th day after, when the new progeny may be expected; the young being very small red insects, the plants should be carefully examined at this period and when any are observed running over the leaves or near the insects, such of the largest as are wanted for breeding should be taken and placed on fresh plants as already described and the remainder plucked off and dried; the plants to be afterwards carefully washed with rags tied to the end of sticks so as to clean them perfectly and, lest any from the smallness of the young should escape, the plants should be examined 8 or 10 days after to take them off; what makes this so necessary is that the insects multiply so fast the plant is soon exhausted, rots and dies; but if thus allowed to recruit for a month or two, it recovers. Such plants however as have had but few insects and consequently not been much injured may support a second generation by allowing a few of the largest insects to remain for this purpose, the rest having been picked off; only one-third of a plantation should have insects at a time, the rest in succession.

7. To pick off the insects a short light stick made thin and smooth and not above half an inch broad at the end with a small earthen vessel or chatîi to receive them is all that is required; great attention must be paid not to bruise the insects; as soon after their collection as possible the chatîi with a little paper or cloth under the insects should be placed over an earthen

Culture of
oohineal.

vessel holding water which is to be boiled till the insects in the chati are heated so as to feel disagreeably warm to the hand during which time they should be repeatedly mixed that all may be equally heated; after this they must be daily exposed to the sun or again to this heat till perfectly dry; as they shrivel and harden they may be rubbed between the hands or cloths to detach the white coverings and afterwards winnowed as the natives do their rice, tossed up in a muram or fan that the light particles may be blown off; when thus dried and cleaned it is fit for all the purposes of dyeing and if kept dry in boxes will remain good for any length of time.

The above is all the information necessary for this valuable dye which requires no capital and so little labour that it may be cultivated by the old and children.

XII

Letter— from Captain A. READ, Superintendent, Bâramahal and Salem Districts.

To— CHARLES WETHERELL, Esq., Assistant Collector.

Dated— Salem, the 30th March 1796.

Enquiry into
expenses on
the different
plantations
and manu-
factures in
the Bâra-
mahal.

Having it in command from the Board to transmit with as little delay as possible, the best estimate I can form of the probable monthly or annual expense of the various undertakings, the conduct of which is entrusted to you, together with such observations as may be thought necessary for the information of Government, I hereby request you to report to me on the state of the plantations and on the progress you have made in the manufacture of every article. Though I have not experience, in a business so entirely new to us, to prescribe the best arrangement for such a report, I shall set down the heads that occur to me as *memoranda* to which you may add whatever you find is deficient, for comprising all the information you may have acquired.

1. *Sugarcane*.—The number of canes you now have in cultivation and the additional quantity of land you may intend for the culture of the cane—the expense of cultivation—the probable number of canes the whole will produce.

2. *Sugar*.—The expense of the present sugar-house, mill, kettles and cattle, and the additional expense that you think will be necessary for the manufacture of the canes you expect next year. In this your estimate should be limited, because we have found that it will not answer to bring canes from a greater distance than 3 miles from the manufactory, and probably as one mill will grind between ten and fifteen thousand canes in 24 hours, our present boiling-house will be adequate to the manufacture of any quantity of canes you can grow in the vicinity of Tirupattûr.

3. The number of each sort of cane that has been ground this season and thence the number of each required to make a hogshead of sugar and a puncheon of rum; and from these calculations the quantities of both that may be expected from the number of canes to be grown this season; the expense of manufacturing every hogshead of sugar and puncheon of rum, and the contents of each.

4. The expense of the intended distillery, including pagodas 700 for a still that is making at Bengal. Inform me also, if you think we can dispense with, or must have, a cooper from Madras. By this question I mean to avoid the expense until absolutely necessary.

5. *Indigo*.—The weight of the indigo plant required to make a maund of 25 lbs., the quantity you have already, and may expect to manufacture this season. The amount of your present disbursements for that article to the 1st April, the quantity you have manufactured to that date, and thence the cost per maund. The quantity of land you have applied or intend to apply to the culture of the indigo. As our ultimate object is to engage the natives to manufacture it by an improved process, I wish you to keep in mind that all you may cultivate should be for experiment only, until that can be effected, and we can ascertain the lowest rate at which they can afford to sell it.

6. *Mulberry*.—The quantity of land you have actually in cultivation, and how much more you expect to have planted in the course of the year. The expense of cultivating the land now planted, and thence that of one acre. As the fort-

was a very irregular tract, and the felons were employed there, you should deduce all this estimate from your accounts of the northern plantations; you should make a difference between the estimate of forming a mulberry plantation till it is ready for supplying worms, which may require six months, and one of its expense after that.

Enquiry into expenses on the different plantations and manufactures in the Bâramahal.

7. *Filature*.—The probable expense of that now erecting including the number of reels it will contain at 30 pagodas each, which they cost at Madras; when it will be ready, and how soon Muhammad Arif thinks you may get up worms.

8. *Cochineal*.—The quantity of ground you now have planted with the nopal, the progress of the insect, and your progress in collecting and curing it; with this you will receive a paper of instructions relative to the care of it. Form the best judgment you can of the expense of the culture of the plant, and the curing the insect.

9. *Cotton*.—The quantity of ground sown with that production at present; its state. The seed you have left will sow about 10 acres more, I imagine, and I recommend the not putting it into the ground before May or June. The plot growing it at present was only tilled once, when the seed was thrown into the ground and covered over, but I wish the next you cultivate to be better prepared: when that is done, it rises, as I see by some here, to 8 feet of height, and of course its roots must extend a good way, when assisted by enlarging the holes.

10. *Grapevines*.—I wish to have the field of them extended, as soon as you can get cuttings from Krishnagiri or Ambûr or other spots where you may find a gravelly soil planted with them; I recommend the erecting the pandals for them at different heights and the manuring them with different composts. The expense of cultivating them, being so much per hole, and of the pandals, may be easily calculated.

11. *Potatoes*.—Should the present season be too hot for the successful cultivation of those I left with you, you may get some of the Manilla seed in August or September, I understand, when the season may be favorable. From their success in the culture of this root at Râyakôttai and Virabadrudrug, I judge that it may be practicable to render the culture of it as general in the Bâramahal as in Bengal.

12. *Wheat*.—Enquire of Mr. Hurdis for the sack he got for me at Madras from an officer of one of our Indiamen and try it in different parts of the district. I shall write the Tahsildar to prevail on some of the gours (gaudas) of the neighbouring hills to try each a plot with it in their villages. It should not be put into the ground till May when showers may be expected.

13. *Land*.—The ascertaining how much ground you may have laid out in the culture of those different productions will require a table of land measures, Native and Europe. I furnish you therefore with the following. A kadam or man's foot is the origin of such measures used in the Bâramahal. Twenty-eight of them, 33 statute feet or 11 yards, make a longitudinal gunta and that is a convenient length for a measuring chain of two half rods. "A square with equal sides of that extent, is a *gunta*." From that data is constructed the table—

Square yard.	1	Square gunta.	
	121	1	Acre.
	4,840	40	1 Sad or cawny.
	12,100	100	2½ 1 Târ.
	48,400	400	10 4 1

By the help of this, a rod of 2, 3 or 4 yards for small plots, and a chain or two of 11 yards each which make a gunta for larger ones, you may easily ascertain the quantity of ground in which you may cultivate particular productions. My writers are busied in translating the survey of the lands belonging to Tiruppattûr, by which you may inform yourself of the tîrvai or rent of every field you may desire to rent, and the ryots may be inclined to let you have; for as they are all given in

Enquiry into the expenses of several undertakings in the Baramahal.

lease, it is optional with them to part with them or not. Get them always for the tîrvai if you can, and never give above 3 per cent. more for the wet alone, or $1\frac{1}{2}$ per cent. more for the wet and dry together. You might regulate your offers between $\frac{1}{2}$ and 3 according to the relative quantities of wet and dry, $1\frac{1}{2}$ upon the tîrvai of a farm that has 300 guntas dry out of 400 being too high a premium. As rent is a great addition to the expense, I wish you to occupy waste lands only. I approve however of your taking some of the fields under the tank for the sugar-canes, that a fair trial may be given to the sugar and rum manufactory.

14. *Wrights*.—The ground of the following table being *grains* and *pagodas* to connect Europe and Native weights, you may easily form any specific weight from it that you may have occasion for:—

Pagoda.											
1											
Ounce Avoirdupois.											
1	Palam.										
$1\frac{1}{2}$	1	Ounce Troy.									
$1\frac{1}{4}$	$1\frac{1}{2}$	1	Seer, Madras or Tiruppattûr.								
$8\frac{1}{2}$	8	$7\frac{1}{2}$	1	lb. Troy.							
$18\frac{1}{2}$	$12\frac{1}{2}$	12	$1\frac{1}{2}$	1	lb. Avoirdupois.						
16	$15\frac{1}{2}$	$14\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{4}$	1	Vis.					
$41\frac{1}{2}$	40	$37\frac{1}{2}$	5	$3\frac{1}{2}$	$2\frac{1}{2}$	1	Maund, Madras or Tiruppattûr.				
$320\frac{1}{2}$	320	300	40	25	$20\frac{1}{2}$	8	1	Qr. cwt.			
448	$435\frac{1}{2}$	$408\frac{1}{2}$	$54\frac{1}{2}$	$34\frac{1}{2}$	28	$10\frac{1}{2}$	$1\frac{1}{2}$	1	Cwt.		
1,792	$1,742\frac{1}{2}$	$1,608\frac{1}{2}$	$217\frac{1}{2}$	$136\frac{1}{2}$	112	$43\frac{1}{2}$	$5\frac{1}{2}$	4	1	Baram.	
$6,502\frac{1}{2}$	6,400	6,000	800	500	$411\frac{1}{2}$	160	20	$14\frac{1}{2}$	$2\frac{1}{2}$	1	Ton.
35,840.	$34,844\frac{1}{2}$	$32,866\frac{1}{2}$	$4,355\frac{1}{2}$	$2,722\frac{1}{2}$	2,240	871	$108\frac{1}{2}$	80	20	$5\frac{1}{2}$	1

To ensure accuracy I have procured a set of weights and scales and Mr. Dring has charge of them to send you. Cart hire being so dear there, I have desired him to keep them till you send for them, and I request you to send some carts for them and a few empty casks he has collected for the rum.

15. *Measures*.—The subjoined table is deduced from the *solid inch* and *rupee* to connect the Europe and Native measures, and by help of it you may form any specific measure that you will have occasion to use:—

Rs.	Pes.	Annas.	Pais.	Other	Company seer.	Paqi or Arcot measure.	Gallon.	Kuruni.	Marcal.	Candy.	Hogshead.	Puncheon.	Butt.	Tun.	Garos.
1															
13	11				1	Pint.									
24	20				1	Quart.									
33	28				2										
66	57				3										
72	62				4										
108	93				8										
266	231				11										
768	666				32										
864	750				36										
19,200	13,828	1,180			640										
20,185	14,558	1,241			698										
26,513	19,279	1,665			931										
40,270	29,106	2,483			1,397										
80,540	58,212	4,967			2,794										
345,600	300,000	25,600			14,400										

Enquiry into the expenses of several undertakings in the District of Baramahal.

Enquiry into the expenses of several undertakings in the Baramahal.

16. *Money*.—The ground of this table is 8 shillings the pagoda, but it will require correction according to the rates of exchange.

Cash.										
1	Anna kantarai.									
18½	1	Penny sterling.								
37½	2	1	Silver fanam.							
80	4½	2½	1	Kantarai fanam.						
300	16	8	3½	1	Shilling sterling.					
450	24	12	5½	1½	1	Company rupee.				
986	52½	26½	12½	3½	2½	1	Chakram.			
3,000	160	80	37½	10	6½	3½	1	Star pagoda.		
3,600	192	96	45	12	8	3½	1½	1	£ sterling.	
9,900	4,800	240	112½	30	20	9½	3	2½	1	

17. *Labourers*.—I recommend your laying up 8 months store of grain for all the people you have in employ, and the prevailing on them to receive grain, with a small proportion of money as pay; for though there will be very little advantage from it for some months, there will be when grain rises in price; and the approaching as much as possible the mode, and rates of payment among the farmers, is of great consequence, for the expense of labour in such an undertaking must be kept under, success depending on it. Wishing we might be able to make a fair comparison between the expense and produce, I desired the maintenance of all the felons might be brought against the plantations, but as they scarce do a quarter of the work that other people do, who are unencumbered with irons, that would make a very unfair comparison. I request therefore the plantations may not be debited with their expense, and that you transmit me accounts of it monthly to carry to account with revenue as usual. No comparison can be made of course between the expense and the produce of plantations on which they are employed, and their produce will the more likely exceed their expense. In that event there can be no objection to the experiments in view; I wish however that labourers in pay alone be employed at one or two of the plantations, that the wished comparison may be made of them.

18. *Register of labourers*.—I request one may be kept of those in pay and one of the felons, as well to show how they are employed, as to ensure their being properly appointed to different works every morning, without which there may be so many at one place as to impede each other, and by that means, double the number might be employed that are necessary. This will only require a book ruled out in lines at the common distance, and divided in as many columns as you may have different kinds of work on hand, with one to the left for the days of the month, and another for the descriptions of work-people; for example—

Date.	Description of people.	Sugar and rum.						Indigo.							
		Digging holes.	Planting canes.	Weeding.	Bringing canes.	At the mill.	In the boiling-house.	At the distillery.	Digging.	Planting.	Weeding.	Bringing leaves.	Steeping.	Beating.	Drying.
January.															
1	Carpenters ... ..	...	...	...	...	2	...	...	...	...	...	...	...	...	...
	Smiths ... ..	...	...	...	...	1	...	...	...	...	...	...	...	...	...
	Men coolies	20	4	10	10	4	2	2	10	3	6	4	6	...	...
	Women coolies ... ..	...	...	5	...	...	...	...	...	...	6	10	4	...	...
	Boys ... ..	...	...	...	...	...	...	...	...	...	3	...	6	...	...
	Girls ... ..	...	...	6	...	...	...	...	...	...	4	...	...	...	...
	Total	20	4	21	10	7	6	8	10	3	24	14	16	...	...

There should be one for every plantation; after it is begun at each, it will require scarce any trouble; indeed it is absolutely necessary to form daily arrangements for each, and the numbers composing them are entered in an instant. You might see them every morning when drawn up before they start for work, at one or two of the plantations; and in walking over them at any time of the day, you may ascertain if all be present or not at each station by reference to such a register. In short it will serve as a check upon all your people, and if you will transmit me one monthly to forward, it will be satisfactory to the Board to see that order is observed in your department, and that so many of the felons are now brought into the account of the industrious and useful. This being so easily practicable, and in my opinion so important, I wish it to commence on the 1st April.

Enquiry into the details of the several undertakings in the Baramahal.

19. *Estimates.*—The draft I have here made being but a hasty sketch, I shall hope that by giving every subject full consideration, and aided by the experience you have had by this time in some matters, you will be able to bring your report upon every one into some form, and to draw up estimates of your monthly disbursements for a twelve month, or from the 1st October 1795 to the 31st October 1796, that will be near the result. I prescribe to you that period in order to exclude all our actual disbursements as they have not yet been sanctioned by the Board. The success of our undertaking being uncertain, till we can show by the net proceeds that it is attained and finding that single manufactories must on account of carriage be supplied with raw materials from a small distance, let it be considered that our attempt may answer the purpose of experiment by circumscribing it to the village of Tiruppattûr as well as if you were to extend them over the whole district. I think therefore you may at once determine the quantity of every commodity that (according to the extent of ground actually intended for the culture of the raw productions) you can expect to manufacture within the above period, and apply your data, brought from experiments, in drawing up your estimates of each. Say for example, 50 hogsheads of sugar, the quantity of rum proportioned to that number—one ton of indigo—one maund of cochineal. As we cannot make yet any estimate of the produce of our silk or cotton, nor of our wine or brandy speculations, all that can be proposed in regard to them is the quantity of land you expect to have in cultivation for them before October. Let us reckon upon 100 acres for the mulberry, 100 for the cotton, and 10 in vineyards.

20. *Economy.*—Though I have spoken of that already, it deserves to be mentioned by itself, for attention to it in every item must be considered the soul of the whole design. That consists no less in the price, than in the application of labour, and the expense of buildings and implements is one requiring consideration; for many of our speculators seem to ruin themselves, and their projects, by laying out too much money upon them at first in place of taking experience as the mother and guide to improvement. On that very account (for the same spirit may pervade you as well as others in the conduct of such works) allow me to restrict you to contingent disbursements not exceeding 10 pagodas, and to monthly allowances not exceeding 10 rupees, until authorised by the Board, or (till its pleasure be known) by myself. When the Tahsildar may not have cash, apply to Mr. Graham for a supply.

21. *Natives.*—I make them a head, to lay you under two injunctions in respect to them. The first is to use no compulsion in the purchase of any article, or the procuring of labourers of any description. It is certain that artificers cannot be had to answer emergencies without some official coercion and on that account I left orders with the Tahsildar as a matter of necessity to furnish the number of smiths and carpenters you required from the villages, relieving them every three or four days. My other injunction is to induce all the natives who show the least curiosity or desire to learn our method of manufacturing every commodity; for it must be remembered that our object in view is the engaging them in the manufacture of them. Our teaching them is the first, and the holding them out a certain market the next step; we may surely do one in a short time, and, Government aiding our endeavours, the other is a natural consequence.

I wish to hear from you soon on all these matters, that, as far as in your power under present circumstances, the Board may be informed upon them.

XIII

Purchase of
cochineal
from the
inhabitants.

Circular—from S. R. LUSHINGTON, Esq, Acting Secretary, Board of Revenue.
To—Captain ALEXANDER READ, Superintendent and Collector of the Baramahal and Salem Districts.

Dated—Fort St. George, the 5th April 1796.

I am directed to transmit to you the enclosed copy of a letter from the Superintendent of the Nopalry, with extract of a letter from Government on this subject by which you will be guided in the purchase of cochineal.

ENCLOSURE No. 1.

Extract of a letter from Government, dated 30th March 1796.

We enclose copy of a letter from the Superintendent of the Nopalry and direct that the Collectors be authorised to purchase cochineal from the inhabitants at the rate of one star pagoda per pound.

ENCLOSURE No. 2.

Letter—from ANDREW BERRY, Esq., Superintendent of the Honourable Company's Nopalry.

To—the Right Hon'ble LORD HOBART, Governor in Council, Fort St. George.

Dated—the 23rd March 1796.

I have been honoured with your Secretary's letter of the 13th instant, desiring my opinion as to the price which it may be expedient for the Company to give for cochineal and at the same time adequate to afford a solid encouragement to the natives to engage in the culture of it; there can be no doubt that your Lordship's wish of promoting generally an attention to the rearing of cochineal will be best answered by holding out an immediate advantage to the natives in the sale; yet I am doubtful whether in the present infant state of its culture among them, the prices that would be suitable for the first intention would be considered so for the second.

The utmost that I have yet been able to have properly collected by one person in a day without bruising the insects, has been half a pound; when this is dried, cleaned and good sized insects only kept, there will remain about one-fourth of the weight as picked off the leaves.

If one pagoda therefore for every pound of cochineal so prepared is given, an industrious man may earn nearly four pagodas per month, which, allowing for the cultivation and care of the plants, will give more money to the individual labourers, than can otherwise be received, especially to the Native labourers in the employment of their women and children; and this price the Company can afford to give, from every information I can learn, with advantage, for sale in Europe; for even by Thiery de Memonville's account the price paid at Gerasaca is 8s. 3d. sterling per lb.

However advantageous in every point of view this culture appears, yet in few places will the natives engage unless the Company in the first instance, by small plantations at each village, show how it can be done, and even then they will probably not think the above price sufficient, if not allowed a freedom in the sale, being well acquainted with its greater value as an article of trade to the interior parts of the country. Something of this kind should be done soon to show them the necessity of the care and frequent examination of the plants; otherwise the rapid multiplication of the insect, at the different stations to which it has been sent, will do much more harm than good; for if great attention is not paid to gather them, check their propagation and allow them only to breed on plants set out for the purpose that can be cleaned, the danger is that they will destroy their food and be lost. It is therefore of most consequence at present to have the plants in the hedges of the villages set out, which require some months to be rooted; for the destruction of the country nopals in a hedge, which nothing else can hurt, where from the closeness of the plants the insects cannot be gathered or all destroyed, is astonishingly rapid and complete.

XIV

Letter from U. WETHEBELL, Esq., Assistant Collector.

To—Captain ALEXANDER READ, Superintendent of the Baramahal and Salem Districts.

Dated—Tiruppattūr, the 26th April 1796.

Expenses on
the different
plantations
in the
Baramahal.

In reply to your letter of the 30th ultimo, I have to state the following answers to the queries you proposed and to make some remarks on the improvements carrying on in this quarter:—

1. I have planted 2,000 streaked canes, 28,900 red, and 45,000 of the bamboo; I have occupied all the ground with canes in the vicinity of Tiruppattūr that can be supplied with water, there being a great scarcity this season; however the quantity above-mentioned will be sufficient to ascertain the expense of planting, and what the natives can afford to sell them for; I refer you to No. (1) of the enclosures for the expense and produce.

Sugarcane.

2. The expense of the sugar-house is laid down in my accounts of the sugar buildings, as also the boilers and cattle. The additional expenses next year that will be necessary, I have laid down in No. (2).

3. I have calculated everything by the maund, as I think it will be more advisable and save some expense to send the sugar off in boxes containing 10 maunds, and a bandy will then carry about 25 or 30 maunds.

4. The estimate of building a distillery you will see laid down in No. (3); at present there is not the least occasion for a cooper, as all the rum that has been made has been bottled, but next January there will be employment for him; as the rum will be much improved by being put in casks; those containing about 42 gallons will be the most convenient size for carriage, and will be a light bandy load.

5. The weight of leaves (when fresh) required to make a maund of indigo, is 168 maunds or 42 bundles of 4 maunds each, each bundle making 8 ounces. The quantity we have manufactured is 10 maunds. Owing to the dryness of the season, the people who agreed to furnish the leaves have been deficient in supplying the quantity they promised by 805 bundles and are likely to be so next cutting, as there is no prospect of rain in this quarter; everything being parched up and all the tanks dry, I estimate therefore the total quantity we may make in three more cuttings is 90 maunds; the expense of making a maund is 10 pagodas everything included. You will see the total and particulars in my accounts; the number of acres I intend to apply to the culture of the indigo will be about five.

Indigo.

6. The quantity of land now laid down with mulberry is 15 acres. The quantity that I expect to plant may be about 10 acres more, the expense of planting, etc., you will see in my accounts; the expense per acre is about 6 pagodas. The disbursements after its completion will be chiefly the hire of monthly people.

Mulberry.

7. The probable expense of a filature, worm-house and reels will be as follows:—

Filature	...	...	...	...	...	Pagodas	200
3 Reels (having one already)	...	...	...	...	...	"	90
4 Worm-houses	...	...	...	...	...	"	80
						Total	370

It will not be ready for 2 or 3 months as we have only one bricklayer and he has been employed for some time in building the indigo vats. The mulberries will be ready for worms in a month.

8. There is about 5 acres planted with the nopal; the insect is breeding very fast; according to the manner of managing the plants directed in the paper you sent, it will be impossible for any person to undertake it, as I am convinced it will require one man to every plant for 2 or 3 days to wash them, and the natives seem very unwilling to have anything to do with it if it cannot be managed any other way. The manner I procure it is to cut the plant when loaded with the insect, and take them off in that state and afterwards cure them in the manner directed in the paper.

Nopal.

Expenses
on the
different
plantations
in the
Baramahal.

9. The ground now planted with cotton is about 2 or 3 acres, but, having been sown under the direction of the natives, it is so thick that it never will come to anything.

Grapevines.

10. As to grapevines I think it will be needless to cultivate any with an intention of making wine, as there is not anybody who understands the management of them sufficiently, and it would require a great deal of ground to be laid out to produce a sufficient quantity. They are never allowed in wine countries to yield fruit under 4 years after they are put in the ground, and are always kept about 2 feet high and never allowed to creep. Mr. Hurdis has not received the sack of wheat; the sending carts to Madras, as we have none but those used in this country (as we must send a carpenter with them), would be as great an expense as hiring carts at Madras. I therefore will defer sending for the weights and measures till I hear from you. None of the waddevars here are willing to go.

I constantly keep a report of the prisoners, but as to the monthly people it will be impossible, because there is hardly one man doing the same thing two hours together.

The monthly estimates of disbursements for every department inclusive of buildings will be about 300 pagodas. We have made about 20 maunds of very fine clayed sugar, 62 gallons of very good rum, and have collected about 2 pounds of cochineal.

I have quite given the productions in the fort up, as there is not a drop of water to be procured any where near the place.

I shall send you my accounts to-morrow or next day as they are copying off.

ENCLOSURE No. (1).

	P.	R.	C.
Canes	92	38	40
Two cooly boys for two months fetching manure	6	0	0
	<hr/>	<hr/>	<hr/>
	98	38	40
Produce, 1,522 maunds of clayed sugar at 1½ pagodas per maund	1,902	20	40
Molasses or rum, 2,000 gallons at 1 pagoda per gallon	2,000	0	0
	<hr/>	<hr/>	<hr/>
Produce	3,902	20	40

ENCLOSURE No. (2).

Fire-wood, bandy loads 1,500 at 3 fanams per bandy	45	0	0
Chunâm, 2 candies at 24 fanams per candy	1	3	0
Oil, 500 seers at 1 fanam per seer	11	5	0
Boxes, 125	50	0	0
Cloth, 6 pieces at 22 fanams 40 cash each	3	0	0
Servants' wages per annum	555	39	0
Grass for bullocks per annum	50	0	0
Contingent charges	20	0	0
	<hr/>	<hr/>	<hr/>
Total annual charges	736	2	0
Carriage at 6 pagodas per bandy	305	0	0
Customs (not known) ... ..	.....	
	<hr/>	<hr/>	<hr/>
One mill	40	0	0
Mending old mill	10	0	0
Sheds for two mills	10	0	0
Two receivers	10	0	0
Two gutters	10	0	0
Forms, 400 at 24 per pagoda	16	30	40
Pots, 400 at 60 per pagoda	6	3	0
	<hr/>	<hr/>	<hr/>
	102	33	40
	<hr/>	<hr/>	<hr/>
Annual charges	1,041	2	0
	<hr/>	<hr/>	<hr/>
Grand Total	1,143	35	40

ENCLOSURE No. (3).

	P.	F.	C.	
Distillery, 45 feet by 20	150	0	0	Expenses on the different plantations in the Baramahal—Sugarcane.
One still	700	0	0	
One tank	20	0	0	
One mixing vat	5	0	0	
Hanging the still	5	0	0	
Fermenting vats... ..	33	16	0	
Casks (price not known)... ..	.....		
	<u>913</u>	<u>16</u>	<u>0</u>	

XV

Letter—from Captain A. READ, Superintendent and Collector.

To—C. WETHERELL, Esq., Assistant Collector, Baramahal.

Dated—Salem, the 9th May 1796.

I have been favoured with your report of the plantations and manufactories which, though it affords a hope of their being established with advantage, I wish you had made it more complete and endeavoured more particularly to ascertain the expense and produce of every article, for that is a matter of the very first importance to the entering upon or prosecuting such undertakings.

Enquiry into expenses, etc., of the different manufactures in the Baramahal.

2. I grant that our several concerns have been so blended together and carried on by such exertion, and consequently at so much more than ordinary expense in order to gain time, as to render a comparison between one and the other unfavourable; but as methodical and satisfactory, I requested to have the cost of the present sugar-house, mill, kettles, cattle, etc., ascertained to compare with the 20 maunds of sugar and 62 gallons of rum that you mention—the number of canes and probable expense of manufacturing an hogshead of sugar and a puncheon of rum, to compare that including customs, carriage and freight with the produce at the Madras and London markets—and the amount of disbursements for indigo to the 30th April to compare with the probable product of the 90 maunds you have got including charges at either of those markets. All the expenses of culture and manufacture could have been extracted from your accounts to which you refer, but I have not got them lower down than February and I requested you to do it for me.

3. The estimates you have furnished are not so satisfactory either as they would be if they contained the data from which they are drawn up. For example, you do not mention in No. (1) the quantity of land you have growing canes, and thence how many you expect it will yield of the streaked, the red or the bamboo per cawny or acre; you state that they will cost only Pags. 93-38-40, without saying how much for rent, for plants, for planting, for watering or reaping, and the quantity of sugar and rum you expect from them, without a word of the expense of cultivation or manufacture. Without these particulars an estimate receives no credit, and admits of no comparison.

4. Seeing how much Dr. McMorris has done here in the cochineal without a tenth part of the ground we have planted with the nopal, I had hopes of your making greater progress in that article by this time, and beg leave to call your attention to it as one peculiarly fit for the employment of poor women and children who are so numerous about Tiruppattur.

5. Your estimate of annual expenses in manufacturing sugar and rum, No. (2), is more particular, but it should state with reference to the number of canes, the estimated number of days the mill may be employed and the kettle boiling throughout the year, and thence the quantity of firewood and oil that may be expended. It ought to show with a reference to the quantity of sugar you expect, the number of boxes that will probably be wanted, and what description of people will be employed, whose pay will amount to 555 pagodas. It appears that you expect to have 50 cart loads of something, but should specify whether that be sugar, or rum, and how much of each article makes a load.

Enquiry into expenses, etc., of the different manufactures in the Baramahal.

6. As the manufactories of sugar and rum are necessarily blended together, it appears to me that Nos. (1), (2) and (3) should have all formed one estimate in order to give a connected idea of the whole, and, being joined to the estimated produce, afford a comparison. I wish you may be quite right in respect to the distillery, for I understood from Mr. Lyte that the stone choultry in the work yard was very fitting for one and required scarce anything to be done to it, whereas I observe in No. (3) that it is expected to cost pagodas 300.

7. According to No. (1)—

The expense of cultivating sugarcanes this year will be	Pags.	98	38	40
The expense of the sugar and rum manufactories, No. (2)	„	1,143	35	40
That of the distillery, No. (3)	„	913	16	0
The cost of indigo which appears to me very exorbitant	„	900	0	0
That of the filature	„	370	0	0
Which in all makes	„	3,426	0	0

and probably including land-rent your annual expense will be about what you have reckoned, about 300 per month.

8. With the view of making a gross estimate of the produce I shall gather the points you have furnished, viz.:—

Sugar, 1,522 maunds at 1½ pagodas per maund ...	Pags.	1,902	20	40
Molasses or rum, 2,000 gallons at one pagoda per gallon.		2,000	0	0
Supposing the indigo and filature to clear themselves only	„	1,270	0	0
Total produce	„	5,172	20	40

That being 1,746 more than the expense, I doubt not its being satisfactory to the Board if you will be so good to draw up the estimates with that particularity I have pointed out as necessary, to show that your data is founded upon either experience or investigation; I shall indeed think you entitled to great credit if your department clears itself the first year, and still more if you should show a surplus of one or two thousand pagodas.

9. Being desirous to show what you have done, I request you to send all the sugar, indigo and rum you have on carts, unless the keeping the rum longer be necessary. Take care that the two former are very well packed up and secured against wet. If you cannot prevail on the waddevars to go, send our own carts. They can be directed to call on Mr. Dring for the weights and empty casks that he may have procured. A carpenter with them is totally unnecessary, for, if any of the carts break down, village carpenters can always be procured for a fair reward. In the meantime send a pound of sugar, one of indigo, a bottle of rum and all the cochineal by Mr. Hurdis; I will request him to receive them in charge and deliver them as your first offering.

Wishing most earnestly for your success, which cannot fail with due attention, etc.

XVI

Letter—from C. WETHERELL, Esq., Assistant Collector.

To—Captain A. READ, Superintendent of the Baramahal and Salem Districts.

Dated—Tiruppattâr, the 21st May 1796.

Accounts and estimates of sugar and indigo manufactories in the Baramahal.

I have received your letter of the 9th instant and have the pleasure of transmitting the accounts and estimates of the sugar and indigo manufactories you require.

Owing to the number of accidents we have met with in the sugar-mill, the expense of manufacturing the sugar has far exceeded the produce, but hope it will be far otherwise the ensuing year. On account of the dryness of the season it has also made the produce of the indigo very small in comparison to what it would have been, had the weather been more favourable, and of course increased the expense of making it. In respect to the distillery what Mr. Lyte meant was, that the stone-

choultry in the fort would do for the country stills, but as one from Bengal is expected it will be necessary to build the distillery I mention.

I shall send as soon as packed up all the sugar, cochineal and indigo to the Board. Since I wrote you there have been some more canes purchased for planting, which makes the present estimates differ from those I sent you last.

The estimate of the expense of a new mill when I wrote you last, was 40 pagodas, the sum I expected it would come to; but as it has already cost 30 I am afraid it will come to 20 pagodas more before it is completed. I therefore have set it down at 50 pagodas.

The mill and still will be about 4 months at work. As the Tahsildar has received orders not to supply me with any more money, I will be obliged by being informed from whom I am to draw for the necessary expenses of the plantations.

Expenses of culture and manufacture of sugar cane in the Bāra-mahal.

ENCLOSURE No. 1.

Expense of cultivating 922·10 Guntas of wet land with sugarcane.

Items.	Pagodas.	Fanams.	Cash.	Pagodas.	Fanams.	Cash.
Rent of 922·10 guntas of wet land	43	34	71½			
Whole red canes 15,350 at 20 sultāni fanams per ettu	22	44	...			
Whole streaked canes 57,513 at 8 sul. fanams per ettu.	38	16	32			
Top plants of the red cane 10,000 at 3 sul. fanams per ettu	2	22	40			
Carriage of canes	6	6	...			
Ploughing	4	38	...			
Trees for picotta	0	8	...			
Carpenters work for do.	0	44	...			
Wood and bamboos for do.	0	12	...			
Manuring	6	4	40			
Watering	3	10	...			
Total pagodas				129	15	23½

ENCLOSURE No. 2.

Estimate of expense of manufactory of sugar.

Items.	Pagodas.	Fanams.	Cash.	Pagodas.	Fanams.	Cash.
1 mill	50	0	0			
Mending old mill	10	0	0			
Sheds for the 2 mills	10	0	0			
2 wooden receivers	10	0	0			
2 do. gutters to convey the cane juice from the mill to the boiling house	10	0	0			
400 forms for laying sugar at 20 per pagoda	20	0	0			
400 pots to receive the molasses at 60 per pag.	6	3	0			
2,034 bandy loads of firewood at 3 fs. per bandy... ..	135	29	0			
2 candies of chunām at 24 fs. per candy	1	3	0			
500 seers of oil at 1 fanam per seer	11	5	0			
6 pieces of cloth at ½ pagoda per piece	3	0	0			
Grass for bullocks per annum	50	0	0			
192 boxes to contain 10 maunds of sugar each at 12 fs. per box	51	9	0			
Carriage to Madras at 4 pags. per bandy, each bandy carrying 20 maunds of sugar	384	0	0			
Total pagodas				752	4	0

ENCLOSURE No. 2—cont.

*Estimate of expense of manufactory of sugar—cont.*Expenses of
Sugar manu-
facture.

Items.	Monthly.			Annually.		
	Pagodas.	Fanams.	Cash.	Pagodas.	Fanams.	Cash.
Pay of the following servants—						
Sugar manufacturers	20	0	0	240	0	0
Sháh Ismáíl	3	0	0	36	0	0
'Abd-ul Qádir	2	0	0	24	0	0
Chínah	1	21	40	17	33	0
Rámah	1	7	40	14	0	0
Kolley	1	7	40	14	0	0
Husain Khán	1	0	0	12	0	0
Chinághûr Bêg	1	0	0	12	0	0
Venkatáswámi	1	0	0	12	0	0
Mútah	1	0	0	12	0	0
Saiyid Muhammad	1	0	0	12	0	0
Kollah	1	0	0	12	0	0
Choliah	1	0	0	12	0	0
Kitte Múta	1	0	0	12	0	0
Nághah	0	24	0	6	18	0
Shaikh Muhammad	0	20	0	5	15	0
Saiyid Qádir	0	24	0	6	18	0
Kollay	0	20	0	5	15	0
Venkataráma	1	0	0	12	0	0
Sána	1	0	0	12	0	0
Káni	1	0	0	12	0	0
Ammaiyappan	1	0	0	12	0	0
Total of servants' wages ...	42	34	40	513	9	0
Customs (not known) ...						
Total pagodas ...				1,265	13	0

ENCLOSURE No. 3.

Rum.

Estimate of expense of manufactory of rum.

Items.	Pagodas.	Fanams.	Cash.
Distillery (45-20-0)	120	0	0
Two stills	700	0	0
Brick and chunám tank to contain 2,000 gallons of water ...	20	0	0
Mixing vat to contain 300 gallons	5	0	0
Firewood, 760 bandy loads at 3 fanams per bandy ...	50	30	0
400 Fermenting pots at 1 fanam each	8	40	0
Hanging	5	0	0
54 casks at 24 fanams each	28	36	0
Carriage 54 bandies to carry 1 cask of 42 gallons each ...	216	0	0
Customs (not known)			
The following servants' pay—			
1 Distiller at 3 pags. per month for one year	36	0	0
1 Cooper for 4 months at 6 pags. per month	24	0	0
4 Assistant distillers for 4 months at 1½ pags. per month	24	0	0
	84	0	0
Total star pags ...	1,238	16	0

ENCLOSURE No. 4.

Expense of manufactory of rum.

Items.	Pagodas.	Fanams.	Cash.	Expenses of Sugar and rum manufactory.
6 country stills at 6 fs. each	0	36	0	
1 country copper still-head	4	27	0	
34 bandy loads of firewood at 3 fs. per bandy	2	12	0	
Distiller's pay from March to May 1796 at 3 pags. per month	9	0	0	
	16	30	0	
Produce of 62 gallons of molasses or rum, 1 pag. per gallon	62	0	0	
Deduct expense of manufactory	16	30	0	
Balance in favour of manufactory	45	15	0	
Total produce of sugar and rum	95	0	0	
Total expense of manufacturing the sugar and rum	718	12	20	
● Balance against manufacturers of sugar and rum.	623	12	20	

ENCLOSURE No. 5.

Expense of the sugar manufactory from November 1795 to the 1st May 1796.

Items.	Pagodas.	Fanams.	Cash.	Sugar.
Sugar-house	119	32	28	
Mill	94	21	26	
Cattle	170	41	15	
4 boilers	44	13	0	
2 skimmers	2	0	0	
1 ladle	1	0	0	
Firewood	2	0	0	
170 forms at 1 f. 56 cash each	6	19	30	
80 pots at 30 cash each	0	30	0	
Chunâm	0	8	0	
Oil	0	4	0	
Streaked canes, 2,100 at 2 pags. per maund	8 27 36			
Red, 8,100 at 1 pag. 32 fs. per maund	13 22 40			
Stick canes 10,000 at 8 sul. fs. per maund	0 32 0			
Carriage of canes to mill	2	2	40	
Feeding bullocks	12	0	0	
2 boxes containing 11 mds. each	2	0	0	
1 piece of cloth	0	22	40	
3 lamp stands	1	0	0	
Pay of servants from November 1895 to May 1896	219	36	10	
Star pags.	701	42	25	
Produce of 22 maunds of sugar at 1½ pagodas per maund	33	0	0	
Difference	668	42	25	

ENCLOSURE No. 6.

*Abstract of expense of the indigo manufactory.*Expenses of
manufacture
of indigo.

Items.	Pagodas.	Fanams.	Cash.
Leaves, 705½ bundles at 12 per pagoda	58	38	40
45 hauzes (vats) at 10 per pagoda	4	22	40
61 pots at 30 cash each	0	22	70
1,089 bundles of firewood at 52½ cash each	15	1	0
Carriage of leaves	6	10	60
Pay to following monthly servants:—			
Tirugappa mēstri, 2½ months at about 4 pags. per month	10	42	0
Sēva Rāo, Karnam, 2 months at 3 pags. per month	6	0	0
Yūsuf Šāhib, 2 months' pay at 2 pagodas per month	4	0	0
Bassava, 2 months' pay at 1½ pags. per month	3	0	0
Subbā Nāyudu and Chengāh, 2 months at 1 pagoda each per month	4	0	0
Making indigo. { Pārandapalli, 12 coolies for 2 months	2	29	32
Mūkkanūr, 12 coolies for 2 months	2	29	32
Lālāpettai do.	2	29	32
Puttagaram do.	2	29	32
Tiruppattūr do.	2	29	32
Carriage, 1 bandy to contain 1 box of 10 maunds of indigo at 4 pags. the bandy	4	0	0
Customs (not known) ... ..	...	...	...
1 deal box to contain 10 maunds	24	0	0
Total pagodas	154	14	50
Produce, 10 maunds at 16 pags. per maund	160	0	0
Deduct expense of manufactory	154	14	50
Balance in favour of manufactory	5	30	30

ENCLOSURE No. 7.

*Account of manufactory of one maund of clayed sugar and one gallon of rum.*Sugar and
rum.

	Streaked cane.	Red cane.	Stick cane.
Number of canes required	500	500	1,000
Quantity of firewood, bandy loads	1½	1½	1
Quantity of juice in gallons	40	30	30
Quantity of chunam in gills	1	1	1
Oil in tablespoonfuls	1	1	1
Molasses in gallons from 1 maund of clayed sugar	1½	1½	1½
Scummings do. do.	2½	2½	2½
Produce in juice from every 1,000 canes in gallons	80	60	30

Quantity of sugar estimated to be made next year *per diem* in maunds 20
Quantity of molasses required for 1 gallon of rum in gals. ... 1
Quantity of firewood, bandy loads, per gall. ... ½
Quantity of rum estimated to be made next year *per diem* in gallons 60

ENCLOSURE No. 7—cont.

Account particulars of the number of canes planted and the estimated produce.

	Streaked.	Red.	Stick	Sugarcane and sugar.
Whole canes ...		15,350	57,513	
Top plants purchased ...		10,000	1,000	
Top plants from sugar-house ...	2,100	8,100	...	
Produce of whole canes divided into 5 cuttings, each cutting containing 4 eyes or buds, each bud producing one cane ...		307,900	1,150,260	
Produce of top plants, each being equal to 1 cutting containing 4 buds, each and every eye producing 1 cane ...	8,400	72,400	4,000	
Total produce in canes ...	8,406	379,400	1,154,260	
Produce in sugar according to the proportion of 500 streaked canes, 500 of red and 1,000 of stick canes separately making one maund of clayed sugar, maunds ...	17	759	1,154	

N.B.—The scummings not reckoned when a gallon of molasses is said to produce one gallon of rum as they are included.

	Pags.	Fanams.	Cash.
Quantity of molasses produced from 1,520 maunds of clayed sugar, gallons ...	2,280		
Value of 1,520 maunds of clayed sugar at 1½ pagodas per maund ...	2,280	0	0
Deduct expense of manufactory, carriage, etc. ...	1,294	43	22
Balance in favour of manufactory ...	985	1	58
Deduct last year's balance against manufactory ...	623	12	20
Balance star pagodas ...	361	34	38
Value of 2,280 gallons of rum at 1 pag. per gall. ...	2,280	0	0
Deduct the expense of manufactory, carriage, etc. ...	1,238	16	0
Balance in favour of rum manufactory ...	1,041	29	0
Total produce of sugar and rum ...	4,560	0	0
Deduct the expense of manufactories ...	3,156	26	42
Balance in favour of manufactories ...	1,403	18	38

XVII

Letter—from ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

To—CHARLES WETHERELL, Esq., Assistant Collector.

Dated—Tiruppattūr, the 13th June 1796.

I have the pleasure of transmitting you herewith a form of an abstract from the monthly accounts of the plantations and manufactures under your superintendence, filled up as well as I am able; but not being certain as to every charge in the different accounts, I have not made it perhaps quite correct as to the sums under each head; I have therefore to request that you will correct it and fill up the different heads under the cotton plantations and the cochineal, and transmit a fair copy of it including the accounts for April and May to the Superintendent, and that you will transmit one of each plantation every month with your accounts. Under "Estimated produce" you will make as many heads as you find it requires; I have only put down those that seem to be absolutely necessary.

Accounts of plantations and manufactures in the Bāramahal.

I have to request that you will forward the abstract with your accounts for April and May without delay and likewise that you will in future forward your monthly accounts to the Superintendent on or before the tenth of the ensuing month.

Enquiry
about the
plantations
and manu-
factures
in the
Baramahal.

I have to call your attention to the Superintendent's letter of instructions to you under date the 30th March last, where you are desired in the 13th paragraph to ascertain how much ground you have laid out in the culture of the different productions under your superintendence, and you are there furnished with tables of land measure (Native and Europe) for that purpose; or by applying to the survey of the lands belonging to Tiruppattūr, you could ascertain any quantity you have or may wish to have in cultivation; in your answer to the Superintendent's instructions, dated 26th of April, you have mentioned the quantity of land laid out with the mulberry and what you expected to occupy, also the quantity planted with the nopal and cotton, but you are requested to specify the quantity and quality of the land laid out in each production and the rent you pay for each, which you will also transmit to the Superintendent without delay.

In the 18th paragraph of the Superintendent's instructions, you are required to keep registers of labourers, one of those people employed receiving pay and another for the felons, with a form or table shewing how they were to be kept and the Superintendent's reasons fully, why he considered it necessary. In your answer to this paragraph you inform him that "you keep a report of the prisoners, but as to the monthly people it will be impossible because there is hardly one man doing the same thing two hours." You have never forwarded the reports of the prisoners as required, and the Superintendent does not admit that it is impossible to keep a regular register monthly of the people who receive pay; and it appears to him from his own experience that by a proper distribution of labour every morning, the labourers may be classed and employed throughout the day at particular work, so many in planting, in digging holes, in weeding, etc.; and should they be called off their fixed work by any other employment more material, it may be easily remarked in the registers, and should they finish the work allotted them in the morning at any time of the day in one place, they may be wanted for the same work at another or be employed in some way that may finish their day's work. By a proper arrangement of this kind much labour is to be gained and without it much lost, by the people sauntering from place to place without any fixed work to attend to; I have therefore to request you will make registers immediately and by referring to the 18th paragraph of your instructions you will find every particular you may wish; copies of them to be sent every month with your accounts to the Superintendent to be forwarded to the Board for its information, likewise a monthly return of every person employed by you, as before required.

In the 17th paragraph of your instructions the Superintendent recommended your laying up 8 months' store of grain and that by prevailing on the people to receive grain in part payment of their wages, he hoped to keep the expense of labour under as much as possible, as of material consequence towards the success of your undertakings; you were required also to employ at one or two plantations, labourers in pay only—you have not answered this paragraph which you will be pleased to do—and you are required to pay particular attention in future in answering the Superintendent's letters paragraph by paragraph.

I have to inform you that Mr. Graham, Assistant Collector, has been advised some time to advance you cash for your several disbursements, and that you are to apply to him accordingly. The Superintendent has heard that you have not drawn for any disbursements, consequently that the people under your direction have suffered by it.

XVIII

Letter—from ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

To—Mr. EYRE WALCOTT LYTE, Tiruppattūr.

Dated—Salem, the 19th June 1796.

Management
of plantations
and manu-
facture of
sugar and
rum in
Tiruppattūr.

The Superintendent having been informed that you wish to undertake the management of the plantations and manufacture of sugar and rum on your own account, and being anxious that the manufacture should succeed in these districts, is induced to favour your wishes, and will at the same time give you every encouragement and assistance to ensure the success of your undertaking.

On this account the Superintendent has considered what articles will be just and fair that you should take upon your own account, and be debited for upon the same terms that they cost; which are principally these—The sugar-house, mill, all the stock and utensils, the rent of the land, ploughing, manure, cuttings, and watering the canes now on the ground, which according to Mr. Wetherell's accounts amount to as follows:—

Management of plantations and manufacture of sugar and rum in Tiruppattūr.

	Pagodas.	Fanams.	Cash.
Sugar-house	119	32	28
Mill	94	21	26
Cattle	170	41	15
4 boilers	44	13	0
2 skimmers	2	0	0
1 ladle	1	0	0
117 forms at 1 fanam 56 cash each	6	19	30
1 country copper still-head	4	27	0
Rent of 922-10 guntas of wet land	43	34	71
Stick canes, 57,513	38	16	32
Red do. 15,350	22	44	0
Carriage of do.	6	6	0
Ploughing	4	38	0
Manuring	6	4	40
Watering	3	10	0
Top plants, 10,000	2	22	40
Total pagodas	571	15	42

You are well informed by this time as to the prospects of success and the advantages to be derived from the manufacture of sugar and rum at Tiruppattūr, and having mentioned the Superintendent's intention of giving you every assistance, you will easily observe that the terms on which you may take the management of these manufactures upon your own account are much in your favour. Notwithstanding this the Superintendent, as a still further encouragement and considering that the price of labour is a serious expense, will apply to the Board of Revenue that the allowance of 20 pagodas a month which you now receive as pay, may be continued for twelve months; he will allow you also as many of the thieves as you may absolutely want on your paying the trifling sum of one quarter fanam for each a day, which is intended to limit your demand to the number really necessary for the carrying on of your work.

After considering the subject you will be pleased to answer this letter without delay.

XIX

Letter—from Mr. E. W. LYTE.

To—Captain ALEXANDER READ, Superintendent, and Collector of the Ceded Districts.

Dated—Tiruppattūr, the 22nd June 1796.

Having received from Mr. Hamilton, your assistant, a letter dated the 19th instant, mentioning your proposals regarding my taking the management of the sugarcane plantations on my own account, and desiring an answer without delay; I take this early opportunity of doing so with as little delay as can be expected on a piece of business that requires some time to consider on.

In a former letter sent to you, I mentioned that I would like to begin on my own bottom in case you would be kind enough to assist me the first year; but never had any intentions on the plantations that had been begun on the Honourable Company's account, but on waste ground when I should not have so heavy a tax to pay as there is on the lands taken up for the Company; at the same time, I should think that I should treat you with ingratitude and behave unjustly to myself, were I to refuse the kind offer, you have been pleased to honour me with; and have no objections in entering on them, on provision my pay be allowed. At

Management
of plantations
and manu-
facture of
sugar and
rum in Tirup-
pattūr.

the same time, I hope it will not be taken amiss in my making a few observations which I hope your honour will be pleased to take into consideration.

In the account of the boiling-house is included the expense of labourers and artificers from the 28th October to the 30th November 1795. This labour was never done on the present boiling-house, but on building a house which was intended for a boiling-house, but unfortunately blown down on the 28th November. And I have enclosed an abstract of the labour, which I hope you will be pleased to deduct from the account of the boiling-house.

In the next place I must observe that in the account of plants there is a mistake of 12,513 wooden or hard canes more than have been planted. These canes have been made use of in the manufactory, and as I likewise see that there is no allowance made for wear and tear of the boiling-house and mill notwithstanding the many accidents attending the bad iron work, I hope it will not be unreasonable to request that the whole of the canes both for manufacture and plants may be put to my account, and that I may have the produce of them, otherwise that the 12,513 be deducted from the account of plants.

I must likewise inform you that there is not more than two-thirds of the ground mentioned in the accounts, planted with canes: and that it will be out of my power to plant them for six months to come; I think it will be that time before I shall be able to get plants, and the ground will be lying idle on my hands. I must beg that you will please to consider this, and not oblige me to pay the rent of the ground, until it may be in my power to plant it with canes.

There is one thing more, and one which appears the most difficult to me is, procuring a market for the sugar and rum that I may not be able to dispose of in these districts. And I must beg the favour of you to try to procure me one, for which reason I have sent enclosed samples of sugar made from the three different kinds of canes now in cultivation. I would likewise send a bottle of rum; but am afraid it would not be convenient by tappāl, but will if required send it by the first convenient opportunity.

As I am confident of your intentions to encourage this business I must take the liberty of informing you, that it will still require a sum of money, but not exceeding 100 star pagodas to repair the old mill, and get some apparatus for the distillery, we having lost already so much by distilling in earthen pots. I would wish to have the stills as well as their heads made of copper. This will not only be a saving of the spirits but prevent any more accidents of the people attending them being scalded, of which there has been a great many by the pots bursting on the fire. And as we shall be able to carry on the business with less expense next year as we shall have no occasion to buy plants, I hope that if I may like to enter deeply in the business and show you any prospering hopes, to be assisted with what trifle of money may be required to do so—as I am confident that you are acquainted with all the difficulties attending such business as this is in the beginning.

In regard to your kind offer of the felons, I will readily accept, but at the same time beg that they will be supplied with tools; these tools I will make myself answerable for, and at the same time that I may give over the felons, will give over the same quantity of tools with them: as there are now plenty of tools on the plantation I hope this will not be thought an unreasonable request.

Having now stated everything which at present occurs to me, I hope you will excuse the rough manner in which I have laid them before you, and take all matters into consideration that I have laid before you, concerning the business. I might have perhaps said something more had I time to consider, but as Mr. Hamilton's letter desired an answer without delay, I have lost no time in complying with your commands and returning you my best thanks for the offer you have been pleased to honour me with.

XX

Circular—from S. B. LUSHINGTON, Esq., Acting Secretary, Board of Revenue.

To—Captain ALEXANDER READ, Superintendent, and Collector of the Bâramahal and Salem districts.

Dated—Fort St. George, the 22nd June 1796.

Under date the 22nd March last, you were directed to ascertain, as correctly as possible and without loss of time, the current price at which sugar is merchantable in your districts and whether any quantity could be purchased for the Company; I am now directed to repeat those orders, and to desire that you explain what causes have hitherto prevented your compliance therewith.

Enquiry about the price of sugar.

XXI

Letter—from ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

To—C. WETHERELL, Esq., Assistant Collector, Tiruppattûr.

Dated—Salem, the 25th June 1796.

The Superintendent has received a letter from the Board of Revenue, on the subject of sugar, which he is anxious to answer, but delays until he receives your answer to the letter I had the pleasure of addressing you on the 13th June, as he means to make a report on the plantations and manufactures under your care at the same time; you will be pleased to forward your answer accompanied by the abstract and the accounts for April and May as fast as possible.

Sugarcane plantations in Tiruppattûr.

I addressed Mr. Lyte on the 19th instant proposing terms on which he might take the management of the plantations of cane at Tiruppattûr on his own account; in his answer, he hopes (among other objections that he makes) that he may not be debited for the rent of all the land, as there is not more than two-thirds of the ground mentioned in the accounts planted with canes. I shall be obliged by your explaining this, and again request that you will specify every field, its dimensions, quality, rent paid for it, and whether planted with canes or any other production. These particulars are required of all the land you now pay rent for.

XXII

Letter—from ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

To—Mr. Eyre Walcott Lyte, Tiruppattûr.

Dated—Salem, the 25th June 1796.

The Superintendent has received your letter under date the 22nd instant and observes the objections you state; on all which he will consider.

In the fourth paragraph you request that “the whole of the canes both for manufacture and plants may be put to your account and that you may have the produce of them; otherwise that the 12,513 hard canes that were made use of in the manufactory, may be deducted from the account of plants.” I do not clearly understand your meaning but if it is that you should have all the produce, it is but fair to expect that you should pay the expenses that were incurred by that produce. From November to May, servants’ wages alone (not including your pay) will amount to nearly one hundred pagodas; or, do you mean the probable quantity of the produce of 12,513 hard canes? You will be pleased to answer this letter for the Superintendent’s information.

XXIII

Circular—from CHARLES N. WHITE, Esq., and THOMAS COCKBURN, Esq., Members of the Board of Revenue.

To—Captain ALEXANDER READ, Superintendent, and Collector of the Baramahal and Salem Districts.

Dated—Fort St. George, the 26th June 1796.

Cotton cultivation in Vizagapatam.

We herewith enclose, for your information and guidance, extract of a letter from Government under date the 16th April last, together with the extract of a letter therein enclosed from the late Commercial Resident at Vizagapatam, containing suggestions on the same subject (cotton cultivation).

As we consider the increase of the culture of this article to be of the greatest importance to all the valuable branches of manufacture and commerce on this coast we desire that you will report the present general state thereof, what quantity you estimate to be annually produced, and what encouragements you conceive most likely to promote its extension, or to improve its quality. In making this report (which we trust will be done with the least possible delay) you will have a particular reference to what Mr. Darvall has mentioned on the subject, and you will furnish us with your opinion as to the eligibility of the methods which that gentleman has proposed for accomplishing the objects in view.

ENCLOSURE No. 1.

Extract of a letter from Government, dated the 16th April 1796.

We enclose extract of a letter from the Commercial Resident at Vizagapatam, upon the subject of encouraging the cultivation of cotton in that district, which we think of sufficient importance to be pointed out to your notice, and to desire that particular attention may be paid to this object by the Collectors upon the renewal of leases.

ENCLOSURE No. 2.

Extract of a letter from the Commercial Resident at Vizagapatam, dated the 8th March 1796.

Cultivation of cotton and manufacture of cloth in Vizagapatam.

The cultivation of cotton, one would suppose, in a country where the principal manufacture depended on the abundant supplies thereof, would be particularly attended to and that peculiar encouragement would be given thereto; but it does not appear from every enquiry I have made that it has hitherto been the case, and it is beyond a doubt that the cotton produced in the Vizagapatam district falls very short of the quantity required to supply the looms and that the chief dependence is on the imports by the Brinjarries who may, from failure in the crops in the interior Provinces, or from other causes, be scanty in their supplies. An object of so much importance as the Vizagapatam and Ganjam investments surely deserves a minute attention and it is sincerely to be hoped that those in immediate charge of the country may devise means to render the culture of cotton more general; if proper encouragement were given to the ryot, it is not reasonable to suppose he would give the preference to a more precarious crop of dry grain, which certainly cannot yield him an equal profit or advantage, for from the best information I can procure, a vissam of ground containing 147 cubits square, cultivated with any of the small grains in a favourable season, cannot yield more than 18 candies, or as many rupees and the same ground cultivated with cotton under the same circumstances, with respect to season, will produce 28 maunds and one viss of uncleaned cotton, the value of which estimated at 9 viss for a rupee, will make 25 rupees; and from what I understand, the cotton requires little or no care after it is once sown, depends less on the rains and is not so subject to be preyed upon by a variety of animals as grain. The introduction of the Mauritius cotton would also be attended with beneficial effects to the investments, as it requires no more care than the plant of the country, yields a cotton of a superior quality, a greater abundance of it, and when once planted will stand several years without any additional labour. The principal objection, I understand, at present made to it by the natives is the short leases the country is rented at, that it is not worth their while to cultivate what they are not to reap the produce of; this objection will be done away when the countries are rented out on longer leases, and if the assessments on grounds cultivated with this cotton are made favourable to the ryot, knowing also that he would have time to reap the produce of his labour, there is no reason to suppose but that he would undertake it with alacrity, and that in a little time a considerable cultivation would be carried on. The encouraging the growth of this article I cannot but consider of much importance, and I think ought to be recommended to Government in the strongest manner; the present will be a favourable time for such recommendation, as in July next the leases expire,

when new cowles I suppose will be granted and stipulations may be made highly favourable to its cultivation.

Cultivation of cotton and manufacture of cloth in Vizagapatam.

I shall next proceed to take into consideration the spinning the thread, on which more depends than may probably appear at first view, which I shall endeavour to point out as concisely as possible. Spinning is performed by all ranks of people, except Brahmins, chiefly by women, and children, and persons disabled for other occupations; the cotton is first cleaned of the seeds, and beat out, and then by means of an ill-constructed wheel and spindle, is spun into thread; by this operation, a single person gains about half a fanam per day; the thread is then brought into market and sold from 3 seers to 5 and it has even been known at 7 or 8 seers the rupee, but this is only where there is, from drought or other causes little or no cultivation carried on, as was the case during the late famine; every hand was then employed to gain a scanty livelihood by spinning; hence it appears that the price of thread does not always bear a proportion to that of cotton; during the time of cultivation and harvest, it is dearer from the above reason than at any other time, although the price of cotton may be the same. The average price of thread the last year was $3\frac{1}{2}$ seers the 14 punjam and $2\frac{1}{2}$ seers the 18 punjam per rupee; this was owing to the failure of the crops from excessive rains which induced me in December last to recommend the remission of all inland duties on the importation of cotton by Brinjarries; this has been attended with such good effects that large supplies have since arrived and are still arriving and the price of cotton consequently reduced. I think it necessary to dwell somewhat longer on this article, because from the late Commercial Regulations it would appear from the half-commission to be paid Commercial Residents in England on inspection of the goods, that the Honourable Court conceived the quality of their investments to depend only on the exertions of their commercial servants, when, in fact, it depends on the price of cotton and thread. This I trust will appear evident from the following exposition. A piece of good standard 14 punjam, ought to contain 25 or 26 seers of thread, and the price paid to the weaver is $7\frac{1}{2}$ rupees. Now if thread is bought at $3\frac{1}{2}$ seers the rupee it will take him near 8 rupees worth of thread; consequently he is obliged to reduce the quantity of thread. He must at least save $1\frac{1}{2}$ rupees out of his $7\frac{1}{2}$ rupees to enable him to live. If therefore a piece of cloth ought to contain 25 or 26 seers and only contains 20 or 21, it is evident that the texture must be defective; the same holds good with respect to the 18 punjam, when the price of thread is $2\frac{1}{2}$ seers for the rupee, and the weaver receives $10\frac{1}{2}$ per piece, which ought also to contain 26 seers of thread. I have been induced to dwell on this point, as well from an idea that it may enable the Board to judge of the expediency of reducing the prices of goods which I shall hereafter touch upon, as from justice to commercial servants in general, and also from a consciousness that the investment of '95, provided under my inspection, will be found of various qualities, and particularly the 18 punjam, which for the above stated reason is particularly defective and less in quality than indented for by the Company; and that throughout the whole provision I was under the necessity of yielding to the circumstance or I should not have procured so large a quantity of cloth as I have done; for it must be considered that the Vizagapatam districts were in a continued state of warfare until the month of May, to which time little better than 9,000 pieces were collected.

With respect to the contracting with merchants in the provision of so large an investment, I conceive it to be by far the most preferable; the Company are thereby ensured a certain quantity of goods without the risk of failure on the part of the weavers, and indeed I believe without the intervention of merchants, copdars and gumâstas, it would be next to impossible to get up so large an investment in a country so extensive. In order to ensure the weaver the full price of his cloth, I have established a check, which will I trust effectually put a stop to any collusion on the part of the copdars or others, which, from the complaints made to me in my tour through the country, gave me reason to think prevailed; after every day's sorting an account is taken of the cloths reduced to a lower number, specifying the name of the copdar, the weaver and the reduction to be made in consequence; chits are to be made out agreeable to this for every village and authenticated by the Resident's chop in English and Gentoo characters; these chits are sent into the respective villages and no deduction is admitted without a chit being produced; this mode, I conceive, carefully attended to, is well adapted to prevent the weaver suffering from imposition, and at the same time holds out an encouragement to him to fabricate good cloths, knowing that no deduction will be made.

The next point I shall consider is whether a reduction in the prices of cloths is practicable, and as it appears, by the 56th paragraph of the Commercial Regulations, to be the wish of the Honourable Court, I shall briefly state my reasons for thinking it a measure not easily to be effected, and perhaps not advisable, at least until the supplies of cotton shall be rendered more certain, and the price less variable than at present. I have already shown that the present prices in a scarcity of cotton, such as generally prevailed the last year, are inadequate to the keeping up the manufacture to its standard; that it will require 8 rupees worth of thread to make a piece of good 14 punjam, for which the weaver only receives $7\frac{1}{2}$ rupees, that in consequence he is obliged to lessen the quantum of thread to enable him to gain a maintenance, and to this simple cause may be principally attributed the debasement of the investment; hence we may draw the following conclusion which I believe is also fully justified by experience, that if cotton is cheap, the manufacture will be proportionally good, and, consequently, must produce under the same circumstances with respect to the markets in Europe a better price; if therefore the texture and quality of cloth, the price of cotton, and the selling price in Europe bear a proportion to each

other, it amounts to the same thing, and, if you reduce the price in one instance, it ought to be augmented in the other; one of the principal duties of a Resident, I conceive, is that he should sort and receive his cloths with a due regard to the existing prices of cotton and thread, on which, as I trust I have clearly demonstrated, depends principally the good or bad quality of an investment.

XXIV

Letter—from Captain A. READ, Superintendent and Collector, the Bâramahal.

To—EDWARD SAUNDERS Esq., President, Board of Revenue.

Dated—Salem, the 28th June 1796.

Plantations
of sugarcane,
indigo, etc.,
in the
Bâramahal.

As you may please to observe from the enclosed, due attention has been paid to your instructions, dated the 22nd March last, on the purchase of sugar in these districts, though I have delayed my communications on the subject. That delay has proceeded from a design I had of inserting them in a report I am preparing upon the plantations of sugar, indigo, etc., in the Bâramahal, which would have been transmitted before now, had I been furnished in due time and with the wished particularity as required of Mr. Wetherell who is in charge of them. It is hoped that what is yet wanting will very soon be obtained, when the intended report shall be transmitted.

Sugar.

The enclosed letters from Messrs. Macleod and Graham may suffice for the present. By No. 1 it appears that above 400 tons of coarse sugar is manufactured every year in the Southern Division but that is no other than jaggery, consequently unfit for exportation, as it would dissolve on the passage. Much, however, could be done in manufacturing sugar in this Division, if Government desired it and proper persons sent to conduct the business. I have never had a doubt as to the sending commodities by water from the banks of the Cauvery to the Coast, which would remove the objection of land carriage. As mentioned in No. 2 very little could be procured in the Bâramahal. I was induced, however, to make a trial in that quarter from the expectation of remaining longer there than has been found convenient, and I think it will answer.

The enclosed are parcels that have been manufactured there by Mr. Lyte, all of which have been once clayed and bleached. A is from the streaked, B from the red, and C from the bamboo sort of cane. I doubt not their all answering for the London market and hope to provide some hogsheads of each by March or April next. Mr. Wetherell has been directed some time ago to send you all that has been manufactured this year at Tiruppattûr, likewise all the indigo and cochineal.

ENCLOSURE No. 1.

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Captain A. READ, Superintendent.

Dated—Nâmagiripêttai, the 14th April 1796.

Sugarcane
cultivation
in the
Southern
Division.

I had the pleasure to receive your letter dated 8th instant requiring a statement of the current prices of sugar in the Southern Division, and an estimate of the quantity which might be procured for exportation, agreeably to the Board's direction.

The chief districts in the Southern Division in which sugar cane is cultivated, are Râsipuram Chennagiri and Salem—small quantities at Sêdamangalam, Bêlûr, Atur and Viraganûr. The cultivation of it is not properly introduced into Nâmakkal, Paramati and Kâttuputtûr, on account of the wet lands of these districts having formerly rented for a proportion of the produce instead of money, which the ryots considered as disencouraging its culture which requires so much more stock and labour than the common productions.

This objection is already removed in all the districts except Kâttuputtûr by a stipulation of money rents for all paddy lands. Should it become a public object to extend the culture of sugarcane in this quarter, I have scarcely a doubt but several hundred tons might be annually procured in the Southern Division for exportation. The soil is favourable to it, and the knowledge of its culture is of so old a date that there is no tradition of its being first introduced.

The quantity cultivated has been confined by there being but little demand for it, which is only the consumption of these districts and a certain quantity exported to Trichinopoly, Tanjore, Cuddalore and Coimbatore.

The Natives here not being acquainted with the mode of refining it, is the cause of its being very coarse. The following is an estimate of the annual quantity exported to the above mentioned places with the average current price during the harvest and manufacturing season, February and March:—

Sugarcane cultivation in the Northern Division.

	TULÂMS.
From Râsipuram and the northern parts of Sêndamangalam ...	28,000
From Chennagiri	15,000
From Salem	6,000
From Bêlâr, Atur and Vîraganûr	15,000
Total ..	64,000

A tulâm is the weight of six hundred rupees and the average price is about $\frac{3}{4}$ pagoda per tulâm, or of the estimated quantity exported 48,000 rupees, being nearly in pagodas 14,500.

The only measure which appears necessary to extend its culture would be to fix a price for its being received from the ryots in their respective districts and to make them advances of cash in March and April for which they may be credited upon the delivery of the sugar.

The only obstacle that seems to occur against its being an object of public commerce is the great distance for land carriage to the Coast. But means might perhaps be devised of transporting it by water on the Cauvery to Porto Novo or Kârikâl. I don't think such a thing impracticable and should the Board approve, an experiment might be tried at a very little expense in June or July when that river is full.

ENCLOSURE No. 2.

Letter—from J. G. GRAHAM, Esq., Assistant Collector.

To—Captain ALEXANDER READ, Superintendent, Ceded Districts.

Dated—Râyakôttai, the 19th April 1796.

I have the honor to inform you that the quantity of sugar manufactured in this district is so extremely small as not to become an object for a private merchant. Such is the scarcity of water that the country does not yield a sufficiency of rice for the consumption of even the Brahmins and better sort of inhabitants, and the Natives are of opinion that the plant especially for the first six months requires a great quantity of water.

Sugar manufacture in the Northern Division.

The Natives in general and especially those who reside in this neighbourhood including the sepoys are so much distressed for water notwithstanding Captain Doveton's exertions, I shall make every possible enquiry to find out the places most likely to afford springs for the purpose of digging wells or tanks, convinced that the Board will think the expense incurred well applied. The geographical survey will, I hope, enable us to ascertain the practicability of cutting canals from the river, which, though the nature of the ground may not admit of their being brought so near as to remove the scarcity felt here, may, by filling the intermediate tanks, improve the lands and perhaps encourage the culture of the sugarcane.

XXV

Letter—from ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

To—CHARLES WETTERELL, Esq., Assistant Collector, Tiruppattûr.

Dated—Salem, the 31st June 1796.

I have the pleasure to enclose a sample of cochineal, cured by Mr. McMorris, Assistant Surgeon here, according to Dr. Berry's instructions.

Cochineal.

You will be pleased to forward a sample of the cochineal that you have cured at Tiruppattûr to the Superintendent; and send all the cochineal you have to Mr. Hurdis at Krishnagiri without loss of time, as he leaves the Bâramahal in a few days for the Presidency and will take charge of it and present it to the Board of Revenue.

In the 9th paragraph of the Superintendent's letter of the 9th May, you are desired to send all the sugar, indigo and rum to the Presidency, unless keeping the rum longer should be necessary; and that if the Waddevars should refuse to go, you were to send the carts at Tiruppattûr, with directions to call on Mr. Dring for the weights and any empty casks he may have procured. I am to request that you will inform me when you sent the sugar and other articles and what quantity of each you did send.

Dispatch of sugar, indigo and rum to Madras.

Mr. Lyte only advised the Superintendent that you had received the weights at Tiruppattûr.

XXVI

Letter—from Mr. EYRE WALCOTT LYTE, Tiruppattûr.

To—ROBERT HAMILTON, Esq., Assistant Superintendent, Central Division.

Dated—Tiruppattur, the 2nd July 1796.

Sugarcane
cultivation
in Tirup-
pattûr.

I hope you will excuse my not acknowledging the receipt of your letter of the 25th ultimo, as it has been entirely for the want of paper that has prevented my answering you.

My meaning in my letter to the Superintendent regarding the canes was, to take all of them on my own account, both those that were made use of in the manufactory and those that were planted; but as you say that if I take those made use of in the manufactory, I must pay all expenses attending, I had rather let them alone, and only take what has been planted.

In regard of the servants' wages, I have enquired of Mr. Wetherell and find that he has charged all the servants employed in the Fort plantations to the account of sugar; this is very far from being right, as there never was any of them employed in the building of the manufactory, and only five men employed while the manufactory was at work, which began on the 13th February and ended on the 17th March, during which time their pay amounts to 17 star pagodas, including some daily labourers that were likewise employed in the manufactory; all other servants were employed on mulberry.

I however do not wish to take the produce and pay this sum, as the canes were purchased at a very dear rate, and will not do much more than pay for themselves and the fuel that was expended.

Having now explained myself as far forth as lies in my power regarding this matter, I hope you will be pleased to inform the Superintendent what I say concerning this matter.

XXVII

Letter—from CHARLES WETHERELL, Esq., Assistant Collector, Tiruppattûr.

To—ROBERT HAMILTON, Esq., Assistant Collector.

Dated—Tiruppattûr, the 5th July 1796.

Cochineal.

Sugar, rum
and indigo.

I have received your letter of the 31st ultimo and enclose you a muster of the cochineal we have made, as also a muster of some I have purchased of a Native at Râyakôttai. The quantity I got from him was 5 lbs. The cochineal shall be sent to Mr. Hurdis; the sugar, rum and indigo, shall be despatched immediately to the Board; the reason of my keeping them so long was that they might be thoroughly dry before they were sent off.

Cinnamon and
sugarcane
plantations in
Tiruppattûr.

The cinnamon trees that arrived here a few days ago are all healthy and thriving. Fourteen died before they arrived. The land I have laid out in sugar, is 14 acres—the rest is unoccupied at present, but when the canes that are now on the ground, are fit to take cuttings from, the whole will be planted with canes. The ground I have lately taken for the purpose and for which we pay rent is as follows:—

	Shaikh Ibrâhim.	Wet fields.	Guntas.	Rent.			
				PAGS.	F.	C.	
Dombumitta	1	234	11	10	44	5
Diôstan putra	1	82	12	3	0	0
Pâlavâdi	1	121	4	4	38	35
Diôstan putra	1	58	2	3	0	0
		4	496	13	21	37	40

Shaikh Haider.				Wet fields.	Guntas.	Rent.			Sugarcane etc., plantations in Tirupattūr.
						PASS.	F.	C.	
Diōstan putra ...	...	...	...	1	128 11	5	18	60	
East of Diōstan putra	...	...	...	1	74 2	2	37	40	
				2	202 13	8	11	20	
Venkataswāmi's Kistmitti	...	...	...	1	123 0	9	0	0	
Total wet				7	822 10	39	3	60	
Shaikh Ibrāhīm.				Dry fields.					
South of Kūṭa's field ...	...	...	...	1	957 8	25	0	0	
East of the tank kori	...	...	...	1	830 12	12	33	60	
				2	1,788 4	37	33	60	
Shaikh Haider.									
East of the tank kori	...	...	...	1	470 8	9	3	60	
				1	470 8	9	3	60	
Venkataswāmi's—south of Malakāsa tank	...	...	...	1	400 0	8	22	40	
				1	400 0	8	22	40	
Total dry				4	2,658 12	55	15	0	

The dry ground will be occupied with rāgi, cumbu, indigo and cotton. I will let you know as soon as measured what quantity there will be of each.

I shall obey your instructions about the register of labourers, and shall transmit with my accounts the register of thieves.

I have laid up a large quantity of grain for the thieves, but as there are so few labourers now (most of them being discharged) it will be unnecessary I think to lay up any grain for them. The sugarcane are coming on remarkably well and we have plenty of water. The mulberries are growing very luxuriantly, and are fit for worms. We got up some eggs not long ago, but all the worms that came forth died. The worm-house is finished, and the filature will be done in the course of a week. Mulberry.

The cotton is now fit to pick—we are making indigo which yields very well, and having discharged a number of servants, hope the expense will be greatly decreased. Cotton and indigo.

Owing to the ground I have mentioned not being cultivated, Mr. Lyte has made the objection to take the whole of the wet ground. I hope the above statement will be a sufficient explanation.

XXVIII

Letter—from R. HAMILTON, Esq., Assistant Superintendent, Central Division.

To—CHARLES WETHERELL, Esq., Assistant Collector, Tirupattūr.

Dated—Salem, the 6th July 1796.

In consequence of a letter from the Board of Revenue to the Superintendent, enclosing extract of a letter from Government on the subject of cotton, and requiring a report on its culture in the Ceded Districts, I have to request that you will communicate all the information you have acquired on this subject. Culture of cotton in the Ceded districts.

It is observed that the culture of the Mauritius cotton is the most beneficial, as it requires no more care than the country plant, is of a superior quality, yields a greater abundance, and when planted will stand several years without any additional expense. In the 9th paragraph of the Superintendent's instructions to you, he mentions that you then had left about a candy (or seven bushels) of seed (the

Culture
of cotton
in the
Ceded
districts.

Mauritius cotton) which would sow ten acres more than you had on the ground, recommending that it should be sown in May or June and that the ground should be well prepared for it which was not the case with that already sown.

In your answer to the Superintendent's letter, you inform him that you have two or three acres of land planted with cotton, which having been sown under the direction of Natives was so thick that it would never come to anything. The Superintendent supposes you allude to the cotton that was planted before he left Tiruppattûr near the Fort. As you have not mentioned the subject of cotton since, I have to request that you will be pleased to state the situation this may be now in and whether you have sown the seed, when you did, and the ground that you have occupied with it.

XXIX

Letter—from R. HAMILTON, Esq., Assistant Superintendent, Central Division.

To—CHARLES WETHERELL, Esq., Assistant Collector, Tiruppattûr.

Dated—Salem, the 10th July 1796.

Cochineal.

Plantations
at Tiruppattûr.

I have the pleasure to acknowledge the receipt of your letter of the 5th instant, with musters of cochineal made at Tiruppattûr, and that which you purchased. The Superintendent is much pleased at the flattering accounts of the plantations under your care, and has very little doubt but that they will answer every purpose for which they were first undertaken.

I must beg leave to remind you that you have not forwarded the abstract required, or your accounts for May and June, which delays the Superintendent from drawing up a report on the plantations and manufactures at Tiruppattûr.

You have not mentioned what quantity of cochineal you prepared at Tiruppattûr and sent to Mr. Hurdis, the quantity of sugar, rum or indigo you intend to forward to the Board, or the quantity of grain you have in store for the use of the thieves, all which you will be pleased to specify. As you have discharged most of the labourers, the Superintendent agrees that it will be unnecessary to lay up a store of grain for the purpose mentioned in the 17th paragraph of his instructions to you.

Mulberry.

Mr. McMorris has supplied the Superintendent with a quantity of mulberry cuttings which are on the road to Tiruppattûr; if you have not any ground prepared for them, it may be perhaps necessary to prepare some immediately.

You will be pleased to forward with the least possible delay, the abstract and your accounts for May and June.

XXX

Letter—From C. WETHERELL, Esq., Assistant Collector.

To—ROBERT HAMILTON, Esq., Assistant Collector.

Dated—Tiruppattûr, the 12th July 1796.

Accounts
of plantations

Cotton.

I have the pleasure of transmitting my accounts for May; the accounts for June with the abstract, etc., shall be transmitted with the least possible delay.

The quantity of land I intend for the Mauritius cotton is about sixty acres—we have already begun to sow it.

I have supplied a number of the Natives with seed in hopes of introducing it in this quarter.

N.B.—I enclose a muster of the Mauritius cotton that has lately been picked from the plantation here.

XXXI

Letter—from Mr. EYRE W. LYTE.

To—Major ALEXANDER READ, Superintendent, Ceded districts.

Dated—Tiruppattūr, the 7th August 1796.

I have the honour to enclose the account of the different articles under cultivation at Tiruppattūr, as — Sugar, indigo and silk.

	CWT.	QRS.	LBS.		MDS.				
Indigo ...	5	1	0	or	28	of	21	lbs.	avoirdupois each.
Sugar ...	3	1	14	or	18	of	21	„	do.
Silk ...	0	0	0	or	0	of	11	seers	3½ palams.

Cochineal, not yet properly dry.

This is the true account of all the dry articles : and the rum is 37 gallons of 5 beer bottles each gallon. I have made boxes for packing the different dry articles, except indigo, and would like to know whether that is to remain in baskets or packed in boxes. Hoping to hear from you soon on this subject.

XXXII

Letter—from Mr. EYRE W. LYTE.

To—Major ALEXANDER READ.

Dated—Tiruppattūr, the 16th August 1796.

Inclosed is the copy of the abstract you left me to copy : the quantity of sugar here is 18 maunds (Tiruppattūr) ; I shall to-day weigh all the other articles, and acquaint you of the contents by the next tappāl. Sugar and indigo.

There was a letter come to Mr. Wetherell's Dubash last night from his master who says he will not be here for one month ; I have taken the liberty to acquaint you of this, and hope you will direct me what to do with the articles after they are packed ; I would likewise wish to know if I shall pack the indigo in boxes, or let it remain in the baskets it is now packed in.

XXXIII

Letter—from Major A. READ, Collector.

To—Mr. EYRE W. LYTE.

Dated—Salem, the 6th September 1796.

I have received your letters of the 7th and 16th ultimo, and wish you to do everything in your power to extend the plantations and improve those already on foot. Lose no time in bringing the 366 guntas or 9 acres of land, that Mr. Wetherell has rented of the farmers (without making use of it) into cultivation. You may take more wet lands to cultivate, of such as they may not intend to cultivate ; as the option will be theirs, you are not to pay rent for it, but you may tell them, that rent will not be demanded of them for it ; I doubt however that you will get any on such terms. I want no more dry lands upon any terms, as there are already above 100 acres of it included in the plantations. Plantations in Tiruppattūr.

Have all the sugar, indigo and cochineal ready for sending to Madras by my carts, which will leave this to-morrow morning. See that the packages are well secured against wet ; direct them to Mr. Stephen Lushington at Madras. Write with them informing him of the quantity of each. In case that customs be exacted on the road, it will be proper to send a conicopoly along with them. Direct him to keep a particular account of the customs levied on each article at every choultry and give him 10 pagodas to pay them. Dispatch of sugar, indigo and cochineal to Madras.
Customs duty.

Dispatch of
sugar, indigo
and cochineal
to Madras.

As you mentioned the want of nopal when I was at Tiruppattûr, my drivers have orders to load the carts with it the day before they go into Tiruppattûr; so have the ground prepared for it; there is abundance of it in every village almost within 7 miles of you.

The ants having eat up all the samples of sugar that were sent before from Tiruppattûr to the Revenue Board, others are immediately wanted; send others therefore, the moment you receive this, directed to Mr. Lushington; you must dispatch a man with them to the Postmaster at Ambûr and money with them to pay the postage.

You mentioned when I was at Tiruppattûr your inclination to farm the whole of the plantations in case Mr. Melvin would join you in partnership. I wish to know your determination. The first leisure time I have, I propose to inspect the whole of the business from Mr. Wetherell's several communications, when I shall be able to write more fully on this subject.

XXXIV

Letter—from Mr. E. W. LYTE.

To—Major ALEXANDER READ.

Dated—Tiruppattûr, the 8th September 1796.

Mulberry
plantation.

Nopal
plantation.

I have this moment been favoured with your letter of the 6th instant, and lose no time in acquainting you of the proceedings here, particularly in regard of the mulberry and cochineal. As soon as I was favoured with the rain of the 27th ultimo I cut down all the large trees of mulberry in the plantation and have filled up all vacancies in that spot. I have likewise begun another plantation of mulberry adjoining the southern sugar plantation, and have got about one acre planted in the very spot where I told you Mr. Wetherell had begun to make a garden. I suppose that I shall have his displeasure on this account, but I was obliged to do it, or lose the favourable opportunity at the time the bandy load of cuttings came from Mr. Parkinson; I have likewise filled up every vacancy in the sugarcane fields, where the canes had failed, with mulberry. I suppose that you have heard by this time from Mr. Smith that I have planted two plantations of nopal and begun a third, which will be ready to plant against your bandies arrive. All the wet lands I am getting ready for paddy, but have no money to purchase seed; that ground will not do either for mulberry or sugarcane, as it is in a very low situation, and when our neighbours surround us with paddy it will always be under water. Your orders about the sugar, indigo and cochineal shall be duly attended to, and everything ready by the arrival of your bandies. But money I must borrow, as I have none, and our Superintendent has not left enough here to defray the expenses till he returns. The thieves have been three days without their dugânies. In regard of the farming of the whole of the plantations, I have sent the estimate to Mr. Melvin, but have yet received no answer. I shall take the liberty to order the bandies to return loaded with mulberry cuttings. I hope this will not be taken amiss.

XXXV

Letter—from Mr. E. W. LYTE.

To—Major ALEXANDER READ.

Dated—Tiruppattûr, the 12th September 1796.

Sugar, indigo
and cochineal
sent to
Madras.

I have the honour to enclose to you a copy of the estimates of articles sent to Madras. The whole I have packed up in boxes, taken from your godowns, and covered with wax cloth. They set off this morning with a conicopoly to keep the account of customs.

I likewise enclose to you a copy of a letter from Mr. Melvin, by which you will see what he says regarding the business. In regard to the 530 pagodas there mentioned he has not properly understood me; I wrote him word that I believed it had cost you 500 pagodas for servants, wages and plants, and he thinks that I meant that this money you expected to be paid to you by the farmer: I have however wrote to the contrary, that you only required payment for the land rent, buildings and stock. Expenses of manufacture

In regard to my own part I can say no more of the matter, than what I did in a former letter to you—that was, that I would accept of your offer in case the Board would allow me my pay, as an encouragement for carrying it on, and that you would allow me the quantity of thieves I may require to carry it on: I had indeed rather by far be under the superintendency of you or some other gentleman who would assist in shoving on the business on the Company's account, than to be on my own bottom.

I am assured that you are well acquainted with my circumstances, and know that I have no money to boast of, and entering on a business of this kind, in a country like this, I may by one accident (that of an enemy, or a tank breaking, or fire) be involved in a debt which for the remainder of my days I may never be able to pay; and whereas, were I to keep clear of this, I should always be at liberty to retire to my native country or any other, when an opportunity may offer to my advantage, a matter which I cannot refrain taking into serious consideration.

You may however depend on my doing everything in my power to assist in carrying on the business as much for you or the Company as if it was for myself, and it would give me as much pleasure to see it thrive in either of your names as my own; only that, were it my own, I should have no one to blame but myself, as I should be clear of a Superintendent who at present does more harm than good, two to one.

In regard to the wet land you desired me to get, I believe I could get plenty on the terms you mention, but it is in bad situations, and no water to be had in a dry season, a circumstance that renders it not proper for sugar or mulberry. There is however some dry ground which was put this year under the estimate of wet, but the season setting in so late here has prevented its being made into paddy fields and it will remain idle. It will do very well for indigo, but as I am not acquainted whether you intend to cultivate that plant or not, I have left it alone until I hear from you; which if you think proper to let me know, the sooner the better, that we may begin to prepare it. There is one part, I believe about one tār (or 10 acres), that will answer very well for mulberry. It is where mulberry was planted by Tippoo, and answered very well. Land for sugarcane I can get on the terms you mention as soon as the paddy is cut, which will be in time for the season. But I would rather recommend taking a village. There is one adjoining Tirupattūr called Vengalâpuram, that does not pay much more than what we pay at present. There is good indigo ground among the dry land and a good deal of water to be had for canes and mulberry. The potails of this village seem to be inclined to give it up. Land for plantations.

Now having said all that is in my power on that head, I must take the liberty of reminding you of the manufactory—that is, for iron for the mill, stills, some more moulds for the sugar, and fermenting pots for the rum; you must recollect that the next year's proceedings will not be like this. When we found we could not go on, we had no more to do but to tell the Natives to grind the canes themselves. Next year the canes will be from our own fields and if there are not proper materials they will be certainly lost, as you may be assured that none of the Natives will buy them from us. I hope you will not take it amiss my speaking so plainly on this part of the business, as I think it a matter of great importance and should be immediately taken into consideration. Manufactory.

Quantity of
sugar, indigo
and cochineal
dispatched
to Madras.

ENCLOSURE.

Statement of the articles sent to the Board of Revenue.

Different kinds of canes.		Sugar.			Indigo.			Different kinds of cochineal in each number.	Cochineal.			
Numbers.	—	Gross.	Tare.	Nett.	Numbers.	Gross.	Tare.		Nett.	Gross.	Tare.	Nett.
		CWT. QR. LB.	CWT. QR. LB.	CWT. QR. LB.		CWT. QR. LB.	CWT. QR. LB.	CWT. QR. LB.		CWT. QR. LB.	CWT. QR. LB.	CWT. QR. LB.
1	Red canes	2 3 12	0 1 12	2 2 0	1	2 3 16½	0 2 12½	2 1 4	No. 1 gathered from cultivated nopal.	0 1 18½	0 0 15½	0 0 21
2	Streaked canes ...	0 2 20	0 0 10	0 2 10	2	1 3 15	0 1 9	1 2 6	No. 2 gathered from fences ...	0 0 10½	0 0 2½	0 0 8
3	Wooden canes	0 2 9	0 0 13	0 1 24	3	1 0 20	0 1 0	0 3 20	No. 3 put in the box purchased, the other part in the cloth gathered from fences.	0 0 26	0 0 9½	0 0 16½
					4	0 2 10	0 0 12	0 1 26				
	Total ...	4 0 18	0 2 7	3 2 6		6 2 5½	1 1 5½	5 1 0		0 2 27	0 0 27½	0 1 17½

NOTE.—The box that contains two parcels and mentioned above as part purchased and part gathered from fences: the quantity bought is 9½ lbs. and the quantity in the cloth, 7 lbs.

XXXVI

Letter—from THOMAS MUNRO, Esq., Assistant Collector.

To—Major ALEXANDER READ, Collector of the Baramahal, etc., districts.

Dated—Dharmapuri, the 16th September 1796.

I have hitherto delayed answering your letter of the 7th July last on the subject of the growth of cotton wishing to gain some information on the quantity produced in the country and imported from the westward ; but no accounts are kept in the villages of the quantity sown, and the Road customs having been abolished the Custom farmers have kept no accurate accounts of what had been imported during the last two years, so that there are no means of ascertaining accurately either the quantity grown in the districts or brought from other quarters.

Growth of cotton and quantity produced in the Baramahal.

There are, however, several circumstances that shew that the whole together is much more than equal to the demand of public and private manufactures. In the course of last year 1,144 bullock loads of cotton thread brought from the Provinces beyond the Cauvery came up the Toppur pass, and after a part being sold in the Baramahal the rest went to the Carnatic. Several hundred bullock loads also passed by Tenkaraikottai and it is possible that a great number entered the Carnatic by Atur and other roads. As all this is thread for which there is no sale in the Salem district, it is plain there is no scarcity of it for the Company's investment. The quantity which came up Toppur in fasli 1204 was only 72 bullocks' load and in 1203 only 23.

Importation of cotton into the country.

This great and sudden increase of importation is no doubt principally owing to the abolition of the Road customs and from present appearances the quantity of the current is likely to exceed that of last year. But while this plenty of cotton is beneficial to the manufacturers it is in some measure hurtful to the farmers by the competition of that which is brought from Coimbatore forcing them to sell their own cheaper ; and as that country produces cotton of a better quality and in greater abundance than this, it is likely that the quantity now grown here will rather diminish than increase. In this Division it is only Tiruchengodu and the eastern part of Sankaridrug that furnish cotton for the investment. The other southern districts grow little or none, and that which grown in Dharmapuri is of a poor quality fit only for the coarsest cloth.

From all that I have been able to collect I am convinced that it is not the prejudices of the ryots but either the poverty or the fault of the soil that prevents the extension of its cultivation. In many districts the land is so ill-calculated for it that it will scarcely pay the expense of raising it. In such situations few of the rich and none of the poor farmers sow any. Even in those places which are most favourable it is only the more substantial farmers that cultivate it. The poorer sort have neither the means of doing this properly, nor can they afford to wait six months for the produce ; their object is not so much distant profit as present subsistence and it is for this reason that even among the dry grains, they do not cultivate those which yield the most plentiful crops, but those which bring the quickest returns. As long as no duties are levied upon cotton, the produce of the country and the importation from Coimbatore will always supply every demand of the weavers. The intercourse with that province is so easy and open for a great part of the year that I don't believe any restrictions or prohibitions by Tippoo would ever be able to hinder its cotton from reaching the Salem market ; but should it notwithstanding be thought a matter of importance to endeavour to raise as much in our own territory as would answer the whole consumption of the investment, I see no way so likely to ensure the accomplishment of this end, as the making a reduction from 5 to 10 per cent. in the land rent of the Southern Division. This would enable many of the poorer ryots who can at present raise nothing but a little grain for their own subsistence to grow cotton on a part of their lands and would in time greatly extend the cultivation of this valuable article.

XXXVII

Letter—from Mr. E. W. LYTE, Tiruppattūr.

To—WILLIAM DRING, Esq.

Dated—the 24th September 1796.

Implements
for the sugar
manufactory.

I am favoured with yours of the 20th instant, and as I believe that the gun axles indented for by Major Read are intended to make gudgeons for the cylinders of sugar mills, I lose no time in giving you the dimensions required.

Bar 3 inches square, $4\frac{1}{2}$ feet long from out to out, 9 inches at each end rounded as full as the size of the iron will allow.

Should Colonel Hall have any already made of this thickness, I would not advise that they should be altered on account of the length; or indeed if they should be one-eighth of an inch more or less in the thickness, it would not be worth while to alter them.

XXXVIII

Letter—from S. R. LUSHINGTON, Esq., Secretary, Board of Revenue.

To—Major A. READ, Collector, Baramahal, etc.

Dated—Fort St. George, the 27th September 1796.

Receipt of
articles at
Madras.

I am directed to inform you that the articles specified in the enclosed invoice have been received at this office from Mr. Lyte.

ENCLOSURE.

Articles received by the Board of Revenue from Mr. Lyte on account of Major Read.

No.	Sugar.			Indigo.			Cochineal.					
	Weighing gross.	CWT.	QRS.	LB.	Weighing gross.	CWT.	QRS.	LB.	Weighing gross.	CWT.	QRS.	LB.
1	Weighing gross.	2	3	4	Weighing gross.	2	3	5	Weighing gross.	0	1	6
2	Ditto	0	2	20	Ditto	1	3	6	Ditto	0	0	10
3	Ditto	0	2	13	Ditto	1	0	17	Ditto	0	0	24 $\frac{1}{2}$
4	...		.....		Ditto	0	2	10	...		...
		4	0	9		6	1	10		0	2	12 $\frac{1}{2}$

XXXIX

Letter—from ROBERT HAMILTON, Esq., Assistant Collector, Central Division.

To—CHARLES WETHERELL, Esq., Assistant Collector, Tiruppattūr.

Dated—Rāyakōttai, the 25th October 1796.

Inquiry
about the
plantations
and manu-
factures
at Tirup-
pattūr.

I am directed to call your attention to the different requisitions that have been made of you for some time back and to point out wherein you have not given the information required, or complied with the directions that have been transmitted for your guidance.

Adverting to the Superintendent's instructions to you, I observe in the first paragraph that the expense of cultivation of the sugarcane is required, and that manure only is included in your estimate; the expense of ploughing, holing, weeding and watering should also, I believe, have been included. On the 3rd paragraph, requiring the number of each kind of cane sufficient to make one hogshead of sugar and one puncheon of rum, and also the expense of manufacturing the quantity of each article, no observation has been made. In the 6th paragraph the expense of cultivating the mulberry is required, in which holing, watering and weeding as well as cuttings ought to have been included. In the 8th paragraph the expense of the culture of the nopal and the curing the cochineal insect is required, which has not been transmitted. In the 11th paragraph, on the subject of potatoes, no observation has been made. The 13th, 17th and 18th paragraphs I shall have occasion to mention hereafter.

In the 9th paragraph of a letter of the 9th May, the Superintendent desires you, in order to show the Board of Revenue what success you had met with at Tiruppattūr, to send to Madras all the indigo, rum and sugar then manufactured; that if the Waddevars should refuse to go, you were to send "our own carts" with

directions to call upon Mr. Dring for the weights and such empty casks as he might have collected. In your answer of the 21st May you inform the Superintendent that you intended to send to Madras all the sugar, indigo and cochineal as soon as packed up. On the 31st June I had the pleasure of addressing you and requested to be informed of the quantity of each article you might have sent to the Board agreeable to your intentions in the foregoing letter, but, in your answer of the 5th July, these articles were found not to have been forwarded. The Superintendent finding that it was still-neglected on the 6th September (four months after the first orders were given for dispatching them) and no reason assigned for the delay, was under the necessity of directing Mr. Lyte to forward them, which was not done until the 12th September.

Plantations
and manu-
factures
at Tirup-
pattûr.

I addressed you on the 13th June, transmitting a form of an abstract for the actual monthly expense and estimated produce of the manufactures and plantations at Tiruppattûr, requesting you to correct and fill it up, and transmit a copy of it with the least possible delay, at the same time mentioning the Superintendent's wish to report on the manufactures and plantations under your management, but delayed it until furnished with a correct abstract. I repeated this request in a letter of the 25th June, and again on the 10th July. The abstract not having been yet transmitted although four months have elapsed since it was first required, you are requested to assign the cause of its delay.

It was desired also in my letter of the 13th June, that your monthly accounts should be transmitted on or before the 10th of the following month, notwithstanding which your accounts for July, August and September have not yet been forwarded.

In the same letter of the 13th June, I requested your attention to the 13th, 17th and 18th paragraphs of the Superintendent's instructions to you, first requiring you to specify the quantity and quality of the lands laid out in each production at Tiruppattûr and the rent paid for it; secondly to keep regular registers of labourers, one of the thieves and another of the people employed receiving pay, the reasons particularly for such registers, and that they should be forwarded every month regularly; thirdly requiring you to specify what quantity of grain had been laid in for the use of the thieves under your charge, and in which of the plantations you had employed labourers in pay only. As you have not complied with any of these requisitions I am to request you will inform me the reason of such omission.

Mr. Lyte informs the Superintendent that preparations ought at this season of the year to be made for the ensuing crop of canes, such as good iron for the mill in case of accidents, more moulds for the sugar, fermenting pots for the rum and as the large still expected from Bengal is not arrived, copper stills ought to be provided here; and that ground also ought to be preparing in order to extend the plantations, which might be successfully done at this season. All the circumstances have been repeatedly mentioned to you, when your answer has been that you wait for instructions. The Superintendent is much surprised at this, as he gave over the entire management and care of the plantations to you with a discretionary power to improve and extend them as you should think advisable. You have not made one report on the situation of the plantations and if you conceived that your power was limited, it became indispensably necessary to have applied to him for instructions as soon as the foregoing circumstances had been represented to you.

Mr. Lyte has directions to inform you of the articles absolutely necessary, and I am directed to request that you lose no time in providing them and any other articles that may appear necessary to you for the benefit and prosperity of the plantations.

XL

Letter—from C. WETHERELL, Esq., Assistant Collector, Tiruppattûr.

To—R. HAMILTON, Esq., Assistant Collector, Central Division.

Dated—the 30th October 1796.

I have received your letter of the 25th instant, requiring my attention to different requisitions made of me for some time back; and lose as little time as possible in giving reasons for not answering them according to your wishes.

Accounts of
plantations
and manu-
factures
at Tirup-
pattûr.

I therefore begin with the 1st paragraph of your letter respecting the expense of cultivating the sugarcane. I believe I long ago sent a complete account of it, but for fear I should not be right in the assertion, I now inclose one of manuring, ploughing, holing, weeding and watering. I sent at the same time an account of the number of cases of each sort and quantity of juice that would make a maund of sugar, which, as it is the general mode of computing articles of that description in this country, I imagined it was all that was required, as also the quantity of molasses or rum (as they are the same thing, one gallon of molasses making one of rum). I however have included it with the account of the canes according to your request. The expense of the culture of the nopal and the curing of the insect is inclosed, marked No. 2. On the subject of potatoes I did not think any observation necessary, otherwise than that some might be produced at Tiruppattûr, as the Superintendent only left with me a few, not exceeding 2 or 3 hundred, some of which according to his directions were sent to Lieuts. Brown and Cormick, the rest with some of my own I planted in the mulberry plantation, but owing to the heavy rains that fell they were all destroyed.

The 2nd paragraph of your letter states my not having complied with the Superintendent's orders of the 9th of May, for which I assign the following reasons, viz. :—that the Company's bandies at Tiruppattûr were in that condition (and are now) that it would have been cheaper to buy new ones or hire Madras bandies than repair them, and even if they had been repaired, in the opinion of most people who saw them, they would not have conveyed the goods that were ordered to be sent to Madras without breaking down, or coming to pieces altogether before they got half way on their journey. For these causes I was incapable of complying with the Superintendent's orders.

The reason for my not having sent the abstract as desired is that I found upon examination that it did not at all agree with my accounts current, and that it would be necessary to make out a new one complete and deferred it until I received my accounts or copies of them, as I could then do it with more exactness, which you informed me by a letter from Salem were copying off and would be sent as soon as done. Never having received them is the cause of the delay. Having heard some time ago that the Superintendent was coming to Tiruppattûr I conceived it would be unnecessary to dispatch my accounts, as his arrival was shortly expected here. They are and have been ready some time and shall be dispatched in a day or two.

Inclosed marked No. 3 is an account of all the wet and dry ground with the rent and productions that they are sown and planted with.

You may observe there is a much greater proportion of dry ground than is usually taken with the same quantity of wet, which was owing to my not having the sthalwâr of Tiruppattûr in my possession at the time; but as the Karnam of the village was present when I took it I conceived it to be the quantity I must unavoidably rent with the wet ground; the being repeatedly asked about it confirmed my opinion; in a letter I wrote to the Superintendent I assigned reasons for not complying with his requisition about the register of labourers, but finding he did not conceive them sufficient I attempted to put his orders into execution, when I found as plantations are so separated that it takes a person three parts of a day to go round them, that it would require a person too who could write to be particularly appointed for that duty. I did not think myself authorised to employ a Karnam for that sole purpose, and as we have very few monthly labourers and they never doing the same thing more than half a day it would be necessary for a person to visit them twice a day to give a faithful account of their different occupations.

The monthly register of thieves is always kept by the Mutaşaddî who serves out their allowances and shall be copied off as soon as the accounts are dispatched. There being only myself and one of my servants who can write English has made me delay it so long, and many otherwise should be done, and as I am obliged to find stationery at my own expense I am rather saving of that article. I inclose marked No. 4 the quantity of grain originally laid up, that expended and the quantity remaining. There are no labourers employed on the plantations who are not in monthly pay.

According to Mr. Lyte's directions I have advanced money for forms, fermenting pots and shall, as soon as the people who furnish firewood come to receive the money, order a large quantity of that also. The good iron that you mention

as necessary I have not in my power to procure, and I understand from Mr. Lyte that stills are ordered to be made up at Madras; it will therefore, I presume, be unnecessary to advance money for them here. Having been uncertain for some time what was the intention of the Superintendent concerning the plantations at Tiruppattûr, I was cautious about extending them, as I did not know but what he might drop them altogether, for when at Tiruppattûr last he offered the plantations to Mr. Lyte for the land rent and from that circumstance I supposed he had so bad an opinion of them, that I did not deem it advisable to extend them; whether he thought it was from mismanagement I cannot pretend to say, but suppose so from the dissatisfaction he showed when at this place; in answer to which I can say that had I the money and was allowed, I would pay the whole expense of the sugarcane plantation and take it upon my own account, being convinced that few concerns will yield so good an interest for the sum that has been laid out upon them and will defy any person to say that anything has failed through want of care. Even had I been certain that the Superintendent wished to extend the plantations there was no ground about Tiruppattûr but what has been lately taken by his orders, and that would not have done in any season but the present. The ground under the Achchamangalam tank being by far too distant to be overlooked in the manner it would require, was an irresistible objection to occupying it for canes, unless a separate establishment for sugar-boiling was made there.

Accounts of plantations and manufactures at Tiruppattûr.

XLI

Letter—from Major A. READ, Superintendent and Collector, Bâramahal and Salem.

To—ROBERT HAMILTON, Esq., Assistant Collector.

Dated—the 4th November 1796.

You have acquitted yourself so much to my satisfaction in every business on which I have hitherto had an opportunity of employing you, and I have conceived such hopes of success in carrying on the plantations, if entrusted to one of your zeal and activity, that I request you to take upon you the superintendance of them.

Management of plantations in Tiruppattûr.

The accompanying is a letter to Mr. Wetherell at Tiruppattûr, who is directed to deliver them over in charge to you, to permit your examination of his accounts, to assist you in filling up the abstracts of them, which you began and sent to him some time ago, and to give such explanations of them as you may find necessary.

A copy of my instructions to him, and of your own correspondence with him on the plantations, being in your possession, I have only to refer you to them for information respecting them, and the different statements that are wanted for the satisfaction of the Revenue Board.

This being the season for improving and extending them, I shall hope for every exertion on your part for the attainment of those ends, which I trust will make amends for late disappointment in this important branch of our department.

I propose to myself the pleasure of a visit to Tiruppattûr before the end of the year, when I intend to enter on a report of our progress in it, which I mention now that you may be preparing every head of information you may think it should comprehend.

The inclosed is a letter to Captain Graham, directing him to supply you with cash for your monthly disbursements.

XLII

Circular—from S. R. LUSHINGTON, Esq., Secretary, Board of Revenue.

To—Major ALEXANDER READ, Collector, Bâramahal and Salem districts.

Dated—Fort St. George, the 7th November 1796.

I am directed to transmit, for your information and guidance, extract of a letter, dated the 3rd instant, from the Superintendent of the Company's Nopalry, pointing out the means of preventing the destruction of the opuntia by the cochineal insects.

Culture of opuntia.

You will in your next report detail the measures you take for introducing the culture of the plant amongst the natives in the districts under your management.

Culture of
opuntia.

Considering the nature of the orders of Government of September 1795, the facility attending the whole process of obtaining the cochineal and the obvious and almost immediate advantage to be derived from its culture, the Board entertain hopes you will not find much difficulty in generally establishing it; they desire you will give the subject your particular attention by making opuntia plantations in the principal villages, and by inducing the inhabitants to plant it on the sides of roads, round back-yards, etc., etc.

The Board are the more desirous of receiving from you an early and satisfactory report upon this subject, as they have been called upon by Government to state the progress of the Collector's endeavours to introduce this important speculation.

ENCLOSURE.

Extract of a letter from Dr. Berry, dated November 3, 1796.

In regard to the plant, I have to state, in addition to former observations, that after the leaves become yellow from two or three generations of insects, if cut down, the ground dug and made to cover the roots, they will shoot up leaves, that in six or eight months may grow to tolerable sized plants; at least some I treated so in August at present promise well; but if the plants are allowed to be destroyed, the roots in general lose all vegetating power; this with what Mr. Carnie has mentioned of cutting off the leaves after the collection of the insect, and planting them so as to be covered with earth, when they will vegetate, may probably avert the destruction of the plant hitherto apprehended, for the washing and reaping clean plants that insects have been on requires more attention than is likely to be given, and for a long time, the leaves slowly recovering from their exhaustion, and seldom I believe attaining their former luxuriance or vigour sufficient to throw out other healthy leaves; for this reason it may be preferable to cut them down to the ground, that the root, not much injured yet from the check to the circulation of its juices, may produce a new plant. Having shown your letter and cochineal to Dr. Anderson, he requested I would mention his satisfaction at even this beginning, but unless the Collector of the Jâghîr will influence the Amildârs, and other native revenue officers, so as to induce their interesting the ryots as to the care of the plant and collection of the insect, very little advantage can be taken of the great quantities of nopal in the Jâghîr as the greatest part of both plants and insects must otherways be lost, and from which it is impossible to say how much might have been collected, and how much the poorest and most infirm of the ryots might have been benefited, as, Dr. Anderson in the neighbourhood of Madras alone has collected in three months above nine hundred pounds' weight of the dried insect.

XLIII

Letter—from R. HAMILTON, Esq., Assistant Collector, Central Division.

To—Major ALEXANDER READ, Superintendent, etc., Salem.

Dated—the 10th November 1796.

Management of
plantations
in Tirup-
pattûr.

Requisites
for the
sugar mill.

The still
expected
from
Calcutta.

Agreeable to your instructions of the 4th instant I have lost no time in repairing to Tiruppattûr to take charge of the plantations, and I shall have the honour in a few days to report to you on the situation of them at present and to what extent in my opinion they may be carried at this season of the year.

My immediate intention in addressing you so early from hence is to apply for some articles that are indispensably necessary, and which we have no time to lose in acquiring; the principal articles are gudgeons for the mill, the dimensions of which are shown on a sketch that accompanies this letter. The next of consequence is the large copper still expected from Bengal, and without which our rum must fail in quantity and quality. As the still has not left Calcutta, I conceive the best and safest way to get it conveyed will be to obtain an order from the Governor-General through the Presidency of Madras, to ship it on one of the first ships from thence, particularly as great attention ought to be paid that it meets with no accident, or it will be out of power to rectify it in these Districts.

Should the plantations be extended to the southward considerably, another still will be absolutely necessary, and likewise iron cylinders, as I conceive no mill can be complete or can be trusted to without these cylinders which may be easily cast at the foundry at Calcutta. I mention this however only in case you should please to write to Government on these subjects, wherein it may appear necessary to state this circumstance. The season is I fear too far advanced to hope for the large still from Calcutta in time for the first crop of canes; it will therefore be necessary to have three copper stills or pots to answer that purpose which may be

procured at Madras, two of them capable of holding 30 gallons each and one 10 gallons, the heads of them of thin copper we can make here; Mr. Lyte has I believe communicated this to you. Sugar manufacture.

I shall pay every attention to your instructions of the 30th March last and I hope to be able to transmit you a correct abstract, and an estimate of the probable manufactures of the plantations very shortly.

XLIV

Letter—from the Rev. ABBÉ DUBOIS.

To—ROBERT HAMILTON, Esq., Tiruppattûr.

Dated—Kôvilûr, the 8th December 1796.

By your last of the 2nd December you declared to me that you would kindly receive any hints I may propose to you on the silkworm. This country appears to me by its temperature to be well calculated for it, and the first experiments on this object have succeeded wonderfully; I think it would be a very very advantageous speculation, would the English Government undertake to introduce the manufacture of silk into this country at large. Such an object is assuredly worth its attention, and according to the knowledge that I have by experience acquired in Europe on this subject, I would pledge myself that such an undertaking would soon produce the greatest advantages, were it conducted by an attentive and careful person. However before you can hope to gather ample fruits from an object of this nature, two or three years must elapse, because it is absolutely necessary that a quantity of mulberry trees should be got and sufficient time allowed for their growth so as to yield the necessary quantity of leaves to feed a proportioned quantity of worms; I cannot conceal from you that I was hurt at the sight of the small shrubs you are rearing in your mulberry garden and if you are desirous of rearing genuine luxuriant mulberry trees you must relinquish the practice of mutilating these young plants and stopping their growth by picking their leaves as soon as they begin to grow. Rearing of silkworms.

The manner of rearing this precious plant in my country is thus:—We begin by getting plants to form a nursery. The cuttings planted in this manner are carefully looked after for three years without picking one leaf; so long a time is necessary in those cold countries that the trees may get a sufficient size and be then transplanted in the form of alleys. I think that as vegetation in these hot countries is infinitely more accelerated than in Europe, fifteen or eighteen months will, by taking suitable care of the nursery, be sufficient time to transplant them. In the interim however care must be taken to cut the superfluous branches from the principal that they may not stop the growth of the tree; before transplanting them, most part of the roots and branches are to be cut off and in this state placed at about six or seven feet from one another in holes of about 2 feet deep and proportionately wide; after this the ground is dug yearly once or twice in rainy weather and the tree pruned twice or thrice yearly also; in this country, however, these operations ought to be oftener on account of the quickness of vegetation. In my country marshy soils, shores of rivers, ponds, etc., are preferred for these plantations, and it is remarked that the mulberries growing in the vicinity of water are by far more luxuriant than others; therefore if you judge it advantageous to follow this method, I advise you, after your trees attain the suitable growth in the nursery, to plant some of them about and beneath the great Tiruppattûr tank, and the river running into it, yet without exposing them to be long immersed under water. Culture of mulberry trees.

Six or seven years ago Tippoo intended to carry the same object now in contemplation into effect, and judging the Bâramahal country best suited for the undertaking, ordered the inhabitants in many places to cultivate mulberry trees, but, in consequence of the war and the country becoming subject to the English, the inhabitants forsook that culture; some trees have escaped and have been reared by nature alone. I have seen two at Râyakôttai and one at Virabadra-
drug and have heard of several about the country.

Rearing
of silk-
worms and
comparison
with the
French
breed.

After speaking so much at length of the rearing of the mulberry I shall, before I conclude, say a few words on the silk worm.

I was highly pleased at the prosperous state of your worms in point of health. I have never seen any in France equal to such prosperity, but the breed is not of a good quality; and by far inferior to that of Europe. At the first view of your silk it appeared to me a little coarse, but after seeing the cocoons, I saw that the quality of the silk was equal to that of the cocoons, and that there was no possibility of getting better silk without a better breed of worms. I know not whether there is a possibility of getting this object in India; I imagine that the Board of Revenue in Bengal after taking much trouble to get a better breed found none better than what you are possessed of. At the same time I wonder that Government, knowing the superfine quality both of the French and Piedmontese silk, and intending to prosecute this culture, do not procure a breed both from France and Piedmont. The French breed is so far superior in quality to that in your possession, that two hundred cocoons are sufficient for the weight of a pound, whilst I am persuaded two-fold of yours is required for the same weight. In France 10 lbs. of good cocoons give 1 lb. of superfine silk, and I believe that a greater quantity of yours will be required to get a lb. of coarse silk. In short both the French and Piedmontese breed are far preferable to those of India; at the same time I perceive no difficulty in procuring some eggs both from them and Turin, where the English commercial correspondences are frequent enough to render the acquisition easy. Regard should be paid to get the eggs in a suitable season, that is about the middle of August, and to be entrusted to a careful person whose principal care must be to prevent them from hatching in the hot climates during their conveyance from Europe to India.

It does not become me to propose to the Board of Revenue this way of improvement in an undertaking which may in a few years rival the best European manufactures; I leave this task to you and I sincerely hope that under your direction that precious culture will soon become prosperous, and a commercial object of immediate importance.

XLV

Letter—from WILLIAM MACLROD, Esq.

To—Major ALEXANDER READ, Superintendent.

Dated—Nâmakkal, the 28th December 1796.

Culture of
opuntia in
the Southern
Division.

In obedience to the orders of the Board of Revenue and your directions contained in Mr. Hamilton's letter of the 18th instant, I have the pleasure to report to you the progress which is making in the Southern Division in propagating the nâga kalli.

As the first step towards it, I directed each Tahsildar to entertain three or four labourers at the rate of thirty-four Madras fanams per month each, to make a plantation in the cusbah of each amildâri, for the purpose of furnishing plants for the rest of the districts, and taking the lead in manufacturing the cochineal after the plants might be sufficiently strong to admit the insects. Accompanying this, I send a statement of the number of plants which were reported to be set on the 30th of last month. It is not yet common in these districts, which has occasioned a difficulty in procuring plants. I have authorized the Tahsildars to hire buffalo carts occasionally to transport the plants to such parts of their districts as may not yet produce it, and also to proclaim to the inhabitants that they will be paid at the rate of one gopally fanam for every 100 plants they may set, being about 3,000 pagodas. This encouragement, I find, has a better effect than other arguments and in consequence of it many of the poorer class of the inhabitants are beginning to make plantations. As the plant will, I suppose, require to be at least eight or ten months old before the insect should be put upon it, five or six months must yet elapse before any cochineal can be made.

I believe it will grow without water even if planted in the dry season, although its being watered will no doubt cause a more quick and luxuriant vegetation; in either case the earth near the roots should be dug and raised a little about the roots twice or at least once after being planted.

XLVI

Letter—from J. G. GRAHAM, Esq.

To—Major A. READ, Superintendent, Ceded Countries.

Dated—Daulatâbâd, the 3rd January 1797.

In stating to you the steps which have been taken to propagate the cultivation of the opuntia in the Northern Division, I feel a pleasure in intimating that, exclusive of what the Tahsildars have put down by my desire at the cusbahs, about 10 acres at each, Mr. Ord, our Assistant Surgeon, has prevailed upon the ryots of Krishnagiri, Jagadêv and Mahârâjakadai to plant about 7 lakhs of the kalli. I have no doubt but a similar success will attend his endeavours in the other districts so soon as the commencement of our April showers will prepare the ground for its reception. Our joint efforts shall not be wanting to encourage its extensive propagation, and I am sanguine in my expectation that a considerable proportion of our useless waste lands will in a short time be made to contribute largely to the attainment of an object which holds out so much public benefit : I shall spare no pains to inculcate on the minds of the inhabitants the great advantage of devoting their spare time to the collection of this very valuable insect, and it shall be my particular care to prevent any abuse in the distribution of the price of their labour.

Culture of opuntia in the Northern Division.

XLVII

Letter—from THOMAS MUNRO, Esq.

To—Major ALEXANDER READ, Collector of the Bâramahal and Salem districts.

Dated—Dharmapuri, the 4th January 1797.

Since receiving your first letter on the subject of the nâgadâli, I have ordered 50,000 cuttings to be planted at different villages, but I have not been able to prevail on any of the inhabitants to make plantations of it. The few who seem to have any disposition to make the experiment are prevented from trying it by the uncertainty how long the encouragement now held out by Government may be continued. I do not conceive myself authorized to give them any promises for a distant period and unless they are assured that it will remain three or four years in force, they can have but little hope of reaping any advantage from the speculation.

Culture of opuntia in the Central Division.

I put down a few thousand plants about six months ago and, judging by their present appearance, I imagine that it will be at least eightéén months more before they are in a condition to receive the cochineal insect. Several months more must be allowed for its spreading over all the bushes and for its being gathered, dried, etc., so that a man who now makes a plantation cannot expect to derive any benefit from it before the third year, and should the insect by any accident get into it, while the plants are young, he will have so much trouble in keeping them clear of it as will probably leave him no great gainer in the end. By the insects having been thrown on bushes near the plantations at this place and from thence reaching the young plants, I have already been obliged to take up several thousands to prevent the whole from being destroyed. To guard the plantations from the intrusion of the insect before the plants are of the proper size will most likely be one of the greatest difficulties in the prosecution of the present undertaking, especially while the inhabitants are encouraged by a premium to scatter it on every bush they see. The regulation as it now stands is rather a premium for the extirpation than for the cultivation of the cochineal. If we wish to save the nâgadâli from being totally destroyed, the price now given ought to be immediately discontinued and given only in future to such people as shall produce the cochineal from their own lands, and notice ought to be published that the same price will be paid for the space of four or five years. If this is done a few of the head farmers will make plantations and others will by degrees follow their example. This appears to be the only method by which the cultivation of the cochineal can be

Culture of
opuntia.

widely extended, and at the same time rendered of lasting benefit. By purchasing the insect as at present without any limitation, and by being over-anxious to spread it at once over the whole country, the danger is that we shall destroy the plant. Even now the insect has already found its way to several of the principal villages and wherever this is the case no cuttings can with safety be taken for plantations.

The nâgadâli is by no means abundant in this country. It is never found except in the neighbourhood of villages, and only in that of a few; and it is said to have been first brought here from the Carnatic about sixteen years ago to be planted in bound hedges. I do not remember even to have seen it in the Carnatic except near villages or places where villages had formerly stood; and I suspect that, if in such situations it is once extirpated, it will be in vain to look for it afterwards in the jungle.

XLVIII

Letter—from ANDREW BERRY, Esq., Superintendent, Honourable Company's Nopalry.

To—Major A. READ, Collector, the Bâramahal.

Dated—Fort St. George, the 11th January 1797.

Culture
of clove
trees.

I am directed by the Right Honourable the President in Council to send you in three boxes a proportion of the young clove trees lately received by His Lordship from Amboyna, to be planted where they are most likely to thrive, in the most sheltered parts of the Bâramahal, as they are, even when full grown, tall slender trees with spreading thick tops easily overturned by the wind. I have put them into three boxes the better for distribution, and recommend their being planted where vegetation is most luxuriant and least drought, and in a sweet clay soil, the earth round their roots being a reddish clay.

As it is a delicate tree, attention should be paid to shelter from the sun, removing the pandals at night, till such time as plantain trees, that should be planted near them, afford sufficient shade; and if at the same time they are not flooded, and the soil always kept moist, they will be secured, an object of the first importance.

In the three boxes I had placed fourteen trees; two however from the removal are now in a doubtful state. I have to request therefore you will inform me how they are received, having promised the coolies, besides their hire which I have paid, a reward if they deliver them in good order.

XLIX

Letter—from J. B. TRAVERS, Esq., Acting Secretary, Board of Revenue.

To—Major A. READ, Collector in the Bâramahal.

Dated—Fort St. George, the 12th January 1797.

Monthly
report of
the clove
plants pre-
scribed.

I am directed to forward for your information extract of a letter from Government under date the 7th instant, and you will be pleased to make a monthly report of the clove plants, and of any other which may hereafter be committed to your charge.

ENCLOSURE.

Extract of a letter from Government, dated the 7th January 1797.

We have directed the Superintendent of the Honourable Company's Nopalry to distribute some clove plants lately received from Amboyna between the Collectors in the Bâramahal, Dindigul and the Jâghîr; and desire they may be instructed to make a monthly report of the state of those plants, and of any other which may be hereafter committed to their charge.

L

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Major ALEXANDER READ, Superintendent.

Dated—Nâmakkal, the 30th January 1797.

The Government and the Board of Revenue being on all occasions desirous to promote improvements, I am induced to propose that an establishment should be allowed in each Tahsildari for a sarkâr garden as has been lately sanctioned in the Jâghîr, for the purpose of introducing the culture of useful plants and trees among the inhabitants. These gardens might be considered as nurseries for plantations in the respective districts. Plants from them should be given gratis to such of the inhabitants as would seem from their circumstances or the situation of their villages, to be the most capable of taking care of them.

Establishment of sarkâr gardens and the culture of useful plants and trees.

The sorts of trees which appear to deserve most attention are the coconut—betel, areca, mango, tamarind, and oil-tree or, in Malabar, iluppai, all of which would in time be productive of revenue as well as ornamental to the country and useful to its inhabitants. Various other trees might be furnished for topes and avenues—such as the different kinds of the banian and the margosa, which, if reared from the seeds, are very hardy and do not require water after transplantation.

I imagine the inhabitants would not only carefully rear such plants as might be given to them from the sarkâr gardens, but that the example would tend to diffuse a spirit among them for such improvements.

The mulberry might also be cultivated to a small extent in the sarkâr gardens to furnish cuttings for large plantations, in the event of its being hereafter judged practicable to rear silk in these districts with advantage. The following establishment and estimate of expense is submitted for the Southern Division :—

For each Tahsildari.		PAGODAS. FANAMS.	
2 head gardeners at 1 pagoda each per month	... ..	2	0
7 cooly do. at 28 P's. do.	... ..	4	16
Contingent expenses for repairs of wells, the purchase of tools and seeds, extra cooly hire, etc., per month	... ..	2	0
	Total monthly	8	16
For nine Tahsildaris	... ..	74	54
Do.	... ..	902	18
The above estimate is supposed to include the expenses of opuntia plantations which had been already ordered and were estimated at		325	31
So that the actual increase now proposed is only		576	32

The encouragement of sugar plantations being considered as important, I request your sanction to purchase at the public expense as many plants of the cane as will be sufficient to plant three or four acres in each of the districts of Paramati, Nâmakkal and Kâttuputtûr, to which the culture of the cane has not yet found its way, notwithstanding considerable quantities of it have been cultivated for ages past in the districts of Bêlûr, Salem, Chennagiri, Râsipuram and the northern parts of Sêndamangalam.

Sugarcane.

I have not a doubt, but the farmers will be easily prevailed upon to enter on its cultivation if seed be given them gratis, and as this is the planting season, I hope you will authorise me to purchase and distribute plants to the amount of 80 or 100 pagodas without waiting for a reference to the Board, which would cause delay, and lose a year in introducing it where it has not yet been reared, although the most favourable situation in the quarter.

This proposal is suggested to me by your having directed Mr. Hamilton to consult with me about the best situations for sugar plantations, which I do not hesitate to say are the three above-mentioned districts, in which there are upwards of three thousand acres now under cultivation watered by the Cauvery.

It is unnecessary to make any observations on the advantage which may hereafter be derived from the navigation of the Cauvery for transporting the productions of the districts bordering upon it to the sea coast.

LI

Letter—from Major A. READ, Superintendent and Collector.

To—Assistant Collectors, Ceded districts.

Dated—Tiruppattâr, the 5th February 1797.

Inquiry
as to growth
and import-
ation of
cotton.

To enable me to answer the accompanying letter from the Board on cotton and cotton thread, I request statements concerning the following heads of information from your respective divisions :—

- (1) Quantity of cotton grown in every district in fasli 1208.
- (2) Price per maund of 25 lbs. and amount.
- (3) Quantity of cotton thread imported from Bâlâghât, price and amount.
- (4) Quantity of thread from Talaghât, price and amount.
- (5) Quantity of it bartered for salt.
- (6) Quantity of it bartered for specie.
- (7) Channels through which the specie may return to these districts.
- (8) Quantity consumed in these districts and amount.
- (9) Proportion of that amount paid to the spinners and manufacturers.
- (10) Cause of preference for the cotton thread of other countries.
- (11) Length of time it must necessarily be kept before it be worked up.
- (12) Preferable mode of increasing the cultivation of cotton.

Apprehending that a remission of the rent of lands growing cotton is the best mode of encouragement that can be adopted, because it may be regulated upon a general principle, and adopted to the several degrees of property in the soil, I recommend that you class the cotton with the exotics specified in my cowlenâma and advertise the proportion you may severally think the remission should be of the ground rent, and that the proportion be more or less according as you may think the measure will tend to prevent the exportation of specie for that article, the object which the Board has in view.

Another measure which obviously will have that effect is the augmentation of the road customs upon all imports of cotton; you will therefore give the sîr farmers directions accordingly, and when you answer this letter you will particularise in what respects you may think it expedient to follow these suggestions.

ENCLOSURE.

Circular—from J. B. TRAVERS, Esq., Acting Secretary, Board of Revenue.

To—Major ALEXANDER READ, Superintendent and Collector, Baramahal and Salem districts.

Dated—Fort St. George, the 23rd January 1797.

I am directed by the Board to call upon you to transmit a statement formed on the most accurate information in your power to obtain, of the quantity of cotton produced in the districts under your management, within the last fasli, and the value thereof, and a statement of the imports of cotton and cotton thread distinctly, distinguishing those by sea and land and the value thereof. You will also state what portion of the sales of the imports by land you estimate to be bartered for salt or other articles, the produce of the sarkârs, and the amount you suppose to be carried out in specie, mentioning the countries from whence the cotton and thread are obtained, whether in your opinion it be probable the specie so carried out finds its way back into your districts, and through what channels.

You will further endeavour to ascertain, with the aid of the Commercial Resident, the estimated consumption of cotton within the last fasli, including manufactures of every description, and its estimated value, also the amount supposed to be paid to the thread spinners and for the labour of the manufacturers distinctly.

The Board wish to be informed whether a preference be given to the cotton and thread imported from foreign countries, the reasons assigned for such preference, and how long it is generally considered cotton ought to be kept before it is worked up.

As it is of the first importance to the prosperity of the country, in the present state of trade, to prevent the export of the circulating specie for raw materials, the Board are anxious that every endeavour should be exerted to increase the cultivation of cotton, at least equal to the home consumption; they therefore desire you will give the subject your particular attention and favour them with your sentiments at large. They doubt not you will find the Commercial Resident ready to afford you every aid and information in his power.

PRODUCTS—SUGAR AND COTTON.

LII

Letter—from Mr. E. W. LYTE.

To—Major A. READ, Superintendent and Collector, Ceded Districts.

Dated—Tiruppattár, the 19th February 1797.

Having fully considered on the proposals you have been kind enough to offer me in regard to taking the sugar plantations here on my own account, and from the experience I have had in that point of business since I have had the honour of serving under you, I have every reason to believe that the business will answer, and turn out to advantage; and find myself willing to accept of your offer in case the Board may think proper to entrust me with the live and dead stock and a trifle of money, so as to enable me to extend the business on a larger scale, so as to keep the manufactories, which are the chief part of the expense, more constantly employed.

Management of sugar plantations and manufacture of sugar at Tiruppattár.

I should however rather wish that the manufactories should be still kept up in the name of the Board and I to pay an annual rent for them, so as to defray the interest of the money laid out in the building of them. I am howsoever agreeable to meet them on either of these terms, or any other they might think proper to point out by which with care and industry I may meet with some recompense for my labour.

The difficulty of procuring a ready market after so long a land carriage obliges me to mention the terms on which I would agree, that is, to deliver such sugar as was sent to the Revenue Board in September last, at £1-12-0 or star pagodas 4-0-0 per cwt., taking the average quality of that sugar, and the rum at 18 fanams per gallon; this I think is by no means extortionate, as by what I have seen in the late papers the average price of Indian sugar in the London market is £3-9-0. But should not the Board approve of this, and I find any difficulty in procuring a market elsewhere in the country, I must request that I may be allowed to send what sugar I may have to dispose of in one of the Hon'ble Company's ships, I paying the regular freight and other duties they may require from any of their merchants in India.

Price of sugar and rum.

As there was no duty required on the sugar sent from this to the Board last year, I must request and hope that they will use their influence with His Highness the Nawáb to take off all duties on that article through his country between this and Madras, by which the greatest difficulty of the long land carriage would be diminished, as the cattle which we are obliged to have for the manufactory would carry the produce to market after the crop is over.

Exemption of duty on sugar passing through the Nawáb's country.

I have now the honour to enclose you an estimate specifying the number of guntas I have given cowle for and the expected quantity of sugar and rum from them, also the number planted on the Sarkár account with their produce calculated according to what I have as yet seen of them by the experience I have had.

LIII

Letter—from CHARLES CARPENTER, Esq., Commercial Resident.

To—Major ALEXANDER READ, Superintendent.

Dated—Salem, the 23rd February 1797.

You will herewith receive the account particulars required in your letter of the 5th instant. Cotton.

Particulars re
cotton and
cotton
thread.

82

ENCLOSURE No. 1.

Average consumption of cotton on account of the Hon'ble Company's investment, Salem, from the 1st July 1795 to the 30th June 1796.

Raw cotton.		Average rate per maund.			Prime cost.			Quantity of thread.		Hire to spinners.			Average rate per maund.			Total cost of thread.			Labour to weavers.			Amount of cloth received at the factory.			Remarks.
MD.	LB.	PAGS.	F.	C.	PAGS.	F.	C.	MD.	LB.	PAGS.	F.	C.	PAGS.	F.	C.	PAGS.	F.	C.	PAGS.	F.	C.	PAGS.	F.	C.	
30,548	8 $\frac{2}{6}$	1	6	60	84,912	18	40	29,803	7 $\frac{1}{2}$	54,640	5	10	@ 8	4	15	89,552	23	50	59,857	13	20	1,49,409	36	70	No preference to cotton thread of other countries.

THE BARAMHAL RECORDS.

ENCLOSURE No. 2.

By individuals in muslins, women cloth, etc., etc.

3,190	0	1	6	60	3,645	33	60	3,110	6 $\frac{1}{4}$	8,431	43	70	8	41	60	12,077	32	50	30,493	32	60	42,571	20	20	No particular time required before it is worked up. In general new cotton preferred, the thread spun from it being whiter.
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LIV

Circular—from S. R. LUSHINGTON, Esq., Secretary, Board of Revenue.

To—Major ALEXANDER READ, Superintendent and Collector of the Baramahal and Salem Districts.

Dated—Fort St. George, the 27th February 1797.

In consequence of the loss sustained in cochineal from the impurities mixed with it, I am directed by the Board to inform you, they deem it necessary, previous to purchasing that it be dried two days at your catcherry, four hours each day and cleaned as the natives do their rice, with the muram or chêta.

Curing
cochineal.

LV

Letter—from Mr. WILLIAM ORD, Assistant Surgeon.

To—Lieut.-Col. A. READ, Superintendent of the Ceded Districts.

Dated—Krishnagiri, the 1st March 1797.

Having for some time past paid particular attention to the cultivation of opuntia, the propagation and subsequent preparation of the cochineal insect, I beg leave to submit to your perusal proposals for furnishing the Company with a certain quantity of cochineal annually.

Proposals re
supply of
cochineal to
the Company.

My motives for wishing to specify the quantity to be received and paid for by Government, arise from the uncertainty I am now in how long the orders for paying for the cochineal at the rate of one pagoda per pound may continue in force, and the chance of being deprived of a certain market rendering any attempt to carry on the cultivation on a large scale, rather hazardous as a matter of speculation.

In regard to the quantity specified in my proposals, and my wish to be indulged with the liberty of offering as much more as can be procured, I have to observe that my experience hitherto has not enabled me to form any exact estimate of the produce of a given extent of ground planted with opuntia or of the time necessary to stock the plants with insects.

As it seems to be the wish of Government to encourage every attempt to render the manufacture of cochineal a permanent commercial object, I am inclined to hope that the proposals I have now the honour of requesting you to lay before them, will meet with a favorable reception.

In hopes of being favoured with an account of the determination of Government on the subject as soon as it may be made known to you, etc.

ENCLOSURE.

Proposals for furnishing the Hon'ble Company with four thousand pounds of cochineal.

Mr. William Ord, Assistant Surgeon at Krishnagiri, engages to deliver at Fort Saint George on or before the 30th day of August 1798, four thousand pounds (troy weight) of such cochineal as is now deemed marketable.

2. For the four thousand pounds of cochineal thus delivered, Mr. Ord is to receive four thousand star pagodas, viz., one thousand to be paid on the acceptance of his proposals, one thousand at the end of nine months from that time and the remaining two thousand on the fulfilment of his engagement.

3. The cultivation of opuntia and manufacture of cochineal never having been attempted in this country on so large a scale, Mr. Ord is not able to ascertain the precise quantity he may have it in his power to procure within the abovementioned time. He therefore hopes that any quantity (not exceeding ten thousand pounds) he may be able to offer over and above the four thousand pounds first proposed, will be received and paid for at the rate of one star pagoda per pound troy.

4. Should the foregoing proposals be acceded to, Mr. Ord presumes to hope that, if it may appear eligible to continue to contract for any quantity of cochineal to be delivered annually, he may on equal terms have the preference, provided his punctuality in the discharge of his present engagement be such as to entitle him to it.

LVI

Letter—from Lieut.-Col. ALEXANDER READ, Superintendent.

To—ROBERT HAMILTON, Esq., Assistant Collector, Baramahal and Salem Districts.

Dated—Tiruppattūr, the 5th March 1797.

Sugarcane
cultivation
and manu-
facture of
sugar in the
Baramahal.

The practicability that now appears of carrying on the sugar manufacture in the Baramahal with advantage to whoever undertakes it; the still more favourable situation of the Southern Districts for the culture of the sugarcane, the conveniency of water carriage, the good fortune of our meeting with a person of Mr. Foulis' experience to assist us in the business, and his inclination to engage in it on his own account, are all circumstances so encouraging to hope for complete success in establishing that valuable manufacture in this country, that I think we should be wanting in attention to the public interest if we did not prosecute the undertaking as far as lies in our power, or if we lost any time in waiting for authority, however necessary that may be on ordinary occasions, as the delay of even a week or ten days at this advanced season would occasion the loss of a whole year. I have therefore to request that you immediately proceed to the southward for the intended purpose. The first thing to be done is certainly the fixing on some situation, which on account of canes, of wet lands for the culture of them, of the number of hands procurable, of fuel, carriage, or other considerations, may be most convenient for a manufactory. It may be as in this vicinity, that from the want of canes or wet lands, you must necessarily have mills at two or at such number of places as it may be in your power to superintend and that by reason of the cultivation of canes being confined to the Central Districts, you may be obliged to erect your mills this year at an inconvenient distance from the Cauvery.

From the difficulty you would find in cultivating the canes yourself, I apprehend it will be much the best to encourage the inhabitants to grow them by advertising that you will give plants and advances of cash to defray the expense of cultivation to those who will stipulate to furnish you with a specific number at a fixed price, and security for the same, as we have done here. The accompanying are copies of our advertisement and obligations which may serve as forms. We there offer 300 plants gratis, for every gunṭa or rood, 10 pagodas takāvi for every 100 gunṭas, or $2\frac{1}{2}$ acres, growing the red or white; and 6 for every 100 gunṭas growing the hard cane, for the red or white canes, 1 pagoda per 1,000, and for the hard or reed canes $\frac{1}{2}$ pagoda per 1,000. The canes are required to be delivered at any one of the mills, and none of them under three hands in length are to be received. The advances of takāvi are to be deducted out of the amount of sales and to prevent disappointment the inhabitants are bound to perform their engagement under a penalty of one gold fanam for every gunṭa of land, they may neglect to cultivate of the stipulated quantity, which is the equivalent of their advances.

Though this be the mode of procuring canes which I think the best, you may find it expedient from their ignorance of the culture of the cane near the Cauvery and dislike to innovation, to cultivate as many yourself as may be practicable. In that event Captain Macleod will direct that all the wet lands unoccupied, or such as the occupants may be inclined to throw up, be pointed out to you that you may take your choice of them. Conformable to the rule which must necessarily be observed with planters, he will require pattās of you and you will give him muchilikā for such lands as you may take into management.

If lands cannot be procured in sufficient number from among the inhabitants he will order as many of the felons in that quarter as can be spared to be sent you, and as cattle will be wanting, 60 of my own shall be immediately sent, which you can employ till those belonging to the plantations here have ground the present crop. They shall be first ordered on to the Tahsildar at Salem, that in case you want canes for plants they may be loaded with them agreeably to your directions.

These things being arranged, you will of course next set to work about collecting materials and workmen, and about constructing the requisite buildings, mills, etc. Though very certain the Company will be reimbursed for all the expense

that may be incurred, I think it necessary to call your attention in these matters to economy, and to express a wish that you would delay for a few months the providing what may not be immediately required, that everything being laid before the Revenue Board, its sanction may be obtained for the undertaking, and I wish you on that account to furnish me with a report of all that is necessary, and of the expense at first, also of the monthly current expense for the first and second years. If you follow up the subject so far as to estimate the probable manufactured produce including carriage, freight and customs to the London market, it will be highly satisfactory. Should there be a scarcity of iron in that quarter, send me an indent upon the stores at Sankaridrug for the quantity required and it shall be sent you.

Sugarcane cultivation and manufacture of sugar in the Baramahal.

Captain Macleod will supply you with cash for your disbursements, and you may depend upon his heartily co-operating with you in everything that may tend to promote a business so conducive to the improvement and wealth of his districts.

Mr. Foulis being so good as to accompany you, we may congratulate ourselves on the benefit that may be derived to it from his experience and advice. I am very sanguine as to its success, and will have much satisfaction in hearing of your progress.

LVII

Letter—from Lieut.-Col. A. READ, Superintendent and Collector.

To—Captain Macleod, Assistant Collector, Baramahal and Salem.

Dated—Tiruppattūr, the 5th March 1797.

My having been much busied in getting up a report for the Board upon our plantations in these districts and other matters, has occasioned delay in my replying particularly to your letter of the 30th January on that important subject.

As that letter will be included in the report I have mentioned, your proposal of establishments for a sarkār garden in every district will of consequence be brought fully under its consideration, and the utility being so obvious, while the expense of them would be so trifling, I make no doubt of obtaining sanction for them.

Sarkār garden in every district.

Your other proposal, to supply the inhabitants with plants of the sugarcane gratis, is perfectly consonant with, and necessary to, the intended plan of extending the culture of it, and establishing sugar manufactories on the banks of the Cauvery. I cannot therefore, though the sanction of the Board be indispensable to all extra charges, withhold my approbation, and I have no doubt of the Board's passing your disbursements for such plants as you may distribute.

Distribution of sugarcane plants gratis.

It has happened very unfortunately that indisposition has delayed Mr. Hamilton in this quarter, but he is now able to proceed into your division for the purpose of carrying the plan above mentioned into execution; and as conveying information thereon, I herewith enclose a copy of his instructions.

He is desired to apply to you for such things as he cannot procure without your concurrence, advice or influence; and as these will be necessary upon almost every occasion at first, you will of course co-operate with him, as far as lies in your power, consistently with the good of individuals, in a business so very conducive to the wealth of your districts.

His first request will probably be to publish his cowle for canes that he may propose to buy the ensuing year of the inhabitants, or for lands upon the banks of the Cauvery, as you inform me there are no canes there, and it will not answer to establish the manufactory in the interior districts. In the latter case let him have the choice of all the wet lands in the Nâmakkal and Paramati districts, that are unoccupied, or whose occupants are disposed to throw them up. Consistently with my cowle, I don't wish to have any of the inhabitants who only rent their lands from year to year in continuance, compelled to relinquish them, but under present circumstances I apprehend they may be very easily prevailed upon to give up any of them freely, in a particular situation that Mr. Hamilton may desire, if

Sugarcane
cultivation
and manu-
facture of
sugar in the
Bâramahal.

they be accommodated elsewhere, and there will always, I apprehend, be unoccupied land enough for their accommodation. I imagine he will desire to have such a portion of the lands under the three water courses of Paramati, Nâmakkal, and Karuppattûr as he may be able to bring into cultivation, and so far as a Collector's influence can be used without operating compulsively, I wish yours to be given in procuring him land under any one or all of them, as he may wish. I should be still better pleased if the inhabitants are prevailed upon to cultivate the canes themselves, and agree to sell them to Mr. Hamilton at a fixed price. In that event he will distribute seed and takâvi among them.

Rent on
lands.

As the produce of lands yielding canes is four or five times more valuable than the common productions of the country, there is no necessity, it may be observed, to make any remission of the established rent of such as grow them, by way of encouraging the culture of them, especially as that is introduced in most parts of the country; but the demanding an increase of rent for them is certainly a discouragement to cultivating canes, betel, tobacco, or any other production that is more valuable than paddy, and it is owing to that maxim having ever been observed here, that plantations are so few, and that exertion on the part of the sarkâr in the way you have proposed is necessary to the extending them. I fear that unacquainted at first with the impolicy of it, and following the suggestions of our mutasaddîs, this error in assessment has been generally introduced in survey. I request that, whenever it has in your division, you will correct it, and that no plantations whatever be assessed any higher than land of the first taram, which is always chosen for them. It may be argued that the planter can very well afford a higher rent for lands so occupied, and by consequence that it ought to be demanded; but though that must be admitted on the principle of assessment, it is carrying it too far; the sarkâr's following up the improvements of industry with a rigid parsimony is the general cause of poverty among the inhabitants.

Conformably to the above reasoning you will give pattâs to Mr. Hamilton, and whoever else may cultivate the sugarcane, at the usual rate of tîrvai, and demand muchilikâs of him, as of the ryots. By this I propose that revenue shall be credited for the rent of lands so occupied though on the part of Government, and that the plantations shall be debited for the amount.

He will likewise apply to you for timber and other materials for building, etc., which he may not be able to procure without your order. These and everything else he may want he will pay for, at the established rates.

Supply him with cash for his disbursements, and enter it as advances to the Superintendent, until authority be obtained for opening a general account with the plantations.

I am hopeful that from Mr. Hamilton's zeal and your suggestions this undertaking will become very important in time; from the lateness of the season, the progress that can possibly be made in it this year must depend very much, indeed almost entirely, on your exertions to procure speedily what he may require to set it completely agoing.

LVIII

Letter—from Mr. D. FOULIS.

To—Lieut.-Col. READ, Superintendent, Ceded Districts.

Dated—Tiruppattûr, the 6th March 1797.

Six years' experience in the West Indies as a sugar planter induces me to try what is to be done in that line on the banks of the Cauvery, if it meets with the approbation of the Revenue Board; but without suitable encouragement it will be impossible for me to proceed to any extent, as my finances will not admit of my trying experiments without some certainty of success. I understand the Revenue Board is willing to encourage sugar manufactories in the districts under your superintendance; I shall therefore be happy in giving every assistance in my power to so laudable an end, without any emolument, provided the Board will allow me to

take it upon myself in the course of eighteen months, if it is found eligible for an individual to carry it on, on my paying for the live and dead stock. As it will be absolutely necessary that a considerable quantity of land should be laid out in the culture of sugarcane, and that the manufacture should be carried on to a considerable extent, to allow of any profit accruing to the manufacturer, I hope through your means that the Board, should they approve of the undertaking, will grant me a lease of 2,000 acres of wet land on the banks of the Cauvery, for the term of seven years certain, according to the following propositions.

Mr. Foulis' Scheme re sugarcane cultivation and manufacture of sugar.

First.—Upon receiving the lease of 2,000 acres of land around the manufactory and paying full rent for the same, I will engage to deliver one-fourth of the produce of such lands as I may be able to cultivate with sugarcane, at the Presidency at the current price there, leaving me the option of disposing of the remainder, by sending it to England, or any other mode I may find most eligible; and it may be necessary for me to observe that I do not expect to cultivate one-half the land I have requested, if even so much, as the nature of cane is such, that it requires one-half the land to be fallow, while the other is in cultivation, to allow it to recover its vegetative quality.

Second.—Should it meet the approbation of the Board to grant me the above land upon a reduced rent not exceeding one-half, I will agree to deliver at the Presidency one-half of the produce of such lands as I may be able to cultivate, at the then current price, reserving to myself, as above, the option of disposing of the remainder as I may find most to my interest.

Third.—Again should I find it more eligible to give cowle to the inhabitants to cultivate the sugarcane, and as it may not then be necessary to rent any land, I trust that may be dispensed with; in such case, I hope the Board will conceive one-eighth of the produce so manufactured, at the above-mentioned rate, will be as much as is in my power to offer.

It is my intention to manufacture Muscovado sugar, which, from the specimen I have seen here, I have little doubt will be found equal in grain and quality to any West India sugar.

LIX

Letter—from Mr. D. FOULIS.

To—Lieut.-Col. READ.

Dated—Môhanûr, the 21st March 1797.

From the reports of Captain Macleod and Mr. Hamilton, it may be unnecessary for me to say much on a subject which I dare say they have so particularly informed you of; yet my public letter to you on the sugar scheme requires me to say that from our experiments and calculations (which I believe to be pretty right) it is found not to be worth undertaking in an individual. I must therefore request my letter to be withdrawn. I have withheld no information from Captain Macleod and Mr. Hamilton that was in my power to give, and I shall be still happy to continue it when required.

Though not advantageous for an adventurer to undertake it from the small profit that might arise from it in exportation, still I think by introducing the manufacture of good sugar in this country, it would greatly enhance the value of land and be the means of enriching the inhabitants. I look on Môhanûr to be best calculated for such an undertaking, and was the Company to give suitable encouragement for such an introduction, they would soon find the advantage of it either by purchasing the sugar from the farmers at a moderate rate here, or supplying the different markets with an article so much wanted, and at the same time it might be worth the Company's while to purchase the scum and molasses for making of rum.

Having heard nothing of my leave, I intend pushing off for Arcot on the 23rd at night, so that I expect to be with you on the 26th and at Arcot the 29th if you can assist me as far as Ambûr.

Captain Macleod and Mr. Hamilton are both here and well.

LX

Letter—from ROBERT HAMILTON, Esq., Assistant Collector and Superintendent of Plantations.

To—Lieut.-Col. READ, Superintendent, Tiruppattûr.

Dated—Môhanûr, the 24th March 1797.

Sugarcane
cultivation
and manu-
facture of
sugar.

In consequence of your letter of the 5th instant, I proceeded to the banks of the Cauvery accompanied by Mr. Foulis, for the purpose of fixing on the most eligible situation for establishing a manufactory of sugar and to encourage the cultivation of the cane here, which is at present but very imperfectly known among the generality of farmers.

Between Vêlûr and Môhanûr there are many situations where buildings might be erected with every advantage, being central as to the watercourses, where by the help of small boats, canes might be brought to the factory from a considerable distance, which is a great object, as it gives an option to the farmer to cultivate any lands he chooses instead of being circumscribed to those lands immediately round the works, which otherwise must have been the case.

Captain Macleod has this year given great encouragement for the general introduction of the cane here by distributing a quantity of plants gratis to any farmer wishing to cultivate it, which, answering your intention in the third paragraph of your letter, I have desisted from doing.

Pursuant to your particular wish that the farmers should if possible be induced to furnish the canes in preference to our taking lands and cultivating them on the Sarkâr account, we assembled a number of the most substantial farmers and required particular information on their mode of cultivating the cane, and the expense that would be incurred by an individual who would be obliged to hire stock and servants to cultivate one chey of land, equal to $1\frac{15}{16}$ acre. I enclose their estimate No. 1, but it was still necessary to make some experiments upon the quality of the canes here before we could proceed; and we were fortunate in finding two small fields, the one growing the red, the other the white cane; No. 2 is the result of our experiments, computing the quantity of sugar from the jaggery to be one-half, as is found to be nearly the case. The white canes here yield in comparison with red as in the Bâramahal so that the cultivation of the red is that which ought principally to be encouraged. On comparing the supposed number of canes grown in one chey and the estimated expense of cultivation No. 1, I did not think we were authorised to offer more than $\frac{3}{4}$ pagoda per 1,000 canes, which is a fair and advantageous price, leaving the cultivator a clear profit of 17 pagodas the chey or 9 pagodas the acre, calculating the expense of cultivation not of the farmer but the individual, and without taking into consideration the advance of 10 pagodas takâvi, authorised by you.

No. 3 is an estimate for one complete set of permanent buildings, utensils and stock required to manufacture 225 hogsheads of sugar annually. Cheaper works might be erected of mud should it be thought that the sum is too considerable; yet if the introduction of so useful a manufacture be an object to Government, I fear temporary buildings will prove in the end most expensive.

No. 4 is an estimate of the annual and temporary servants, including every expense of 225 hogsheads of sugar to the London market; and No. 5 is the amount of sale at the Madras market, from which it appears, that the manufacture might be introduced with advantage notwithstanding the heavy percentage and amount of freight will exclude it from the London market. As such a commodity will require every encouragement, I hope that you will obtain permission that no customs be levied upon it through the Nawâb's country or any duty required at Madras.

I beg leave to observe before I conclude that I am apprehensive but a very small portion of 200 acres of land will be engaged for this season, owing to the timidity of the farmers and general ignorance of the cultivation of the cane here. Next year there is hardly a doubt but any quantity that may be required will easily be procured; but as the farmers have generally got the seed gratis this year (which is an expensive article) they will naturally prefer trying what can be made of the produce to selling the canes to us. And as for cultivating lands ourselves I do not think we should be able to rear the cane for the sum we offer the farmers,

or that we could procure a sufficient number of ryots for some time to cultivate any quantity of land. It is a consideration therefore under these circumstances, whether the buildings should be begun now or wait until, by engagements with the farmers, we could ensure a certain quantity of cane for the manufacture of sugar. On this subject I beg your instructions, as likewise whether I should continue to hold out the cowle upon the terms I have before mentioned.

Sugarcane cultivation and manufacture of sugar.

ENCLOSURE No. 1.

An estimate of the expense of cultivating one chey (or $1\frac{1}{8}$ acre) of land in the Paramati district.

	GOP.FS.	P.	F.	G.
Rent of one chey of land	360			
Ploughing 10 times, 6 ploughs a day	60			
Thirty thousand plants	175			
Preparing the ground after ploughing	40			
Manuring	36			
Weeding twice, 30 women at $\frac{1}{2}$ fanam	30			
Hoeing 3 times, 20 men at 1 Gopally fanam	60			
Trenching, 20 men 1 day do.	20			
Hedging, 50 do. do.	50			
One man in constant pay	168			
Cutting and bringing to the mill	360			
Gopally fanams .. 1,359				
Star pagodas (at $29\frac{1}{2}$ Gopally fanams per pagoda)		46	3	4

ENCLOSURE No. 2.

An estimate of the quantity and quality of the canes in the Paramati district.

Manufacture of sugar.

	Number of canes in 841 square feet.	Quantity of juice in gallons.	Quantity of jaggery in pounds.	Estimated quantity of sugar in pounds.	Estimated quantity of sugar from an acre.		
					CWT.	QRS.	LBS.
White canes	874	37	54	27	12	1	11
Red canes	844	70	105	52	24	0	21

ENCLOSURE No. 3.

An estimate for complete buildings, mills, utensils and stock required to manufacture 225 hogheads of sugar annually.

	PAGS.	F.	C.	PAGS.	F.	C.
Buildings—						
A curing-house and distillery, 70 feet long by 20 broad, and a boiling-house, 30 feet by 20, requiring 332,024 bricks at 18 Madras fanams per mille ..	132	36	0			
Bricks for flooring the above	10	0	0			
Wood for doors, windows and floor for the curing-house	60	0	0			
Palmyra roof	90	0	0			
Mat tiles	30	0	0			
Crooked tiles	50	0	0			
Jaggery, chunam and beating, etc.	142	36	0			
Bricklayers and coolies	240	0	0			
Carpenters and sawyers	82	0	0			
Iron work	10	0	0			
1 conicopoly	18	0	0			
Sundries	50	0	0			
				915	27	0
Mills—						
2 mills at 60 pagodas each	120	0	0	120	0	0

ENCLOSURE No. 3—cont.

Manufacture
of sugar.An estimate for complete buildings, mills, utensils and stock required to manufacture 225
hogsheads of sugar annually—continued.

Utensils—	PAGS.	PAGS.	F.	C.			
For the boiling-house—							
1 iron kettle of 80 gallons	20						
1 do. of 150 do.	30						
1 copper kettle of 200 do.	80						
1 do. of 300 do.	120						
1 iron kettle of 500 do.	80						
		330	0	0			
4 copper skimmers and 4 ladles	20						
1 wooden receiver of 500 gallons	20						
2 wooden coolers	40						
			80	0	0		
Distillery—							
1 still of 300 gallons, worm, etc.	500						
1 do. 150 do.	250						
24 fermenting vats of 300 gallons each	144						
12 wooden cans of 5 gallons each	12						
2 chunam tanks for the worms of the stills.	50						
			956	0	0		
Stock—							
Fifty head of cattle at 4 pagodas each	200	0	0		1,566	0	0
Total star pagodas						2,601	27 0

ENCLOSURE No. 4.

Manufacture
and sale of
sugar.An estimate of the annual expense of manufacturing 225 hogsheads of sugar being the supposed
average produce of 200 acres of land and the amount of sales of the same at the London market.

Servants' wages—	PAGS.	PAGS.	F.	C.	PAGS.	F.	C.
Annual servants—							
1 English writer at 12 pagodas per month.	12						
1 conicopoly	4						
2 head boilers	6						
3 coopers	9						
8 bullockmen at 1½ pagodas	10						
1 head distiller	3						
	44						
		Annually ..	528	0	0		
Temporary servants—							
16 men feeding 2 mills, 4 men to one set and	20						
2 sets to each mill at 1½ pagodas each	10						
8 men employed at the boiling-house at the	5						
above rate	2½						
4 men attending the trees	3½						
2 do. the distillery	41½						
8 extra men for sundry employments							
			247	22	40		
The above servants for 6 months							
Package of canes—							
43,560 canes in 1 acre of land at ¼ pagoda per					6,534	3	0
1,000, 32-28-60, and will make upon an average 1½					322	5	0
hogshead of sugar, at which rate 200 acres will							
amount to					262	22	40
3,600 double gunny bags for packing the sugar							
75 puncheons for the rum at 3½ pagodas per							
puncheon							
Expense in India						7,894	8 0
Carriage—							
Water carriage of 225 hogsheads of sugar and 75					600	0	0
puncheons of rum down the Cauvery					60	0	0
Masula boat-hire at Porto Novo to the doney					300	0	0
Doney hire to Madras							
Total expense in India						8,854	8 0

PRODUCTS—SUGAR.

91

ENCLOSURE No. 4—cont.

An estimate of the annual expense of manufacturing 225 hogsheads of sugar being the supposed average produce of 200 acres of land and the amount of sales of the same at the London market—cont. Manufacture of sugar and sale at London.

	£	s.	d.	£	s.	d.
The amount of annual expense in India 8,854-8-0 Pagodas at the exchange of 8 shillings the star pagoda.	3,541	13	5			
Freight to London at £15 per ton for 225 hogsheads of sugar	2,700	0	0			
Percentage on East India sugar at £37-16-0 per cent. on the sales	3,407	8	0			
Commission to agents, brokerage, 1½ per cent. ..	277	4	0			
Live and dead stock amounting as per No. 3 to Pagodas 2,061 at 12 per cent., Pagodas 312-5-40 or	124	17	0			
Total expenses in India—Pagodas 8,854-8-0 at 12 per cent., Pagodas 531-11-0 or to	212	12	0			
Total ..				10,263	14	5
Sales—						
The estimated amount of manufactured produce being 225 hogsheads of sugar, we must allow at least 15 hogsheads for wastage, say that 210 hogsheads, sale at the rate of 55 shillings per cwt.	9,240	0	0			
Amount of sales of 75 puncheons of rum at 11 fanams per gallon to be sold in India	806	13	4			
Sale of 75 empty puncheons	80	0	0			
Total amount of sales ..				10,126	13	4
Total expenses ..				10,263	14	5
Against the manufacturer ..				137	1	1

ENCLOSURE No. 5.

An estimate of the annual expense of manufacturing 225 hogsheads of sugar, the supposed average produce of 200 acres of land and the estimated amount of sales of the same at Madras. Manufacture of sugar and sale at Madras.

	PAGS.	F.	C.	PAGS.	F.	C.
Expenses to Madras inclusive						
Annual servants' wages	528	0	0			
Temporary servants' wages during the crop	247	22	40			
Canes at ¼ pagoda per mille	6,534	3	0			
Package of sugar	161	5	0			
Do. rum	262	22	40			
Water carriage down the Cauvery	600	0	0			
Masula boat hire from Porto Novo to the doney and from that to Madras	120	0	0			
Doney hire to Madras	200	0	0			
Godown hire at Madras	120	0	0			
Agency at Madras on the sales at 3 per cent.	422	31	0			
Live and dead stock as per No. 3, amounting to Pagodas 2,061 at 12 per cent.	312	5	40			
The amount manufactured exclusive of agency and percentage on live and dead stock amounting to 8,773-8-0 at 6 per cent.	526	19	20			
				10,034	18	60

ENCLOSURE No. 6.

Sales at Madras						
Sugar made at Bengal sells at the market (Calcutta) at an average of 9 Sonant Rupees the maund of 82 lbs., that is about 9¼ lbs. per rupee or 175½ Rupees the hogshead (1,600 cwt.) the estimated quantity to be made here; 225 hogsheads allow 5 for wastage there, 220 hogsheads will amount to Rupees 38,610 or at exchange of 3¼ Rupees per pagoda	11,880	0	0			
75 puncheons of rum at 11 fanams per gallon	2,016	30	0			
Sale of 75 empty puncheons	200	0	0			
Total amount of sales ..				14,096	30	0
Deduct total expense ..				10,034	18	60
Balance in favour of manufactory ..				4,062	11	20

LXI

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Lieut.-Col. READ, Superintendent.

Dated—Paramati, the 29th March 1797.

Sugar manu-
facture.

In reply to your letter of the 5th instant, I have the pleasure to forward to you the accompanying statements Nos. 1, 2 and 3 on the subject of sugar. The estimate of the expense of manufacturing sugar with that of the buildings and utensils is drawn up entirely from the information of Messrs. Hamilton and Foulis. The Europe and Madras charges as stated in No. 3 were procured from Mr. Hamilton.

The experiment No. 2 may be depended upon because it was done with particular attention under our own inspection.

Not having had any opportunity of being informed on the subject of sugar planting, or of the advantages which may be derived from making it an object of public commerce, I consider myself as incompetent to speak of it with precision. What I offer is chiefly and must be reckoned as rather leading to the obtaining better information, than as data to act upon.

I apprehend that exporting sugar for the London market will not be attended with any advantage unless a considerable reduction can be made in the amount of freight or customs in No. 3 or the rate of sales much higher than 45s. per cwt. It is true that the rate of sales during the present war has been upward of 60s. per cwt., but in a calculation of this nature the average price of West India sugar in times of peace should be taken in preference to the present high prices, which certainly must fall as soon as there may be an end to the war.

It may notwithstanding be deemed an object deserving public consideration to establish on the banks of the Cauvery the manufacture of sugar for the consumption of Madras or other parts of India, at present supplied from China and Bengal. For although the country consumption would be trifling in comparison to that of the London market, still I think the circulation of specie in these districts might be much increased by the manufacture of sugar for the Madras consumption in the Company's districts. Another circumstance which would render its introduction conducive to the wealth of these districts, is that the consumption of grain is not equal to the quantity reared; and grain is the only production almost with which the farmers are acquainted who often find a difficulty in converting it into money.

You will observe that the ryots have not yet agreed to sell their canes for so little a price as $\frac{3}{4}$ pagoda per thousand; but if once the manufacture was begun, I have scarcely any doubt but they would cultivate and sell canes at that rate, because they acknowledge themselves they would have more profit on canes than on rice. You express your apprehension that lands laid out under sugar and betel may be assessed higher than rice fields. But that has not been the case in the Southern Division, because it could not in that manner be a permanent assessment, for sugarcane is never planted for two successive years in the same ground.

Being apprehensive the Board may not wish that much expense should be incurred at present on account of sugar, I shall, until favoured with your further instructions, confine the distributing seeds gratis to the value of a few hundred rupees.

The loss or gain may vary considerably from what is stated in the estimate No. 3, because many of the calculations being made from conjecture, cannot be depended upon. Nor do I think it possible to ascertain the gain or loss of a business so intricate without positive experience.

ENCLOSURE No. 1.

Estimate of the expense of cultivating 84,100 square feet of land as a sugar plantation, from the information of the farmers in the Paramati District.

Sugarcane cultivation in Paramati.

	Gopally fanams.
To the hire of 6 ploughs for 10 days, 1 gopally fanam each per day ...	60
To the purchase of seed (red canes)	175
To turning the ground with the spade, 10 men for 4 days at 1 Gopally fanam each per day	40
Manure	36
Weeding	30
Hoeing	60
Trenching	20
Hedging	50
One man in constant pay for 12 months	168
Cutting and carrying to the mill	360
	999
 The highest land rent in grounds watered throughout the year by streams from the Cauvery	360
	1,359

	PAGES.	F.	C.
At 29½ Gopally fanams per Star pagoda	46	3	4
Supposed number of canes 84,000 at the rate of ½ pagoda per thousand	63	0	0
Supposed profit to the farmer	16	41	76

ENCLOSURE No. 2.

Result of experiments made in the Paramati District of the produce of 841 square feet of land planted with sugarcanes of two sorts.

	Number of canes in 841 square feet.	Gallons of juice contained.	Quantity of jaggery * produced.	Supposed quantity of sugar or one to two of jaggery.	Rate per acre.
			LBS	LBS.	CWT. QRS. LBS.
Vellakarambu, white canes ...	874	37	54	27	12 1 11
Señkarambu, red canes ...	844	70	105	52½	24 0 21

* Jaggery is the native term for coarse sugar without the molasses being separated from it.

NOTE.—It is to be understood that 841 square feet is applied to each kind.

The land in which the red cane was planted is supposed to be more fertile than the average; therefore 20 cwt. may be estimated as the average produce per acre.

ENCLOSURE No. 3.

Estimate of the expense of manufacturing 225 hogsheads of sugar in the Paramati District and of the profit and loss of exporting it to London, or disposing of it at Madras.

Expenses of
sugar
manufacture
in Paramati.

Buildings and Utensils.

	PAGS.	F.	C.
To a curing house and distillery, 70 feet by 20, and a boiling-house, 30 feet by 20—the whole of brick and chunam walls—roofs of palmyra, flat tiled with teakwood doors and windows	916	0	0
To the expense of constructing two mills	120	0	0
	PAGS.		
To one iron kettle to contain 80 gallons	20		
Do. 150 "	30		
Do. 200 "	40		
Do. 300 "	60		
Do. 500 "	90		
	240	0	0
To one still to contain 300 "	500		
Do. 150 "	250		
10 copper skimmers and ladles	20		
1 wooden receiver	20		
2 wooden coolers	40		
24 fermenting tubs of 300 gallons each	144		
12 buckets	12		
1 chunam tank for distillery	50		
	1,036	0	0
50 bullocks for mills at 3 pagodas	150	0	0
Total, live and dead stock	2,462	0	0

Allowances to Fixed Servants.

	PAGS.	F.	C.	PAGS.	F.	C.
1 Overseer	12	0	0			
1 English writer	10	0	0			
2 head servants	6	0	0			
2 China boilers	12	0	0			
1 carpenter	2	22	40			
1 smith	2	22	40			
1 bellows boy	1	0	0			
2 coopers	6	0	0			
10 bullock men	10	0	0			
Grass or straw	3	0	0			
	65	0	0			
Monthly						
Annually				780	0	0

Extra servants during the Crop Season.

16 men for feeding the mills, 4 to each set and two sets at mill	16	0	0			
8 men for the boiling-house	8	0	0			
2 men for the distillery	2	0	0			
4 men for attending the fires	4	0	0			
3 men for extra labour	3	0	0			
	33	0	0			
Monthly						
Annually				165	0	0
To the price of the crop of 200 acres of canes, reckoning 43,000 canes per acre at $\frac{1}{2}$ pagoda per 1,000	6,450	0	0			
To the wear and tear, etc., of utensils and the casualties of cattle annually	300	0	0			
Total annual charges at the manufactory exclusive of casks or package	7,695	0	0			

ENCLOSURE No. 3—cont.

Estimate of the expense of manufacturing 225 hogsheads of sugar in the Paramati District and of the profit and loss of exporting it to London, or disposing of it at Madras—cont.

	PAGS.	F.	C.	PAGS.	F.	C.
To 225 casks for the sugar at 4 pagodas.	900	0	0			
„ 75 casks for the rum at 5 pagodas ...	375	0	0			
„ the water carriage on the Cauvery from Paramati to Porto Novo of 300 casks	600	0	0			
Masula boat hire to the doneys ...	60	0	0			
Doney hire from Porto Novo to Madras	200	0	0			
Masula boat hire at Madras ...	60	0	0			
Hire of carriage from beach to warehouse	60	0	0			
To godown hire at Madras ...	120	0	0			
To agency at Madras, if sold there ...	447	0	0			
				2,822	0	0
				10,517	0	0
Freight of 225 hogsheads of sugar to London being 180 tons at £16 per ton, £2,880	7,200	0	0			
Charges for shipping at Madras ...	80	0	0			
Waterage and wharfage in England ...	1,070	0	0			
Agency and brokerage at 3 per cent. £256-16s.	642	0	0			
Customs in Europe at £37-16s. per cent. on the sales, on £8,560, £3,235-13s.	8,089	0	0			
				17,081	0	0
Charges in India and in Europe, exclusive of the live and dead stock (pagodas 2,462) ... ..	.....			27,598	0	0
Add interest on stock, pagodas 2,462 for 1 year at 12 per cent	295	0	0			
Add interest on Indian disbursements, pagodas 10,517	1,266	0	0			
				1,561	0	0
Total ...				29,159	0	0
Proceeds if the sugar be sold in London.						
Amount of sale of 210 hogsheads of sugar at 45s. per cwt. allowing 15 hogsheads for leakage and wastage, £8,560 ...				21,400	0	0
The sale of 75 puncheons of rum at Madras at the rate of 10 fanams per gallon and 45 fanams per pagoda ...				1,833	0	0
Drawbacks on account of the casks, two-thirds of prime cost				850	0	0
Drawbacks on account of Madras agency				300	0	0
Total ...				22,383	0	0
Loss				6,776	0	0
Proceeds if the sugar be sold at Madras.						
Amount of sales of 220 hogsheads of sugar allowing 5 hogsheads for wastage and leakage at 30 lbs. per pagoda				13,141	0	0
Sale of the rum as already stated ...				1,833	0	0
Drawback of two-thirds of the cost of the casks				850	0	0
Total ...				15,824	0	0
Charges annually in India	10,517	0	0			
Interest on charges annually in India at 12 per cent.	1,266	0	0			
Interest on stock at 12 per cent.	295	0	0			
				12,078	0	0
Supposed annual profit, about 30 per cent.				3,746	0	0

Expenses of manufacture of sugar in Paramati and profit and loss of exporting it to London or disposing of it at Madras.

ENCLOSURE No. 4.

Estimate of the expense of manufacturing the supposed produce of 200 acres of canes into sugar, and the freight to England and of the customs there, by Mr. Lyte.

Manufacture
and sale of
sugar.

Live and Dead stock.

	PAGS.	F.	C.	PAGS.	F.	C.
To a building for a curing and boiling-house, 70 ft. by 20, supported by brick and chunâm pillars, a wooden roof tiled and the remainder mud wall ...	250	0	0			
To a distillery, 60 by 20, in the same manner built, the hanging of the stills, included with all the brick and chunâm vats that are required ...	290	0	0			
Expense of 4 mills at 60 pagodas each.	240	0	0			
To 5 iron boilers at 30 pagodas each running from 80 to 400 gallons ...	150	0	0			
To 4 small stills Madras-made at 50 pags. each ...	200	0	0			
To 60 empty beer butts for fermenting at 1½ pagodas each ...	90	0	0			
To a wooden receiver for the mill ...	3	0	0			
To 2 coolers at 3 pagodas each ...	6	0	0			
To 100 cattle at 3¼ pagodas each ...	325	0	0			
To feeding of cattle at 2 pagodas each, per annum ...	200	0	0			
To pots and forms, ...	100	0	0			
Total Live and Dead stock ...				1,854	0	0

Allowances for fixed servants.

To 1 Overseer capable of keeping the accounts, etc. ...	20	0	0
To 2 Chinese boilers at 5 pags. each ...	10	0	0
To 2 peons 1½ each ...	3	0	0
To 6 bullockmen 1 pag. each ...	6	0	0
To a carpenter and bricklayer in one ...	3	0	0
Monthly ...	42	0	0
Annually ...	504	0	0

Extra servants during the crop season.

To 64 men for attending 4 mills, 8 men in a set and 2 sets to each mill ...	64	0	0
To 4 men for the boiling-house ...	4	0	0
To 4 men, firemakers for the boiling-house ...	4	0	0
To 4 men for distillery ...	4	0	0
To 2 men, firemakers for distillery ...	2	0	0
Monthly ...	78	0	0
For 4 months ...	312	0	0
			816
To the price of the canes of 200 acres at the average of 32,000 per acre is 6,400,000 at 1 pagoda per thousand is	6,400	0	0
To 1,000 bandy loads of firewood at twenty-five per pagoda ...	40	0	0
To oil and chunâm ...	40	0	0
			6,480

PRODUCTS—SUGAR.

97

ENCLOSURE No. 4—cont.

Estimate of the expense of manufacturing the supposed produce of 200 acres of canes into sugar, and the freight to England and of the customs there, by Mr. Lyte—cont.

Sugar exportation, the freight to England, and the Customs charges there-by.

<i>Expense of exportation.</i>					
	PAGS.	F. C.	PAGS.	F. C.	
To the package of 1,200 maunds of sugar equal to 150 hogsheads in gunnies—1,600 gunnies at 2 fanams each ...	53	20 0			
To 75 empty Madeira casks at two pagodas each	150	0 0			
To carriage for 150 hogsheads and delivering the same on Madras beach ...	600	0 0			
To the carriage of 75 casks of rum, 4 pagodas each	300	0 0			
					1,103 20 0
Total expense in India ...					10,253 20 0

<i>Expense for Europe.</i>					
	£	s. d.			
To the freight of 150 hogsheads or 120 tons of sugar at £45 per ton ...	1,800	0 0			
To Commissions on sales and Customs at 33½ per cent.	2,400	0 0			
To lighterage and wharfage at 10 shillings per hogshead	75	0 0			
Total at 8 shillings per pagoda ...	4,275	0 0	or		10,187 22 40
Total expense in India and Europe ...	.....				20,440 42 40

<i>Account of sales.</i>					
To 150 hogsheads of sugar at £48 per hogshead, £7,200 or pagodas ...	18,000	0 0			
To 75 pipes of rum at 40 pagodas per pipe	3,000	0 0			
					21,000 0 0
Profit ...					559 2 40
Interest of money laid out in India ...	.....				1,230 0 0
Loss to the manufacturer ... ..	.....				670 42 40
Live and Dead stock ... ..	.....				1,854 0 0
Deduct 20 per cent. for wear and tear in the year	371	0 0			
Loss found by estimate	670	42 40			
					1,041 42 40
Profit, star pagodas ...					812 2 40

LXII

Letter—from WILLIAM DRING, Esq.

To—Lieut.-Col. READ.

Dated—Fort St. George, the 5th April 1797.

I enclose an account taken from the two estimates by which you will at one view see the difference between them.

It appears the produce of an acre is very different in the two places and that the cost of 1,000 canes is three-fourths in one and one pagoda in the other.

Estimates of sugar manufacture.

Comparative estimates of sugar business by Capt. Macleod and Mr. Lyte.

The produce of 200 acres by Captain Macleod's account is 180 tons of sugar and 75 puncheons of rum, and by Mr. Lyte's, 120 of sugar and 75 of rum—a vast difference, one-third less sugar.

Perhaps Captain Macleod may have a little overrated his quantity, but on comparing the cost of that made by Mr. Lyte with the cost in Bengal his will be found much cheaper.

I cannot go into the minutiae of the buildings and implements; perhaps Mr. Lyte may in some have gone too near but he has two mills more than Captain Macleod and 50 bullocks more; and he also included 200 pagodas for feeding his, which Captain Macleod omitted.

I have taken the cost of package and transportation to Madras as stated, supposing these gentlemen must know the exact amount, but it is proper to observe that no account of duties either by land or sea are in the estimates, and perhaps none may be exacted; but there is a charge of boat and cooly hire and godown rent, unless the goods are sold or shipped, which should be added.

The estimates of Captain Macleod value the rum at 40 pagodas per pipe; Mr. Lyte's at $12\frac{2}{3}$ —I suppose it will produce 20 which is a fair valuation,—but it ought not to be sent down because if it is good it will bring more at the end of a year at the different garrisons, as it may be served out to the troops, if Government think proper to order it.

Bengal sugar.

Sugar is of late much advanced in Bengal, and yet people find their account in carrying it home. I have not gone into the particulars of freight, insurance, wastage and charges home—but, stopped at Madras from whence the sugar as you will see can be shipped cheaper than in Calcutta, for, taking the dearest (Mr. Lyte's) cost, you will perceive it amounts on Madras Beach to per ton—star pagodas $72\frac{1}{2}$, and that the cost upon a ton in Bengal at 9 rupees is 78; but 9 is rather too little, we ought to say $9\frac{1}{2}$ or 10.

Sugar by late accounts averaged £70 per ton and the purchaser pays the duties. The wastage, if well cured, is not above $2\frac{1}{2}$ per cent.

	PAGS.	PAGS.
Suppose twenty tons are shipped, the cost as by Mr. Lyte's statement at $72\frac{1}{2}$ pagodas is	...	1,450
Shipping charges	10	
Insurance, 10 per cent.	145	
		<u>155</u>
	£	£ 1,605
Sales 20 tons at £ 70	1,400	
Deduct—Wastage and all charges 10 per cent.	140	
Freight at £13	300	
		<u>960</u>
	Pagodas	<u>2,400</u>
Brokerage	...	795
		<u>2,400</u>

I will go over the accounts again in the morning, but I have no reason to think they are incorrect.

The interest charged in the estimates is too much, as you will see—half of the same should be for only half the time, and it is charged in the wear and tear of implements.

Gunnies are the best packages for sugar and cost but little,—6 to 7 rupees per 100,—here they are 5 pagodas more.

ENCLOSURE.

Estimate of the expense for manufacturing the produce of 200 acres of sugarcanes with their cost, the freight to London, sales, etc.

Manufacture of sugar and sales, etc.

Quick and dead stock.	By Capt. Macleod.	By Mr. Lyte.
For buildings of brick and mortar, 2 stills boilers, stills and vats and 50 bullocks Star pags.	2,462 0 0	
For buildings, part brick and part mud, 4 mills, boilers and still vats, 100 bullocks, and feeding one year ... ..	.....	1,854 0 0
Fixed servants per annum	744 0 0	} 504 0 0
Extra servants for 5 months	165 0 0	
" 4 months ... ..	.....	312 0 0
Cost of crop	6,450 0 0	6,400 0 0
Firewood, oil and chunam ... ..	.....	80 0 0
Charges for exportation— Casks and Carriages to Madras ...	2,075 0 0	
Casks for rum, gunny for sugar and carriage to Madras ... ..	.....	1,103 20 0
	11,896 0 0	10,253 20 0
Interest of money laid out in India ...	1,467 0 0	1,230 0 0
	13,363 0 0	11,483 20 0
<i>Deduct</i> —Value of quick and dead stock 2,462 0 0		
From which take wear and tear of utensils, and casualties 300 0 0	2,162 0 0	
Less ... 371 0 0 1,854 0 0		
Feeding cattle. 200 0 0 571 0 0		1,283 0 0
Total cost of the sugar and rum on Madras beach	11,201 0 0	10,200 20 0
<i>Deduct</i> —Value of the 75 pipes of rum after paying commission and for wastage as well, nett 20 pagodas per pipe	1,500 0 0	1,500 0 0
	9,701 0 0	8,700 20 0
	For 180 tons is nearly 57 pagodas per ton.	For 120 tons is 72½ pagodas. per ton.

Sugar in Bengal cannot be procured of good quality for exportation under 9 rupees per maund, which with the bags brings it to full 78 pagodas per ton.

LXIII

Letter—from WILLIAM DRING, Esq.

To—Lieut.-Col. READ.

Dated—Fort St. George, the 8th April 1797.

Since writing you on the sugar business, I find the Company are buying Batavia sugar at 22 pagodas per candy of 500 lbs., which is, for 4½ candy or 2,250 lbs., 99 pagodas; a ton is 2,240 lbs.; so that they buy it at near 99 pagodas per ton.

If your sugar is of good quality, it will be of such advantage to Government to encourage the manufacture of it as it will enable them to load many ships at Madras by having dead weight to put into them, and thereby prevent a heavy expense incurred every year for demurrage; and instead of paying £22 to £28 per ton ship loaden will grasp at contracts for £15, and the piece-goods which are stowed over the sugars will get to market 5 or 8 months sooner than they now do.

Carriage of
sugar to
Madras.

Although the Company do not make a practice of insuring, yet that charge ought always to be reckoned in making an estimate; with this idea I suppose the sugar Mr. Lyte makes, is insured to Madras, for there is certainly a risk of water carriage to Porto Novo by the chance of boats leaking and getting aground on the shoals and by running against the stumps of trees, and there is risk in the sea surf from Porto Novo. Taking everything into consideration, I believe, the risk by river and sea, the charges of transshipping, and the boat hire landing, not to number the speculation and waste, is full 5 per cent.; thus on the cost of 120 tons of sugar, Pagodas 8,700,

	P.	F.	C.
is	...	...	...
Mr. Lyte supposes the carriage is	...	...	...
	435	0	0
	600	0	0
	1,035	0	0

I find a cart will carry 8 bags of Bengal rice or 16 maunds which at 84 lbs. is 1,344 lbs: 10 carts will at that rate carry exactly 6 tons; the question now is whether it will be better to employ carts to bring down the sugar to a certainty, or risk the water carriage; the latter with the insurance, for 120 tons, costs 1,035 pagodas; by allowing 10 carts to 6 tons, 200 carts will bring 120 tons. The cart-hire from Madras to Tiruppattâr is 5 pagodas, so that 200 carts are 1,000 pagodas; but I suppose carriages might be contrived that would carry more and that the 100 bullocks employed in the manufactory could be sent down with the produce, or if the 1,000 pagodas to be paid us here be sent in carts and bullocks, or suppose another 1,000 to be added, it would clear itself by the back carriage of casks, hoops, gunnies, etc., etc. In short, should it cost more than 5 pagodas per cart to Madras, probably there are parts of the coast much nearer and the ships might be loaded as well at Porto Novo, Cuddalore or Pondicherry, if these ports are nearer, and so would save the expense of sending down the southern cloths to Madras. A vast field is open if this sugar business takes place; and I think more may be made out of Mr. Lyte's canes than he estimates.

Packages for
sugar.

The best package for sugar is mats and bags,—such mats as we used to lay on in Bangalore, made into the shape of a bag and a gunny bag put over it; the mat being close keeps the sugar from going through and the bag bears the weight. Bags cost in Bengal from 5 to 6 rupees per 100; with all expense to Madras this will come to about one fanam each, and suppose the mat costs another, it is a very cheap package.

Some of the fine sugars in Bengal have a coarse cloth bag within the gunny and some, though very little, is put in boxes.

By way of ascertaining the cost of carts, I will write to Calcutta to know what the wheels will stand, with an iron axle and pole with the yoke round, the cost, and the expense of a palmyra frame over it would be a trifle, here they talk of a cart being worth 15 to 17 pagodas and our man says the country carts will not in general carry 8 bags to such a distance as Tiruppattâr.

Price of
sugar.

The selling price of sugar is now 29 to 30 pagodas per candy, the common price is 16 to 18; but that was at a time when vast quantities were brought into the market from Batavia, and these prices were barely a saving to the importers.

Suppose the Company gives 100 pagodas per ton—

	£
Shipping is	40
Freight	15
Wastage 2, charges 10 per cent., say	5
	60
	—

without insurance. This proves they would not levy at that rate if it did not answer. It sells at 60 to 70 shillings per cwt., the purchaser pays duty, and it will continue at that rate for a long time.

When your sugar comes, I will get it compared with the other sorts—a good strong grain has the preference to very white sugar.

Manufacture
of rum: at
Tiruppattūr.

I see no reason why the rum after being kept a year or two should not be as good and as wholesome for the troops as Columbo arrack, which sells at 30 to 35 pagodas per leager of 150 gallons. Your rum is estimated 20 pagodas for 110.

The people in Bengal keep their rum in large vats, made on purpose, as there is little loss by evaporation, and it gets mellow sooner, is all of the same quality and easier brought to one standard proof. It would be easy to ascertain the loss of such a vat and if you made large quantities the saving would be great. You may in time make sufficient to supply the Coast and the Navy.

Bengal rum.

On the whole much depends on the strength of the sugar. If it is equal to the Ganjâm, Midnapore or to the Benâres, it will answer at a higher price even than Mr. Lyte's; but will be losing every year as the West India sugar is again brought to sale.

I shall send off part of the stationery on Monday morning. I have waited to get large paper which is very scarce.

Since writing the above I find Mr. Cochrane gets rum from Bengal at eleven annas per gallon with casks. This with freight and charges comes to 40 pagodas for 150 gallons so that 20 for 110 gallons is too low, for yours, if equally good, is worth at that rate near 30. The price of Columbo arrack is seldom under 32, and the arrack farmer uses much of it; if you will send down two or three musters of different qualities, I will let you know if any contract could be entered into for a quantity.

Price of rum.

I also find that the Manilla sugar is packed in mat bags. After the sugar is properly boiled, they pour it into moulds like our sugar loaves; when dry, they take it out and put soft mud out of the river over the large end; in a few days this is taken off, and the sugar cut off so far as it continues dry and white. When the molasses appear, fresh mud is put over. This cutting is dried in the sun till it looks like dry sand, when it is put into a *double* mat and beat down until it is quite hard. The bags are quite oblong, hold 150 to 180 lbs., and are reckoned the best packages that can be had for sugar. This sugar is so dry that it comes out without soiling the mat. The usual price at Manilla is 4 dollars or 2½ pagodas for 140 lbs.

Manilla
sugar.

LXIV

Letter—from R. HAMILTON, Esq., Assistant Collector and Superintendent of Plantations.

To—Lieut.-Col. READ, Superintendent, etc.

Dated—Tiruppattūr, the 13th April 1797.

I have the pleasure to enclose an account of the articles that are at this time packed and ready to be sent to Madras. There remains about an equal quantity of sugar here, which is not sufficiently dry for packing, and as we intend to make several experiments on the different processes of sugar, it may be necessary to postpone packing more for some time.

Account of
the articles
sent to
Madras.

Should you write to the Board of Revenue on this subject permit me to remind you that the quantity of silk made here is more as a sample of the quality, than an attempt to reimburse any of the expense of the mulberry plantations, as for five months past we have fed only as many silkworms as would preserve the breed, and satisfy us that the climate here was favourable to them, in order that, few leaves being picked from the young mulberry plants, they may acquire strength and maturity before we begin seriously to feed a quantity of worms for the produce.

Silk.

ENCLOSURE.

Account of the articles packed and ready to be sent to the Presidency.

(i) Silk marked No. 1.

Dispatch
of sugar, silk
and cochineal
to Madras.

Quality.	Number of hanks.	Quantity.		Quantity.		
		VISS.	POLS.	LBS.	OZ.	CWTS.
White Silk	338	7	21	23	6	0
Yellow Silk	116	2	12	7	1	10
	504	9	33	30	7	10

(ii) Cochineal marked No. 2.

Cochineal manufactured and purchased	Quantity.		
	CWTS.	QBS.	LBS.
	1	2	20

(iii) Sugar marked from No. 3 to No. 34.

Quality.	Number of gunnies.	Contents of each gunny.		Total of each.
		LBS.	OZ.		MAUNDS.
Sugar once clayed marked C.S.	22	112	0	119½
Muscovado sugar marked M.S.	10	112	0	54½
	32	...	...	174½

LXV

Letter—from Lieut.-Col. A. READ, Superintendent and Collector of Bâramahal.

To—EDWARD SAUNDERS, Esq., President, Board of Revenue, Fort St. George.

Dated—Tiruppattûr, the 20th April 1797.

I herewith enclose a letter addressed to me by Mr. Hamilton, my assistant, who has charge of the plantations at Tiruppattûr, and an account of silk, cochineal and sugar on the road to the Presidency, which will be delivered to your Secretary. These will serve as samples of our manufactures here, which I am hopeful will prove a source of wealth to these districts, and on which I shall shortly report to your Board, giving every desirable information on their subject.

LXVI

Letter—from Mr. D. FOULIS.

To—Lieut.-Col. READ, Superintendent, Bâramahal.

Dated—Arcot, the 25th April 1797.

Estimates of
sugar and
rum manufac-
ture.

According to your desire on my leaving the Bâramahal, I have attentively considered upon the means of advancing the manufacturing of sugar and rum; and herewith I have the pleasure of transmitting an estimate of the necessary expenses that will attend carrying into effect the plans I have submitted to you; and with them the profits that will accrue to Government, should they think proper to encourage the undertaking. I have also shown the losses that will accrue in shipping the produce to England as long as the high freight and duties continue

on East India sugar. The time taken up in making these calculations could not have been less, as the information necessary for my guidance has been drawn from several persons, whose knowledge in this branch of business can be depended upon.

Estimates of buildings, utensils, etc., for the manufacture of sugar and rum.

Estimate No. 1 shows the buildings, utensils, etc., required in manufacturing 200 hogsheads of sugar and 75 puncheons of rum with their prices.

Estimate No. 2 shows the annual expense in manufacturing 200 hogsheads of sugar and 75 puncheons of rum, and sending it to Madras.

Estimate No. 3 shows the profits arising from the above produce at Madras.

Estimate No. 4 shows the annual expense in manufacturing the above, and sending it to England.

Estimate No. 5 is the supposed sale in England with the loss sustained in shipping it.

What advantages will arise to Government from a liberal encouragement given to a sugar manufactory upon the banks of the Cauvery, I must leave to one so well acquainted with the produce and the revenues of the country to point out; and it will hardly escape your observation that while the sugar plantations give employment to many more inhabitants, it would, by enhancing the price of rice, make the latter a more saleable commodity.

The pains I have taken I trust will secure me your recommendation should Government be pleased to adopt the method of improving the revenues under your control which is here submitted to their inspection, and in this event I can have no reason to fear that allowances will not be granted to me equal to my industry and future perseverance; and whatever you think fit to ask of Government to bestow, I shall be contented to receive. With esteem, etc.

ENCLOSURE No. 1.

Estimate of buildings and utensils, etc., required for making 200 hogsheads of sugar, each hogshead 16 cwt.; and 75 puncheons of rum, each puncheon 110 gallons.

	PAGS	F.	C.	PAGS	F.	C.
A boiling-house 40 feet by 20; curing house and distillery in one range, 70 feet by 20 with beams for floor, doors, windows etc.	915	27	0			
Three sugar mills for extracting the cane juice at 60 pagodas per mill	180	0	0			
One iron kettle of 80 gallons for boiling the juice	20	0	0			
One " 150 " " "	30	0	0			
One " 200 " " "	45	0	0			
One " 300 " " "	60	0	0			
One " 500 " " "	80	0	0			
				235	0	0
Four copper skimmers for cleaning the cane juice while boiling	10	0	0			
Four copper ladles for carrying the cane juice from one copper to another	10	0	0			
Two wooden coolers for receiving the cane juice when sufficiently boiled	40	0	0			
				60	0	0
One wooden receiver of 500 gallons for receiving the raw cane juice from the mill				20	0	0
One copper still of 300 gallons with worms	500	0	0			
One copper still of 150 gallons with worms	250	0	0			
Two chunam tanks for the still worms	50	0	0			
Twenty-four fermenting vats of 300 gallons each	144	0	0			
Twelve wooden cans of 5 gallons each	12	0	0			
				956	0	0
Seventy-five head of cattle at 4 pagodas each	300	0	0			
Ten small basket boats for carrying canes to the mills at 12 pagodas each	120	0	0			
Six large boats that will carry each 12 hogsheads down the Cauvery at 70 pagodas each	420	0	0			
Sundries	100	0	0			
				3,306	27	0
Original price of live and dead stock						

N.B.—If sugar mills were commissioned from England two well constructed ones would take off yearly 300 hogsheads of sugar, and would require fewer cattle, and people to work them.

ENCLOSURE No. 2.

Annual expense in manufacturing 200 hogsheads of sugar, and seventy-five puncheons of rum in the Paramati District, and sending it to Madras.

Expenses of manufacture of sugar and rum and of sending them to Madras.

		PAGS.	F.	C.	PAGS.	F.	C.
<i>Yearly servants.</i>							
Two head boilers at 3 pagodas each per month	...	6	0	0			
One head distiller per month	...	3	0	0			
One carpenter per month	...	3	0	0			
Two coopers at 4 pagodas per month	...	8	0	0			
One English writer per month	...	12	0	0			
One Malabar writer per month	...	3	0	0			
Twelve bullockmen at 1½ pagodas each per month	...	15	0	0			
One blacksmith and bellows boy per month	...	4	0	0			
					648	0	0
Star pagodas per month	...	54	0	0			
<i>Servants during the crop season for the six months.</i>							
Thirty-six men for feeding and supplying 3 mills with cane at 1½ pagodas each per month	...	45	0	0			
Six men for cleaning 5 coppers in the boiling house at 1½ pagodas each per month	...	7	22	40			
Three men for one set of coppers and a clarifier at 1½ pagodas each per month	...	3	36	0			
One headman for 3 mills	...	3	0	0			
Two men for distillery at 1½ pagodas each per month	...	2	22	40			
					370	22	40
Star pagodas per month	...	61	36	0			
One hundred and twenty coolies for 4 months while the Cauvery is full in attending six boats to Devikottai allowing 20 men to each boat and 1½ pagodas each per month	...		720	0	0		
Ingredients for granulating and cleaning the sugar	...		30	0	0		
Wood and charcoal for distillery	...		40	0	0		
Two hundred empty sugar hogsheads at 3 pagodas each	...		600	0	0		
Seventy-five empty puncheons at 5 pagodas each	...		375	0	0		
Casualties amongst the bullocks at ½ yearly	...		60	0	0		
Buildings and repairs yearly	...		200	0	0		
7,040,000 canes which will make 200 hogsheads of sugar, each hogshead 16 cwt. and 75 puncheons of rum, each puncheon 11½ galls. at ½ of a pagoda per thousand	...		5,280	0	0		
Interest on 3,306-27-0 at 12 per cent. per annum being the original price of live and dead stock	...		396	36	0		
Freight of 200 hogsheads of sugar from Devikottai to Madras at 4 pagodas per ton (160 tons)	...		640	0	0		
Freight of 75 puncheons of rum from Devikottai to Madras at 3 pagodas per puncheon	...		225	0	0		
Wastage in shipping it to Madras at 1 per cent.	...		180	0	0		
					9,765	13	40

ENCLOSURE No. 3.

Estimate and profit of 200 hogsheads, or 3,200 cwt., of sugar, and 75 puncheons, or 8,250 gallons of rum manufactured in the Paramati District and sold at Madras.

Sale of sugar and rum and profit thereby.

		PAGS.	F.	C.	PAGS.	F.	C.
Annual expense in manufacturing 3,200 cwt. of sugar, and 8,250 gallons of rum and sending it to Madras from the Paramati District	...	9,765	13	40			
Total expense in manufacturing and sending to Madras	...	9,765	13	40			
Sale of 3,200 cwt. of sugar at Madras at 15 pags. per 500 pounds	...	10,752	0	0			
Sale of 8,250 gallons of rum at Madras at 11 sicca annas per gallon	...	1,553	36	0			
Drawback on 75 empty puncheons at 5 pags. each	...	375	0	0			
Drawback on 200 empty hogsheads at 3 pags. each	...	600	0	0			
Total sales, star pagodas	...	13,280	36	0			
Expense in manufacturing, etc.	...	9,765	13	40			
Profit on the sale at Madras	...	3,515	22	40			

ENCLOSURE No. 4.

Annual expense in manufacturing 200 hogsheads or 3,200 cwt. of sugar and 75 puncheons, or 8,250 gallons, of rum in the Paramati District and shipping it to England.

	PAGS.	P.	C.
Expense in manufacturing and moving to Madras	9,585	13	40
Wastage in shipping it to England at 3 per cent. and Commission on the sales at 2 per cent.	980	0	0
Freight to England, 160 tons. of sugar at £22-5-0 including kintleage	9,000	0	0
Freight of 75 puncheons of rum to England at £12-0-0 per puncheon	2,250	0	0
Customs at £ 57-16-9 per cent. on sale prices	6,432	23	40
Charges of merchandise at 3 per cent.	660	0	0
Total amount, Star Pagodas	28,907	37	0

Expenses of manufacture and of shipping to England.

ENCLOSURE No. 5.

Sale of 200 Hogsheads of sugar, 175 Puncheons of rum, at England as shipped from the Paramati District.

	PAGS.	P.	C.		PAGS.	P.	C.
Manufacturing 200 hogsheads of sugar in the Paramati District and 75 puncheons of rum and shipping it to England with Interest, etc.	28,907	37	0	Sale of 200 hogsheads of sugar or 3,200 cwt. in England at 45s. per cwt.	18,000	0	0
Amount of sales	22,975	0	0	Sale of 75 puncheons of rum or 8,250 gallons in England at 4s. per gallon £ 1,600	4,000	0	0
Loss on shipping the above to England	5,932	37	0	Drawback on 200 empty sugar hogsheads at 3 pags. per hogshead	600	0	0
				Drawback on 75 empty puncheons at 5 pags. per puncheon	375	0	0
				Amount of sales, star pags.	22,975	0	0

Sales in England and the loss thereby.

Exchange, 8 shillings per star pagoda.

LXVII

Letter—from S. B. LUSHINGTON, Esq., Secretary, Board of Revenue.
 To—Lieut.-Col. A. READ, Collector of the Bâramahal.
 Dated—Fort St. George, the 5th May 1797.

Received from Colonel Read, Collector of the Bâramahal, the undermentioned articles, viz.:—

388 skeins of white silk weighing nett	...	...	...	...	LBS.	23 $\frac{5}{8}$
116 do. yellow do.	...	...	...	...		7 $\frac{5}{8}$
						<u>31$\frac{4}{8}$</u>
Cochineal, 1st sort	...	...	...	...	150 $\frac{1}{4}$	} 187
Do. 2nd sort	...	...	...	...	35 $\frac{3}{4}$	
Do. dust	...	...	...	...	1	
32 bags of sugar weighing nett	...	...	...	...	...	3,547

Receipt of sugar, cochineal and silk at Madras.

LXVIII

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Lieut.-Col. A. READ, Superintendent and Collector.

Dated—Paramati, the 11th May 1797.

Culture of
two sorts
of cotton in
the Southern
Division.

The difficulty which occurred in reconciling the reports of the Tahsildars regarding cotton and thread has till now delayed my replying to your letter accompanied by a copy of the Board's letter to you on that subject of the 26th June last.

I have the pleasure to send you a statement of the estimated quantities of cotton, thread and cloth produced, manufactured, exported and imported, which relate to the districts of the Southern Division. It is made out partly from the information of the Tahsildars, Custom farmers, etc.

There are two sorts of cotton in these districts—Nâdanparutti and Uppam-parutti. The nâdan cotton grows on a branchy shrub from three to five feet high, which begins to produce in from eight to twelve months after being sown, and yields for two and three years according to the nature of the soil, and the time of being sown. It thrives best in a high, dry, stony, or red soil. If it be sown in May, June or July, it will produce in February and March following; but if it be not sown till August, September or October, it will not produce till after the May rains, and its largest crop will be after the second monsoon. In the Sêndamangalam, Nâmakkal and Paramati Districts the shrub produces for three years; but in Râsipuram, Chennagiri, Salem, Belûr, Atur and Viraganûr, the farmers seldom allow the shrub to remain after the second year, not deeming it an object, on account of the smallness of the third year's crop, to let it remain in the ground any longer. The nâdan cotton is always sown with other productions; when sown in May, June, July or August it is sown with râgi, bâjra, kodrû, etc., if in September or October, it is commonly sown with gram. The reason of its not being sown alone is the great length of time before the farmer would get a return for his labour—from eight to twelve months—at the same time that he must pay annual rents for all the lands he may occupy. Besides it is reckoned a great speculation in farming to sow cotton alone, because too much or too little rain is unfavourable for cotton, on which account a season may be favourable for cotton, but unfavourable for other productions, and *vice versa*. By sowing both the farmer has a chance of getting a moderate crop of each, and almost a certainty of getting a good crop of either one or the other. Ground intended for cotton should be ploughed from four to seven times before it is sown, and afterwards every five or six months, while the shrub is allowed to be in the ground.

	1st year. TULÂMS. *	2nd year. TULÂMS.	3rd year. TULÂMS.
An acre of cotton, supposing it sown with some other production, will yield, if sown in May or June ...	7 to 12	3½ to 6	2½ to 4.
If sown in July or August ...	3½ to 6	7 to 12	2½ to 4.
If sown in September or October ...	2½ to 4	7 to 12	3½ to 6.

It is supposed that the produce would be 70 or 80 per cent. greater if the plant be cultivated separately from other productions.

The uppam cotton grows on a delicate shrub from two to three feet high; it produces in four or five months after being put in the ground, which should be a black clayey soil. The plant is annual and continues to bear from sixty to ninety days. It is sometimes cultivated alone, but more commonly with various sorts of grain, for the reasons assigned with respect to the triennial cotton. It may be sown at any period between the middle of June and the middle of September; but July is reckoned to be the most favourable season for it.

	TULÂMS.
An acre if sown along with grain is said to produce from ...	40 to 60
If sown alone ...	70 to 140

* The talâm is about 15½ lbs. The seeds are about ¼ of the whole weight, and are included in this calculation.

Those of the Reddi caste, who are the best farmers in these districts, are the only people who sometimes cultivate the annual cotton without mixing it with grain.

Culture of cotton and manufacture of cloth in the Southern Division.

The nâdan cotton is reckoned to be the strongest, and best adapted to the manufacture of coarse cloth, such as that made for the investment. The fibres of the uppam cotton are said to be softer and finer, and therefore better suited to the manufacture of fine cloth. Its thread, when used for coarse cloth, will answer for the woof, but not for the warp.

From the enquiries I have made respecting cotton, I am led to believe that the culture of this article has been considerably extended in these districts since they have been ceded to our Government and that the price has risen from 50 to 75 per cent. above what it had been before the breaking out of the last war with Tippoo Sultan, in consequence of the great demand for the investment, and on account of the private trade to the Coast being open, which it had not before been since the year 1780.

In 1792 and 1793, when the investment was first established, almost all the cotton used for it was imported, because the quantity then cultivated was proportionate to the district consumption only. Now the quantity reared continues yearly to increase with the demand; but the demand must precede that quantity at least a year and in two or three years most probably the quantity produced in these districts will be equal to, if it does not exceed, that which may be manufactured.

Statement of
cotton,
thread and
cloth pro-
duced, manu-
factured, and
exported and
imported in
the Southern
Division.

ENCLOSURE.

108

1	Prices of cotton with the seed			Thread from cotton the produce of the Company's districts.							
	In the month of March per tulâm.*	In September per tulâm	Average.	Quantity of thread.	Coarse thread.		Fine thread.		Proportions.		Value of the thread.
					Price in March.	Price in September.	Price in March.	Price in September.	Coarse thread.	Fine thread.	
2	3	4	5	6	7	8	9	10	11	12	
	P. F. C.	P. F. C.	P. F. C.	TULÂMS.	P. F. C.	P. F. C.	P. F. C.	P. F. C.			P. F. C.
Salem	0 8 38	0 13 46	0 11 2	9,470	1 22 68	2 5 0	4 23 45	6 1 34	13/16	3/16	23,293 17 59
Chennagiri	0 6 63	0 6 63	0 6 63	6,000	1 16 6	1 16 6	1 22 68	1 22 68	15/16	1/16	8,203 23 74
Bêlur	0 8 38	0 12 0	0 10 19	3,500	1 27 75	1 29 51	1 36 34	1 43 17	15/16	1/16	5,112 35 32
Atur	0 8 38	0 10 14	0 9 26	3,000	1 29 51	1 36 34	1 29 51	1 36 34	14/16	2/16	5,350 18 60
Viraganûr... ..	0 11 0	0 12 0	0 11 40	2,500	1 22 68	1 29 51	1 43 17	2 11 63	15/16	1/16	4,431 15 28
Sêdamangalam	0 5 7	0 6 63	0 5 75	5,000	1 22 68	1 36 34	2 32 11	3 0 57	15/16	1/16	8,670 1 69
Hâsipuram	0 6 63	0 9 26	0 8 4	3,500	1 19 37	1 29 51	2 11 63	2 25 28	14/16	2/16	5,758 42 59
Nâmakkal	0 6 63	0 8 38	0 7 50	7,500	1 9 23	1 22 68	1 22 68	1 36 24	15/16	1/16	10,314 2 74
Paramati	0 5 7	0 6 63	0 5 75	5,000	1 16 6	1 22 68	3 41 34	4 23 45	15/16	1/16	8,030 42 15
Total	0 7 46	0 9 43	0 8 39	45,700	1 20 62	1 30 31	2 19 25	2 37 33			79,195 20 70

* The tulâm is 15½ lbs. and ½ only of the weight is equal to that of the wool after the seeds, etc., are removed.

THE BARAMHAL RECORDS.

ENCLOSURE—cont.

	Raw cotton imported							Thread imported				Total cash paid for imports.
	From Tippoo's country.	From the Nawáb's country	Total.	Prime cost.	Quantity of thread made from imported cotton.	Value.	Difference on the hire of spinning.	From Tippoo's country.	From the Nawáb's country.	Total.	Price.	
	13	14	15	16	17	18	19	20	21	22	23		24
	TULÁMS.	TULÁMS.		P. F. C.	TULÁMS.	P. F. C.	P. F. C.	TULÁMS.			P. F. C.	P. F. C.
Balem ... ..	...	...	...	...	...	...	...	...	...	...	...	...
Chennagiri ... ..	...	...	...	...	...	...	...	2,000	...	2,000	2,733 11 70	2,733 11 70
Béjúr ... ..	...	...	...	...	...	...	...	...	...	...	...	...
Atur ... ..	...	...	...	...	...	...	...	...	1,200	1,200	2,150 7 40	2,150 7 40
Viraganúr... ..	...	...	...	...	...	...	...	...	...	...	...	...
Séndamangalam ... ..	...	2,500	2,500	337 28 60	500	877 0 19	539 16 39	...	...	...	...	337 28 60
Rásipuram ... ..	...	8,000	8,000	1,431 5 0	1,800	2,646 12 40	1,215 7 40	450	350	800	1,323 6 20	2,754 11 20
Námskkal	8,000	10,000	18,000	3,050 0 0	3,000	4,952 39 30	1,902 39 30	6,000	2,000	8,000	11,006 17 40	14,056 17 40
Paramati	8,201	...	8,201	1,082 3 35	1,640	2,635 9 66	1,553 6 31	7,258	...	7,258	11,662 4 33	12,744 7 68
Total ..	16,201	20,500	36,701	5,900 37 15	7,340	11,101 16 75	5,210 24 60	15,708	3,650	19,258	28,875 2 43	34,775 39 53

PRODUCTS—COTTON.

Statement of cotton, thread and cloth produced, manufactured, exported, and imported in the Southern Division.

Statement of cotton thread and cloth produced, manufactured, exported and imported in the Southern Division.

ENCLOSURE—cont.

	Exports, etc., consumption.									Remarks.
	Thread exported to the Coast.	Value of thread exported.	Value of remaining thread.	Prime cost of cloth manufactured for the investment.	Prime cost of cloth exported by private trade.	Total prime cost of exports, thread investment and private trade.	Exports exceeding the imports.	Supposed value of district consumption.		
	25	26	27	28	29	30	31	32	33		34
		TOLÁMS.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	
Salem	Illegible.	7,056	12,480 0 0	1,08,891 40 28	80,000 0 0	60,000 0 0	1,52,480 0 0	1,17,704 5 22	38,593 21 21	The value or price of the thread is calculated upon the averages of coarse and fine thread and on the proportions of each which are supposed to be used in each district. The following proportions of the No. 9 will convey an idea of the relative prices of cotton-spinning and weaving bear to each other:— 2. Price of cotton with the seed. 3 $\frac{1}{8}$ Hire of spinning. 3 $\frac{2}{8}$ Hire of weaving.
Chennagiri										
Béjar										
Atur										
Vilgandúr										
Séndamangalam										
Básipuram										
Námakkal										
Paranati										
Total										

THE BARAMHAL RECORDS.

Some of the thread used in Salem and Chennagiri is brought from Ómalúr and Sankaridrug districts.

LXIX

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Lieut.-Col. A. READ, Superintendent.

Dated—Kāttuputtūr, the 29th May 1797.

I have the pleasure to forward herewith the accounts of the Southern Division for April 1797. I have not made out the monthly or annual general abstracts or the Tahsildars' account current and general comparison, as I am in expectation of getting permission to strike out the balances due for fasli 1205.

Accounts of sugarcane plantations in the Southern Division.

In the charges 'extraordinary' you will observe a premium distributed in the Nāmakkal and Paramati Districts for planting sugarcanes amounting to about 150 pagodas. My motive for holding out this encouragement for extending the culture of sugar was approved of by you in your answer to my letter of the 30th January last, and I am pretty confident it will have the desired effect of introducing it along the banks of the Cauvery, where the farmers have always found a difficulty in disposing of their paddy (the only production they have been in the habit of rearing in their wet lands) because there is no consumption for a great part of it at hand, and it is too bulky a commodity to afford exportation. Sugar is one of the most valuable articles of farming; and will always find its way to a market. As it is only experience that can convince the Natives of the advantages that might accrue from any change in their modes of farming, it is necessary the Government should occasionally contribute towards improvements, and the removal of habits for which better may be substituted; and I cannot suppose that, notwithstanding the usual official restrictions, our superiors will disapprove of the disbursements I allude to, if you will explain the motive.

The premium has been at the rate of nearly two pags. per acre, which sum with half its amount as a penalty is to be refunded by such as may not plant sugarcane, in the quantity of land they have agreed upon.

LXX

Letter—from R. HAMILTON, Esq., Assistant Collector.

To—Lieut.-Col. A. READ, Superintendent, etc., Bāramahal and Salem.

Dated—Tiruppattūr, the 30th September 1797.

I have herewith the pleasure to forward the plantation accounts for September, accompanied by an abstract of the expense which closes the accounts for the two years they have been established here. As you may conceive it necessary to address the Board of Revenue on this subject, it may be proper in me to give some account of the plantations since they have been under my charge.

Report on the plantations and manufactures at Tiruppattūr.

2. The lands in these countries being for the most part settled in lease, particularly the best soil around large villages such as Tiruppattūr, we have been under the necessity of cultivating such lands as became vacant, or those that the ryots would freely give up to us, which have been generally such as they themselves derived little benefit from. Consequently our endeavours have been cramped and our productions, requiring the best soil, have not been so abundant or luxuriant as we might otherwise have expected.

3. Twelve acres of land were planted with sugarcane by Mr. Wetherell, which owing to unfavourable seasons and bad soil yielded only 349 maunds of sugar and 415 gallons of rum, both, however, of very good quality.

Sugar and rum manufacture.

4. Mr. Lyte who has had many years' experience in the West Indies and two years on these plantations, being satisfied with the prospect of success, was induced to make an offer in February last of taking these plantations on his own account, which agreeable to your directions, I arranged with him for, last month. He has agreed to purchase all the buildings, stock and utensils of the sugar and rum manufactories, and to deliver a quantity of sugar of the same quality as that sent to the Board in September last at 4 pagodas per cwt., and his rum at 18 fanams

Mr. Hamilton's Report on the plantations and manufactures at Tiruppattûr. Sugar and rum manufacture.

a gallon, should the Board choose to purchase his produce. If it is an object to send sugars to the London market, these terms may be found to be advantageous, being but one half the average price current for East India sugars in England. No. 1 of the accompanying papers is an inventory of the articles delivered over to Mr. Lyte, with the prices affixed to them, amounting to pags. 863-25-66, for the payment of which he has given a Bond, No. 2, payable in three instalments.

5. The buildings and most of the utensils having been used in manufacturing the last crop of canes and the proportionate quantity of rum, 12 per cent. of their estimated value in December has been deducted, and it may be proper to mention that nearly all the buildings charged in the first nine months' accounts were blown down in the monsoon of that year, so generally destructive throughout the Carnâtic. This swells their amount in the abstract considerably more than what Mr. Lyte is now charged for them.

6. By giving over this manufacture (which has been with much trouble introduced here) to Mr. Lyte, its general adoption throughout the country will more immediately follow, than were it carried on by the Sarkâr, as farmers naturally look to individual success and example in undertakings which they are not acquainted with. As a proof of this, there is hardly a substantial farmer near Tiruppattûr, who has not since the plantations have been delivered over, taken a field for the purpose of rearing the sugarcane.

7. Mr. Lyte has distributed some money as takâvî among the ryots to supply him with canes, and has planted some guntas himself; but as he has no capital of his own, he requires to be supplied with cash for his disbursements this year, which, should the sum he wants be authorized and his offer of sugar accepted, might be repaid by the produce, or the money being advanced as takâvî might be paid with the 5 per cent. interest at the time of the sale of his produce at Madras. On this subject I have referred Mr. Lyte to yourself.

The difficulty of superintending a culture and manufacture of this kind, which requires so much attention, not being in the power of any person however anxious for its success who has other objects to attend to, rendered the disposal of these plantations to be wished, particularly as the great end in establishing them is obtained, viz., the introduction of a valuable culture and manufacture, which must in time be considerably productive of revenue.

Mulberry plantations.

8. There are now fifty-four acres of land planted with mulberry; and when it is considered that we have been obliged to send to the Company's plantations at Vellout and Doctor Anderson's gardens at Madras for nearly all the cuttings, I trust you will be satisfied that attention has been paid to economy.

9. The mulberry requires a good soil and a considerable quantity of water, but the ground we have been under the necessity of occupying is generally indifferent; we have been obliged to dig 13 tanks or wells and still find difficulty in the dry weather to water the plants sufficiently. I directed Muhammad Arif last month to increase the number of worms, as there appeared abundance of leaves, and the plants of a sufficient growth to allow of their being taken from them without injury. I have pleasure in informing you that the silk produced exceeded 11 lbs., which of course may be increased as the plantations approach maturity; but, the principal object in establishing plantations at Tiruppattûr being to induce the inhabitants to engage in cultivating valuable productions, it may appear more advisable to keep the mulberry plantations as nurseries to supply the inhabitants with cuttings; and in this idea I have made out an Ishtiâr-nâma (No. 3 of the enclosures) which, if it meets your approbation, might be published through the Tiruppattûr District. The option is therein given to the ryots to sell the mulberry leaves at the manufactory at fixed rates; choosing to feed the worms themselves, they may be supplied with eggs and we will purchase the cocoons, or not choosing to sell the cocoons, that we will reel off the silk for them deducting one-fifth for the trouble. I purposely made the terms as favourable as I could for the ryots, that the cultivation of the mulberry

may be the more general and effectual, so that in a year or two the possibility of establishing silk manufactories with advantage may be clearly shown.

Mr. Hamilton's report on the plantations and manufactures at Tiruppattūr.

10. Having yourself investigated the qualities of the Mauritius cotton it requires no observation from me. A part of the field that we have at present occupied with it, I intend for mulberry as soon as the season will admit, and the remainder I purpose to keep in order to try whether it will improve in quality by another year's growth.

Mauritius cotton.

11. One tār of land was sowed with indigo in December last; but, the season proving unfavourable, it yielded only $4\frac{1}{2}$ maunds. We were unfortunate in the vats built by Mr. Wetherell bursting the first time they were filled with water, which obliged us to follow the country method of manufacture. As indigo bears so low a price at this time, I have declined occupying any land with it, but, should it appear advisable to you, we may still rear some, or give cowle to farmers to supply us, the season for sowing it not being until November; a small set of vats are now finished, which, having been built with care, I think may be depended upon, if the introduction of a better mode of manufacturing indigo is an object.

Indigo culture.

12. We have planted nearly 100 acres of land with the opuntia; but the cochineal insect has spread so generally throughout the Tiruppattūr, Vāniyambādi and Krishnagiri Districts, and I believe partially through both the Northern and Central Divisions, that, notwithstanding every care, it may not be possible to preserve our plantations; the insect has appeared in several of them, which made it necessary to plant hedges to preserve the others, and to employ a conicopoly with 15 or 20 of the felons daily to take up every plant by the root on which the insect appeared and immediately burn it. The opuntia thrives very well here, and if we can preserve it from the insect until January, the produce will be considerable.

Opuntia plantations.

13. Conceiving that you require every information relative to the plantations, I enclose an account of all the lands we have under cultivation, No. 4; an inventory of the stock, buildings, etc., at present on the plantations with their estimated value, No. 5; a form of the daily register kept of the employment of the felons, No. 6; and estimates of the probable expense of the plantations for 1797/8: A is an estimate of each plantation, B* of the servants for each, and C* the estimate of the general charges comprehending the expense of the felons, their guard and subsistence with an abstract of the whole, showing a decrease in the expense on the preceding year of pagodas 701-30-50.

Lands in cultivation.

14. Before I conclude it may be proper to state that your having desired me to carry the expense of the felons (which is a revenue charge) against the plantations, causes a great addition to the balance that appears against them, and it is also necessary to give credit for the produce that has been sent to the Board and that which remains here, which being deducted from the total expense will show the real balance that should be entered in the accounts against the plantations.

Expenses.

	PAGS.	F.	C.	PAGS.	F.	C.	PAGS.	F.	C.
Total amount against the plantations from 1st October 1796 to 30th September 1797	.....			.....			6,259	36	54
Articles sent to the Board by Mr. Wetherell, sugar 18 mds. 7 lbs. at 1 pagoda	18	12	6						
Cochineal $68\frac{1}{2}$ at 1 pagoda	68	21	40						
Indigo, 28 mds. 10 lbs. at 7 pagodas	198	34	30	285	24	76			
Articles sent to the Board in June 1797, sugar $174\frac{2}{3}$ at 1 pagoda	174	9	44						
Silk, 1 md. 2 viss at 43 pagodas	53	32	20						
Cochineal, 187 lb. at 1 pagoda	187	0	0	414	41	64			
Prisoners' subsistence, guard and batta (an extra duggāni for particular labour, such as working picottas)—									
Prison granary, etc.	1,852	12	39						
Amount of the articles delivered over to Mr. Lyte	863	25	66						

* Omitted, being indecipherable.

Mr. Hamilton's report
—cont.

	PAGS.	F.	C.	PAGS.	F.	C.	PAGS.	F.	C.
Amount of articles remaining on the plantations	344	33	61						
Estimated amount of produce remaining at Tiruppattūr—									
Sugar, 220 $\frac{1}{4}$ mds. at 1 pagoda ..	220	37	50						
Silk, 92 lbs. at 43 pags. per maund	37	36	14						
Indigo, 4-1 $\frac{1}{2}$ at 5 pags. per maund	21	4	0						
Rum, 415 gallons at 18 fanams ...	173	31	0						
Cochineal, 124 $\frac{1}{2}$ maunds	124	21	40	578	1	24	4,339	11	10
Leaving a balance of pagodas against the plantations							1,920	25	44

The sugar, rum, indigo, and silk can be disposed of here, but I rather suppose the Board will prefer their being sent to Madras if not to a foreign market, that their value in a commercial point of view may be understood.

ENCLOSURE No. 1.

Sugar and rum manuf-
factories.

Inventory of the articles belonging to the Sugar and Rum Manufactories delivered over to Mr. Lyte.

	Articles.	Dimen- sions.		Amount of each.	Total.	Remarks.	
		Length.	Breadth.				
Sugar.	Build- ings.	Old. * 1 Boiling and curing house ...	92	24	PS. F. C. 62 18 3	The several build- ings and utensils that are marked with an asterisk before them have been used in manufacturing one crop of canes and the proportionate quantity of rum and amount to ... From which 12 per cent. is to be de- ducted for wear and tear and casualties ... Remainder ... Add amount of arti- cles from which no percentage is de- ducted ... Gives the total amount due by Mr. Lyte ... and for which he has given a bond pay- able in three instalments.	
		Do. * 1 Overseer's house	27	26	15 4 33		
		Do. * 1 Cook-room to overseer's house.	12	9			
	Mills	Old. * 1 Erected in 1796... ..			88 36 0		77 22 36
		New. * 1 Do. in 1797... ..			38 25 40		
	Utensils.	Old. * 5 Iron boilers			49 0 0		127 18 40
		Do. * 240 Sugar forms			12 0 0		
		Do. * 196 Draining pots			1 42 0		
		Do. * 2 Copper lamps			1 0 0		
		Do. * 1 Do. large ladle			1 21 40		
Do. * 2 Do. large skimmers				3 0 0			
					68 20 40		
Build- ings.	Old. * 1 Still house	27	26	13 15 0	28 19 33		
	Do. * 1 Distiller's house	16	26	15 4 33			
	Do. * 1 Do. cook-room	12	9				
Utensils.	Old. * 25 Fermenting pots			2 21 40	379 5 75		
	Do. * 6 Casks			6 0 0			
	New. 3 Copper stills with complete set in which account is included 3 sets of iron gudgeons. }			306 36 35			
	3 Copper pots			37 12 0			
	5 Brass heads for copper pots			28 22 0			
Sundries.	Weights and measures			10 0 0	13 41 40		
	Old. * 1 Iron crow			0 21 40			
	Do. * 2 Axes			0 12 0			
	Do. * 4 Grass hooks			0 8 0			
	Do. * 1 Grinding stone			2 0 0			
New. Gauging rod			1 0 0				
Cattle.	23 Bullocks at 4 pagodas each as per Mr. Wetherell's accounts.			92 0 30	149 23 10		
	13 Bullocks at pag. 3-2-40			39 32 20			
	14 Buffaloes (valued)			17 33 40			
Plants	{ Red Cane }			45 4 10	50 4 10		
	{ White Cane }						
	Manure			5 0 0			
Land rent.	Paid for Virappah field given over.	Guntas.		5 17 0	6 25 40		
	Paid for Virappah field near the Fort.	Do.		1 8 40			
	Total star pagodas			901 9 4			

ENCLOSURE No. 2.

Copy of Mr. Lyte's Bond, dated 13th July 1797.

Be it known that I, Eyre Walcott Lyte of the Island of Barbadoes in the West Indies and now residing at Tiruppattūr under the Presidency of Fort St. George, am held and firmly bound unto the Hon'ble East India Company in the Penal sum of One Thousand Three Hundred and Thirty-seven Star pagodas, fifteen fanams, and forty-eight cash, current money, to the payment whereof well and truly to be made to the said Company their Executors, Administrators or Assigns, I do hereby bind myself, my heirs, Executors and Administrators firmly by these presents. In witness whereof I have hereunto set my hand and seal this thirteenth day of July in the year of our Lord One Thousand Seven Hundred and Ninety-seven.

Mr. Lyte's bond ament sugarcane plantations.

Penalty, Ps. 1,337-15-48.

Whereas the above bound Eyre Walcott Lyte hath received from the aforesaid Hon'ble East India Company in houses, buildings and various utensils to the full amount of Eight Hundred and Sixty-three Star pagodas, twenty-five fanams and sixty-six cash, which is to run at interest at the rate of twelve per cent. per annum, payable in three years from the date hereof, in three instalments agreeable to the following dates and sums, first instalment to be paid on the 12th day of July 1798 ;—

	PAGS.	F.	C.		PAGS.	F.	C.
The amount of interest at 12 per cent.	103	26	50				
And 33½ per cent. of the amount ...	287	37	22				
<hr/>							
The amount of the first instalment ...	.....			391	18	72	
Second instalment to be paid on the 12th July 1799, interest on the amount at 12 per cent. ...	69	3	48				
And ½ the amount ...	287	37	22				
<hr/>							
Amount of the second instalment ...	.....			346	40	70	
Third instalment to be paid on the 12th July 1800, interest at 12 per cent. ...	34	24	24				
And the amount due ..	287	37	22				
<hr/>							
Amount of the third instalment ...	.....			322	16	46	

Now the condition of this Obligation is such that if the beforebound Eyre Walcott Lyte his heirs, Executors or Assigns shall well and truly pay or cause to be paid into the aforesaid Honourable East India Company their Executors, Administrators or Assigns, the full and just sum of eight hundred and sixty-three pagodas, twenty-five fanams, and sixty-six cash together with such interest as shall or may become due thereupon as before specified, then this Obligation to be void and of no effect, otherwise to continue in full force and virtue.

(Signed) EYRE WALCOTT LYTE.

Signed, sealed and delivered in presence of Robert Hamilton, Assistant Collector.

(Signed) YEGÂMBARAM,
Office writer.

ENCLOSURE No. 3.

Ishtiâr Nâmâ.

To the Potails, Karnams, Ryots and other inhabitants of the District Tiruppattūr setting forth— That a silk manufactory having been established at the Casbah of Tiruppattūr, notice is hereby given, that if any person chuses to cultivate the mulberry tree, upon making application at the plantations at Tiruppattūr he will be supplied with mulberry cuttings gratis and the leaves will be purchased from him at the following rate :—

Notice about silk manufactory at Tiruppattūr.

(1) *Price for mulberry leaves.*—One maund of leaves will feed eight hundred worms ; and eight hundred worms will produce four fanams fifteen cash worth of silk, the expense of the reeling off the silk is one fanam, four cash ; the remainder being three fanams eleven cash, will be the price given for one maund of leaves. Any quantity of leaves will be received and paid for at the above rate.

(2) *Price for the cocoons.*—Any person being desirous of feeding the worms, and selling the cocoons, they will be paid for at the plantations at the following rates :—

Twelve hundred worms will make six fanams, thirty-six cash worth of silk. The expense of the reeling being one fanam, twenty-six cash, the remainder four fanams, thirteen cash, will be paid for twelve hundred cocoons or one fanam for three hundred ; or any number that may be bought at the foregoing rate.

Silk manu-
factory at
Tiruppattûr.

Any person being desirous of selling the silk at any other market than the one held out at the Cusbah and shall bring cocoons to be reeled off, a seer of silk selling for one pagoda in the bazaar, nine fanams will be the price required for reeling it off and the silk will be returned to the owner.

Any person being desirous of disposing of the silk after it is reeled off, the price paid for it at the plantations will be thirty-six fanams for the pagoda's weight.

TIRUPPATTÔR, }
25-9-1797. }(Signed) ROBT. HAMILTON,
Assistant Collector.

ENCLOSURE No. 4.

Account of lands with the several productions with which they are occupied at
Tiruppattûr plantations.

Plantations
at Tiruppatt-
tûr.

		Names of stalls.	Stall.	Gunta.	Acre.	Rent.	Remission.	Required for Gov- ernment.	
Pakkat nilam.	Mulberry.	<i>Punjai or dry.</i>							
		Haider Sâhib	1	837 0	20 15	1-4-30	1-6-0	0-3-30	
		Maetan Miyân	1	455 0	11 6	3-9-30	3-0-28	0-9-2	
		Ilapamarram	1	282 8	7 1	1-24-50	1-20-22	0-4-28	
		Total ...	3	1,574 8	39 6	5-43-30	5-26-50	0-16-60	
	Cotton.	<i>Nanjai or wet.</i>							
		Gounden	1	370 0	9 4	22-9-0	20-36-44	1-17-35	
		Kollavart	1	150 0	3 11	3-11-41	2-37-29	0-19-13	
		Total ...	2	520 0	12 15	25-20-41	23-28-73	1-36-48	
	Nagari nilam.	Nopal.	<i>Punjai or dry.</i>						
Shaikh Mira			1	957 8	23 15	21-28-30	20-12-15	1-15-65	
Settikulam			1	478 13	11 14	9-33-60	9-6-26	0-27-34	
		Total ...	2	1,434 5	35 12	31-16-60	29-19-41	1-42-19	
Mulberry.		Poodoninnit	1	85 2	2 2	0-22-23	0-20-72	0-1-31	
	Nopal.	Anadi Banjar punjai	1	1,681 0	42 3	1-39-23	8-34-2	0-5-21	
Muni kollat punjai		1	884 8	22 1	4-39-75	4-26-15	0-13-60		
	Total ...	2	2,565 11	64 4	6-34-18	6-15-17	0-19-1		
	<i>Abstract.</i>								
	Mulberry	6	2,179 10	54 7	31-41-14	29-31-35	2-9-59		
	Cotton	1	453 14	11 6	9-3-34	8-22-72	0-25-42		
	Nopal	4	4000 00	100 0	38-5-78	35-34-53	2-16-20		
		Grand Total ...	11	6,633 8	165 13	79-5-46	73-44-5	5-6-41	

ENCLOSURE No. 5.

Inventory of Stock upon the Hon'ble Company's Plantations as at Tiruppattūr in the Bāramahal—July 1797.

Plantations at Tiruppattūr.

	Articles.	Dimension.		Amount of each.			Total.			
		Length, feet.	Breadth, feet.	Pags.	Fs.	C.	Pags.	Fs.	C.	
Mulberry.	Buildings.	Filature tiled in the fort	27	26	66	1	37	77	4	76
		Worm-house thatched in the northern garden.	49	18	11	3	39			
	Utensils.	4 Copper pans			12	50	23	...
		5 Silk reels			25	...	...	
		25 Spinning baskets			2	11	40			
		30 Feeding do.			1	11	40			
Indigo.	Buildings.	1 Set containing 3 vats in the Fort	15	13	7	3	60	18	31	15
		1 Set containing 2 vats, } Steeper. on the south of the fort, } viz. } Bester.									13	11	11	27	35
	Utensils.	54 Fermenting pots			5	18	...	8	19	...
		100 Water pots			1	...	...	
		3 Toppies ... ..			...	24	...
		2 Wooden presses			1	22	...			
Cochineal.	Utensils.	1 Brass pot for killing the insects...			1	12	...	1	12	...
	Cattle.	21 Bullocks			81	27	10	113	39	20
		3 Carts, complete			29	12	10			
		1 Spare axle, pair of hoops			3	...	...	
		3 Tank diggers, carts, prime cost...			...	...	...
Sundries for general use.	Farmers' utensils.	64 Mamuties, prime cost			11	9	20	43	30	60
		35 Hand hoes			3	2	20			
		62 Small hoes			1	19	...			
		10 Pick-axes ... ..			...	...	...
		8 Ploughs			1	12	...			
		2 Iron crow			1	...	...	
		15 Choppers			5	37	20			
		15 Iron buckets			15	...	...	
		76 Grass hooks			2	37	...			
		7 Axes or kōdālies			1	...	...	
	2 Country harrows			1	...	...		
	Carpenters' tools.	1 Cross cut saw, 1 hand saw			9	32	10	9	32	10
		1 Plane, 6 files, 6 chisels								
		2 Augurs, 2 claw hammers and 1 plane.								
	Joiners' tools.	2 Planes, 2 small hammers			20	20
		2 Saws, 1 small hatchet								
		1 Spokeshave, 1 pair princers								
		5 small chisels, 1 bevel, 1 square								
		1 Wrench, 3 small gimlets								
		1 Gouge, 2 small mallets								
		1 Saw set, 1 Turkey stone, 1 handle with 5 tools of different sizes.								
	Blacksmiths' tools.	1 Country-made bellows	11	...	20	...	40
		2 Sledge hammers								
		2 Hand hammers								
		4 Pairs of tongs								
		1 Screw plate								
Grand total ...							344	33	61	

ENCLOSURE No. 6.

Daily report of the felons on the plantations at Tiruppattūr for the 1st September 1797.

Plantations at Tiruppattūr

Where employed.	Occupation.	Felons.	Peons.	Carpenters.	Brick-layers.	Blacksmiths.	Watchmen.	Watch Boys.	Men on pay.		Boys on pay.		Mutassaddi.	Doctor.	Duffadar.	Overseer.	Remarks.
									Monthly.	Daily.	Monthly.	Daily.					
Northward Plantation.	Watering and working picottas.	40	5	...	...	...	1	...	...	...	...	...	...	...	...	...	Seven maunds of raw cochineal picked by the thieves.
	Making water course	10	1	...	...	...	...	...	...	...	...	...	...	...	...	...
	Weeding mulberry plantation.	6	1	...	...	...	...	...	...	...	...	...	...	...	...	...
	Making a pandal	2	...	...	...	...	...	...	1	1	...	1	1	1	1	1	Five bandy loads of nopal brought from Vāniyambādi by Colonel Read's bandies.
Southward plantation.	Attending the worm-house.	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	Four hanks of silk reeled off.
	Attending the cattle	25	3	...	...	...	...	1	...	...	...	...	...	...	...	...
	Planting nopal in Haidar's garden	9	2	...	...	...	...	...	...	...	...	...	...	...	...	...
Westward	In Haidar's garden watering mulberry plantation.	32	8	...	...	...	...	...	...	...	...	...	...	...	...	...	Twelve felons and two peons given in charge of Mr. Lyte this day.
	In Haidar's garden weeding mulberry plantation.	...	...	...	...	...	1	1	1	...	...	...	...	...	...	...
In the Fort	Raising mud wall round the granary.	20	2	...	...	...	...	...	...	...	...	...	...	...	...	...
In the new prison.	Attending the filature.	2	1	...	...	...	...	1	...	...	...	...	...	...	...	1	Four ryots confined by order of Colonel Read on suspicion of being concerned in a murder.
	Grinding, measuring and winnowing the rāgi.	18	1	...	...	...	...	...	...	...	...	...	...	...	...	...
	Curing cochineal	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Making a grinding stone for the gran.	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Sick	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total	182	19	...	...	...	2	4	4	...	4	...	1	1	1	2	

ENCLOSURE A.

Monthly and annual comparison between the plantations, etc., at Tiruppattūr for 1796-97 and the proposed establishment for them submitted to the Board of Revenue for 1797-98.

Number.	Denominations.	1796-97 or from October 1796 to 31st October 1797.		1797-98 or from October 1797 to 31st October 1798.		1797-98.		Remarks.
		Monthly.	Annual.	Monthly.	Annual.	Increase.	Decrease.	
Mulberry.	1 Holing ...	0-27-7	7-24-4	7-24-4	The felons being able to perform the labour no expense will be incurred for holing.
	2 Cutting ...	8-39-72	107-5-64	...	...	...	107-5-64
	3 Watering ...	0-2-20	0-27-0	...	...	...	5-27-0
	4 Manuring ...	0-25-75	7-10-20	0-25-75	7-10-20	...	...
	5 Weeding ...	0-40-28	11-11-16	...	...	...	11-11-16
	6 Worm-house ...	0-16-46	4-28-72	0-16-46	4-28-72	...	...
	7 Filature ...	0-19-39	5-18-78	0-19-39	5-18-78	...	...
	8 Charges, extraordinary.	6-3-69	73-2-74	6-3-67	73-2-74	...	...
	Total	18-3-34	216-41-8	7-22-67	90-16-4	...	126-25-4	The plantations being sufficiently extended no mulberry cuttings will be required.
Indigo.	1 Advances for indigo ...	0-9-20	2-25-0	2-25-0	The manufacture of indigo by the cold water process requiring a person to conduct it who understands the process and cannot be got at Madras, no estimate is made of the expense of indigo supposing that it may not be necessary.
	2 Watering ...	0-7-36	2-3-32	...	...	...	2-3-32
	3 Firewood ...	0-20-12	5-26-64	...	...	...	5-26-64
	4 Charges, extraordinary.	0-8-13	2-11-76	...	...	...	2-11-76
	5 Indigo vats ...	0-42-29	11-35-28	...	...	...	11-35-28
	6 Utensils ...	0-5-24	1-20-48	...	...	...	1-20-48
	7 Weeding and cutting ...	1-3-58	13-1-56	...	...	...	13-1-56
	Total	3-10-39	38-38-64	...	...	...	38-38-64
Cochineal.	1 Charges, extraordinary.	0-5-36	1-22-32	0-5-36	1-22-32	
	2 Firewood ...	0-0-56	0-8-32	0-0-56	0-8-32	...	...
	3 Purchasing cochineal.	14-30-23	176-19-36	14-30-23	176-19-36	...	...
	4 Nopalry ...	1-42-62	23-10-24	1-42-62	23-10-24	...	...
	Total	16-36-17	20-24-54	16-36-77	202-4-44	...	...
Cotton.	1 Charges, extraordinary.	0-7-75	2-9-30	2-9-30	
	2 Picking cotton ...	...	...	1-0-0	12-0-0	12-0-0	...
	3 Weeding ...	0-33-32	9-13-60	...	...	...	9-13-60
	4 Servants' wages ...	0-19-35	5-21-20	...	...	...	5-21-20
	Total	1-18-2	17-1-30	1-0-0	12-0-0	12-0-0	16-44-30	
	Grand Total	...	474-42-76	...	304-20-18	...	170-22-28	

LXXI

Letter—from Lieut.-Col. A. READ, Superintendent and Collector, Baramahal and Salem.

To—EDWARD SAUNDERS, Esq., President, Board of Revenue, Fort St. George.

Dated—Tiruppattūr, the 1st October 1797.

Expecting the time when a few days might be spared from revenue business without inconvenience or I might be able to turn my mind entirely to the plantations that have been carrying on in the Bâramahal these two years past, I have postponed reporting on their progress till this late period, and even now I have entered upon the subject unprepared, from a painful consideration of the blame that may be ascribed to such delay.

Report on the plantations and manufacture in the Bâramahal.

2. I beg leave under the circumstances that have induced this sudden communication to refer you to the 17th Volume of my routine, lately delivered in to your Board by Mr. Hamilton, my Assistant, as containing all my investigations, and correspondence on the culture and manufacture of sugar, indigo, mulberry, cotton, cochineal, etc., likewise on the conduct of the plantations. Fuller testimony cannot be desired of the attention that has been paid to them; and it may be added, that, as stated in a special report of them composing No. LXX of that volume by Mr. Hamilton (who has been this last twelve months in charge of them) they are in as promising a state, as, under existing circumstances, could have been expected.

3. As mentioned in the said report, Mr. Lyte, an experienced West India planter, who has been two years employed at Tiruppattūr, is so well satisfied in regard to the prospect of advantage from the sugar plantations here, that he has taken all the lands we had planted with the cane, likewise the sugar manufactory, on his own account, agreeing to deliver their produce to the Company, at the Presidency if desired, the sugar at 4 pagodas per cwt. and the rum at 18 fanams per gallon, which, it appears, are only half the average prices in England. The sugar and rum he made last year being according to the report of merchants at Madras of a good quality, I apprehend these terms are advantageous to the Company and request to know, soon, if Government wish to have those articles for the Europe market, that, if not, Mr. Lyte may be permitted to dispose of them wherever he may find the best sale for them.

Sugarcane.

Sugar and rum—Mr. Lyte's rates.

4. The sugarcandy and soft sugar consumed in these districts being brought from the Coast, and some of the Natives already concerned with Mr. Lyte, there can be no doubt now of this manufacture being established in the Bâramahal or of the benefit which the country will receive from it.

5. According to Mr. Hamilton's report, our mulberry plantations contained last month fifty-four acres; but they have been considerably extended since, and we may now expect them to be constantly productive. Our object being the introduction of this manufacture also among the Natives, I have much pleasure in acquainting you that, one of them having demanded a lakh of cuttings this month for a plantation, others may be expected to follow his example. This is in consequence of advertising that we would buy up the leaves, or the cocoons, at fixed rates, which appears to be the first step that is necessary to induce the inhabitants to cultivate the plant. There can be no doubt of their soon after imitating us in the manufacture.

Mulberry.

6. The Mauritius cotton proving in every respect inferior to the country cotton, and the indigo requiring an attention that only manufacturers can give, I have relinquished the culture and manufacture of them, as unworthy of any further trial.

Cotton and Indigo.

7. Mr. Hamilton reported an hundred acres of opuntia last month, but there are now many more. It is all in a thriving condition, but it will not yield a good crop in less than two or three years, and I am apprehensive that the insect will get upon it, before it arrives at maturity.

Opuntia.

Col. Read's
report on
the planta-
tions and
manufactures
in the Bâra-
mahal.
Lands in
cultivation.

8. Mr. Hamilton states in No. 3 which accompanies his report that the lands actually composing the plantations exclusive of the sugarcane are as follows:—

	ACRES.
In mulberry	54
In cotton	11
In nopal	100
Total	165

But I think that from the quantities laid down since in mulberry and nopal, they must now contain at least 200 acres.

Stock on the
plantations.

9. The subjoined is an abstract of his valuation of the stock upon the plantations at present, as per No. 5 of his accompaniments:—

	PAGS.	FANS.	CASH.
The filature	77	4	76
Mulberry utensils	50	23	0
Indigo vats	18	31	15
Ditto utensils	8	19	0
Cochineal utensils	1	12	0
Cattle and carts	113	39	20
Farmers' implements	43	30	60
Carpenters' tools	9	32	10
Joiners' tools	20	0	0
Smiths' tools	1	13	40
Total	344	83	61

Expenses.

10. Following Mr. Hamilton in his report, I shall debit the plantations, as he does, for the amount of disbursements upon them, from October 1795 to September 1797, viz., 6,259-36-54 and credit them for sugar.

	PAGS.	FANS.	CASH.
Cochineal, and indigo sent to your Board in September 1796	285	24	76
Sugar, silk and cochineal sent in May 1797	414	41	64
Prisoners' subsistence, guards, etc.	1,852	12	39
Buildings, etc., sold to Mr. Lyte	863	25	66
Stock now upon the plantations as above	344	33	61
Sugar, silk, indigo, rum and cochineal at Tiruppattûr	578	1	24
Total	4,339	11	10
Balance against the plantations	1,920	25	44

He has taken credit for the articles sent to the Presidency at moderate rates, for the prisoners' subsistence as what might have been charged to Revenue, and for the sum owing by Mr. Lyte which is to be paid by instalments, the amount of stock on the plantations, and the manufactured produce on hand, as all forthcoming.

Establish-
ment of
plantations
in the
Bâramahal.

11. It remains to state that, induced by the disposition which your Board and Government had uniformly manifested to encourage the introduction of foreign plants and manufactures into the Company's possessions, and anxious myself to promote what so certainly contributing to their welfare will render them more valuable to the Company, I heartily engaged in establishing the plantations in the Bâramahal, relying on your approval and support. In February 1796 I reported on the progress that had been made in them, and intimated my intention of bringing my disbursements to account, when your Board expressed your approbation of what had been done, but objected to the admission of my charges because no estimate of them had been furnished. I was of consequence directed to give in one, and, being entirely unacquainted then with the nature of everything I was undertaking, I not only set immediately about investigations of the culture and manufacture of the foregoing articles in the Bâramahal and Bâlâghât, but procured every possible information on the subject from other quarters, as appears in the volume on the subject now before your Board. While prosecuting these inquiries my proceeding to the Southern Districts became indispensibly necessary, and ever since

I have been, as already mentioned, so incessantly engaged in matters of still greater importance to revenue, that, feeling confident of your indulgence, I have yielded to the urgency of their demand upon my time, and to my own solicitude on account of the business which is more strictly my duty.

Col. Read's report on the plantations and manufactures in the Bâramahal.

12. Having thus given a faithful recital of the pressure I have laboured under, I request your permission to bring my disbursements for the two years past to account, which, as before stated, amount to pagodas 6,259 including pagodas 1,852 for prisoners' subsistence and guards over them, which I might have charged to Revenue, and have not, from a wish to keep a fair account with the plantations by carrying every charge to their debit that would have been incurred by them under other circumstances. You may please to observe by the foregoing statement of the different heads composing my disbursements, that the plantations may be said to have cost the Company only pagodas 1,920, though including the expense of the prisoners they are 3,772 in debt. It appears probable, that while they are carried on at the public expense, and by the prisoners, who do much less work than people at liberty, they will never do more than clear themselves; but in that event they will be a gain to Revenue of nearly 1,000 pagodas per annum. Including the prisoners, their expense will amount to 2,000 pagodas this year, of which particular estimates will be given in with those of my revenue disbursements.

Disbursements brought to account.

13. Thus it may happen that though a debt of 10,000 pagodas may appear against them in a few years Revenue may still be a gainer by the concern, if they defray only half the expense of the prisoners who must otherwise be maintained entirely at the expense of Revenue. This however is supposing very little in their favour. It may be supposed with at least equal probability that, defraying the expense of the prisoners, they may yield an overplus which may go to the discharge of the debit and afterwards form a net revenue to Government.

14. Though, considering the matter in either point of view, it appears expedient to carry them on at the public expense, I have so much doubt of their being sufficiently attended to for any length of time, and the throwing the whole concern into the hands of the Natives would be of so much greater importance, that I think it will be most advisable, after they are sufficiently extended, and the manufacture of the silk and the cochineal is introduced among them, to distribute the plantations among them and to demand but a very low rent. That might be thought a loss to revenue, but it would induce people, who live in a state of indolence and poverty at present, to turn their hands to agriculture, and the people who occupied the lands growing mulberry would only remove to others for which they would pay the same rent as formerly. A light soil in waste land being found to answer very well for the nopal, a few acres only of arable have been given it, merely to try the difference of its growth in poor and improved soils.

Throwing of the concern on the Natives.

15. I have imagined the foregoing account of the plantations in the Bâramahal may suffice till it be in my power to furnish you with a digest of the information contained in my correspondence, etc., upon their subject; but if you are desirous of entering the detail, and of observing their whole progress, I beg leave to refer you to that volume, which is prefaced by an index, for the finding every article it contains without trouble.

16. The Bâramahal being chiefly a dry grain country, and an hundred and fifty miles from the sea coast, it is unfavourably circumstanced for the carrying plantations in it to any great extent, or the supplying foreign markets with its manufactures. The increase of its inland trade, and enhancing the value of its ordinary productions are therefore all that is hoped for from the improvements that have been introduced.

The Bâramahal not quite suitable for plantations and commerce.

17. The Southern Districts however being better supplied with water, and above an hundred miles of their western frontier bounded by the Cauvery, by which goods may be transported to the Coast, those are the circumstances so much more favourable to the culture and vent of the products in question as appeared to merit particular attention. The navigation of the Cauvery being of the first importance, Mr. Hamilton was sent in July last to ascertain it as far as Trichinopoly

Transport of goods to the Coast by the Cauvery.

Col. Read's report on the plantations and manufactures in the Bâramahal.

Navigation on the Cauvery ascertained for the transport of products to the Coast.

by an actual survey, for which he took along with him Mr. Mather, my surveyor, and I have the pleasure to enclose Mr. Hamilton's correspondence* or journal of the expedition, which contains such minute and correct information on the subject as cannot fail of giving satisfaction.

* Pages 137-144 *infra*.

18. As mentioned in his first letter, they embarked in a basket boat at Kumârapâlaiyam, opposite to the Bhavâni, and nearly so to Sankaridrug, which as in the statement annexed, they estimated, in going, to be 108 miles, but afterwards found from measurement to be 93 miles, from Trichinopoly. As therein shown, the breadth, depth, falls, and velocity of the river, the nature of the bottom, the villages and creeks on either bank, were the main objects of their survey. Thus directing their inquiries, they proceeded to Trichinopoly, where Mr. Hamilton procured a boat (of which his draught No. 1 is a just representation) drawing 18 inches, when full, 7 when empty, and capable of carrying 20 or 30 tons. In this, they undertook the voyage back, and ascertained the true course of the river, as laid down in the map which accompanies the correspondence. The figures shown on the river express the distances from Trichinopoly, in miles, and the villages underlined are the stages at which they halted.

19. As stated in Mr. Hamilton's letter No. 4, they reached Silappillâputtûr in the Ceded Districts on the 4th day. That place is 33 miles from Trichinopoly, and near to a river that would admit boats, such as that described, for 800 yards. The river is above a mile broad there, its bed all sand, its depth was then 5 and 6 feet, and it ran at the rate of $2\frac{1}{2}$ miles in the hour, but that being at the end of July, when it was reckoned only a quarter full it must be variable, more deep and rapid prior to, and less so after, July. From all these circumstances, that place would answer for an harbour and were the impediments to the going higher up the river removed, the products of most of the Southern Districts could be transported thither, to be shipped for the Coast.

20. There being safe mooring places everywhere along the banks of the river, it is sufficient to mention that their fifth halting place was at Môhanûr, the sixth Gûdalûr, the seventh Kondalam, the eighth Sêdarpâlaiyam, and the ninth Mûlasi, which last is 74 miles above Trichinopoly. There is a creek at Mûlasi which goes about a mile inland. The bed of the river there is about 500 yards broad, and a little stony; but it was then 6 feet deep, and its velocity only 3 feet an hour. There are several falls above, but small boats can come down loaded without danger, 40 and 50 miles higher up, consequently about 120 miles from Trichinopoly.

21. Boats of 20 or 30 tons burthen can always be navigated in June and July as far as Mûlasi, and it will seldom happen, that it cannot be done four or five months in the year. The river being so much frequented below Trichinopoly it was thought unnecessary to enter into particular inquiries concerning its navigation to Devikôttai, Tranquebar or Negapatam, where goods could be shipped for Europe. Boats could be constructed at those places, but there is abundance of timber along the banks of the Cauvery and upon the Sêndamangalam hills that would answer the purpose.

22. The sailing an hundred miles up or down a river, like the Cauvery, though it appear to have been the first time, is not assuredly an arduous undertaking, but knowing the impression of its importance, with which it was undertaken, I cannot help marking the activity and correctness with which it has been performed, as indicating a zeal for the service, that I am sure will animate Mr. Hamilton on every other occasion.

23. The practicability of transporting goods by the Cauvery to the Coast being established seems already to give an additional value to the produce of the Southern Districts which from the want of a market has sold these two or three years past at a very low price, and it is so far favourable to the improvements in view, that though the banks of that river, are in general too high to be watered by it, there are three canals supplied from it, one in the Paramati district 17 miles, a second in that and the Nâmakkal district that is 18 miles, and a third near Kattuputtûr that is 7 miles in length. All these canals are between Mûlasi and Silappillâputtûr, the highest and lowest places proposed by Mr. Hamilton for harbours, of consequence;

they are conveniently situated for plantations, but goods can be brought from others higher up, in basket boats, and there can be no doubt that much greater use than has been attempted could be made of the Cauvery, in a tract of 117 miles, the extent of our frontier that is bounded by that river. Besides which, several smaller rivers in the Southern Districts that run into the Cauvery might be rendered greatly more serviceable than at present in supplying wet lands.

Col. Read's report on the plantations and manufactures in the Bâramahal.

24. Considering all these circumstances, the great demand for sugar in England, the ruinous state of our plantations in the West Indies, from which they cannot, especially without slaves, recover for some years, and the success of our humble attempt in the Bâramahal, I was encouraged to invite a Mr. Foulis who had been six or seven years a West India planter, that I might consult him as to the expediency of entering largely into the business, by establishing plantations and manufactures on the banks of the Cauvery. He approved much of what he saw at Tiruppattûr and I prevailed on him in March last, to proceed with Mr. Hamilton to the Southern Districts where Captain Macleod cheerfully assisted them in their inquiries.

The carrying on of sugar business.

25. There they ascertained on the spot the number of canes grown in a given quantity of land, their quality and produce, the expense of labour and materials, and every point of information required for the forming estimates of the expense of cultivation, buildings, utensils and thence the cost of the whole manufactured produce; and being provided with other data they determined with I imagine tolerable exactness, the expense of water carriage to the Coast, the freight to England, the warfage, customs, agency and other charges incurred between this and the London market. In case it be desired you will find the whole detail of their proceedings in the LIX and subsequent numbers of the volume delivered to you by Mr. Hamilton which compose their correspondence with me on the subject.

26. As the result of all the information they contain and of more acquired since upon the duties and other charges incurred by exportation and of several years' experience No. LXVI which is a letter from Mr. Foulis with its accompaniments appears to contain everything requisite for enabling you to judge of the project submitted to your consideration; though to that end you may give them particular attention, I shall touch on them severally here by way of comprising the whole in this letter, and for ready reference I herewith transmit you copies of them.

27. It appears by No. 1 of this estimate that for the annual manufacture of 200 hogsheads or 3,200 cwt. of sugar and 75 puncheons or 8,250 gallons of rum the necessary buildings and utensils consisting of a boiling-house, three mills, five iron kettles, ladles, coolers, receivers, stills, live-stock, etc., will cost pagodas 3,306-27-0.

A resumé of the expenses of the sugar business.

28. By No. 2, the establishment of monthly, annual, and occasional servants, casualties among the cattle, the raw produce, interest upon the fixed capital or stock, freight and wastage in shipping the said 200 hogsheads of sugar and 75 puncheons of rum to Madras will cost pagodas 9,765-13-40, and according to No. 3 the sale of the sugar there at 15 pagodas per candy of 500 lbs. and the rum at 11 sicca annas per gallon including drawbacks for empty casks will fetch pagodas 13,280-36-0 yielding a net profit of 3,515-22-40.

29. From No. 4 it appears that the whole expense of servants, cattle, raw produce, interest on the fixed capital, freight from Devikôttai to Madras, the sugar at 4 pagodas per ton, the rum at 3 per puncheon, freight to England, the sugar at £22½ per ton, the rum at £12 per puncheon, wastage of 3 per cent. on the voyage, commission of 2 per cent. customs at £37-16-9 per cent. and merchants' charges at 3 per cent. on the sales, will amount to pagodas 28,907-37-0 and that according to No. 5 the sugar if sold there at 45 shillings per cwt. and the rum at 4 shillings per gallon the whole will bring including drawbacks for empty casks pagodas 22,975, which would occasion a loss of 5,932-37-0.

30. The estimates of the expenses may be correct enough, but it appears to me that Mr. Foulis has underrated his sales. First I shall observe that he estimates his sale of the sugar (3,200 cwt.) at Madras to be only 15 pagodas per candy of 500 lbs. which by my calculation would bring pagodas 9,600, whereas according to my

Col. Read's report on the plantations and manufactures in the Bāramahal.

Sales and prices of Sugar and rum.

Remarks on the sugar business whether carried on by the Company or by an individual.

information from Mr. Dring, No. LXIII of my correspondence on the plantations, the common price of it, when vast quantities were brought from Batavia, was 17 and 18 per candy. In April last Mr. Dring informed me the company were buying it up at 22 pagodas per candy which is near 50 per cent. more, and at the same time the common price at Madras was 29 and 30 per candy which is almost double. By Mr. Dring's information Mr. Cochrane was then buying rum at 11 annas per gallon in Bengal, the price Mr. Foulis puts on his, but the freight and charges to Madras being according to Mr. Dring 40 pagodas, per 150 gallons or 12 fanams per gallon, our rum would, if equally good, be consequently worth so much more. I much doubt the charges being so high, but all these circumstances shew that both the sugar and rum would yield considerably more at present, and at all times more, than Mr. Foulis has estimated.

31. This estimate of the sales of sugar at the London market is likewise very low, being 45 shillings per cwt., which I remember is the average of a number of years prior to our attaining the superiority over the French in that branch of commerce as ascertainad by a Committee of the Court of Directors or Proprietors. Certainly no estimate is to be formed from the high prices of sugar during the war (between 60 and 70 per cwt.) but from the uncommon devastations committed in most of the West India islands, and the abolition of the slave trade, there appears very little reason to suppose that they will fall again to their former standard, at least for several years. My inference however shall only be, that the Company could not lose by the proposed undertaking. Treating it however as a speculation Mr. Foulis has done right in estimating his charges as high, and his sales as low, as in all probability they will ever be, for many have been ruined from the being over sanguine, and the taking too favourable a view of their favourite project.

32. A material difference must be made between the Company and an individual in considering the business in question. Taking it merely in a commercial point of view the following observations of Mr. Dring in the letter before referred to, appear deserving the attention of Government. "If (he says) your sugar is of a good quality as that of Bengal it will surely be of vast advantage to Government to encourage the manufacture of it, as it will enable them to load many ships at Madras by having dead weight to put into them, and thereby prevent the heavy expense incurred every year for demurrage; and instead of paying £22 to £28 per ton ship-loaden will grasp at contracts for £15, and the piece-goods which are stowed over the sugars will get to market 5 or 8 months sooner than they now do." These being matters which I am very little acquainted with, I will only remark that Mr. Foulis, Mr. Lyte, and others who are supposed to understand the estimable qualities of sugar, have affirmed that they never have seen better than what has been manufactured here.

33. Taking a grander view of the business as it would affect the land and labour of the country, it appears that every 200 hogsheads of sugar would require the produce of as many acres of land, that the cost of the raw produce being double or treble the value of paddy, and amounting to 5,300 pagodas, it would enable the farmers to increase their stock and take every year more lands into cultivation, that they would create work at first for a considerable number of masons, carpenters, smiths, braziers and coopers, after that for 21 of them all the year round, for 50 millers and distillers half the year, and for 120 boatmen four months in the year, exclusive of herds and coolies upon various occasions, that the transporting every 200 hogsheads of sugar and 75 puncheons of rum would create employ for a number of boatmen between Devikōttai and Madras who would receive 865 pagodas freight, employ also for our own Indiamen for which 11,250 pagodas would be paid as freight, that they would contribute 6,432 pagodas as excise to the public revenue, 1,100 pagodas as commission and charges to merchants and last of all, an addition to Indiastock. Thus it appears that if the Company were to lose by the undertaking as merchants which there is not room to suppose, they would benefit by it as Sovereigns of the country, and it is still more obvious that it would be of national advantage.

34. But though the national wealth and prosperity may be of great importance to the Company, I am sensible that its interests are at the same time very distinct from those of the nation, and require that it conducts its own affairs with attention

to economy; consequently that the business proposed might be productive of the several advantages I have pointed out to the community at large, and yet at such a loss to the Company as might be very detrimental to its affairs. I am likewise so sensible that no branch of agriculture or manufacture will ever be carried on for it or any great body with due attention to economy, that I would not even suggest the undertaking any of the kind for it, if I could find an individual that would undertake it upon his own account.

Col. Read's report on the plantations and manufactures in the Baramahal.

35. I have recommended it to Mr. Foulis, but he objects his want of a sufficient capital, his apprehension that he would have the prejudices of the natives to struggle with, his opinion that the jurisdiction or influence of a Collector is not always favourable to industry, the distance of the market, the improbability that any individual under all these circumstances could conduct the business with advantage, and finally the probable loss or smallness of the profits that according to his estimates, it would afford.

Mr. Foulis recommended as an agent for the sugar business.

36. He is inclined to engage in it, however, after being satisfied as to the certainty of prosecuting it with such an advantage as he may deem an adequate reward for his trouble, and as stated in his letter, which accompanies, to conduct it on the part of the Company, either till he makes the desired experiment, or while Government may wish it to be done for the Company, provided that he be made a monthly allowance correspondent with the labour and responsibility of the situation.

37. As recommendatory of him for any situation of trust, I may with propriety inform you, that I have known him these seven years past that he has been in the country, that he is much respected in society, and, appearing to be active, intelligent and sincere in all the ordinary transactions of life, I readily conclude that he is a very fit person for an agent, and believe that he would conduct any business entrusted to him with integrity, and with attention to the interest of his employers. Being an officer in the cavalry his sentiments in regard to situation and character must be correspondent with those common to gentlemen of his profession, and thence I conclude that pecuniary advantage would not be his sole object for taking charge of the plantations, also that (having never asked what allowance he would expect) he would accept of an hundred pagodas for the first two years, in which time it might be certainly known whether it would be worth the while of individuals to undertake the business, or eligible to prosecute it on the public account.

38. Having stated here generally the ideas I have on this interesting subject and all the information I have on it being laid before your Board, I have only to add a request, that you will recommend to Government an application to his Highness the Nawáb to order that all sugar, rum, silk, cochineal, cotton, and indigo the produce of the plantations in the Baramahal and Salem districts may be passed duty free through his country.

Exemption of goods from duty in the Nawáb's country.

LXXII

Letter—from Mr. E. W. LYTE, Tiruppattúr.

To—Lieut.-Col. A. READ, Superintendent.

Dated—the 26th October 1797.

I herewith take the liberty of enclosing my estimate of money required for carrying on the sugar plantations in the Baramahal under my own name, which I hope you will find satisfactory; and must request the favour of you to recommend to the Board that I may have it advanced to enable me to take in my crop, of which I have also enclosed an estimate of the supposed quantity of produce and the time I propose delivering to the Board, in case they may think proper to purchase it, agreeable to my former letter, which was at 4 star pagodas per cwt. for sugar and 18 fans. per gallon for rum. But in case they should not like to purchase, I wish to be made acquainted with it that I may look out in time for some other purchaser.

Financing of the sugar plantations in the Baramahal.

2. By my estimate you will see the quantity I purpose sending to Madras at a time, which will enable me to carry on my business without troubling the Board further than the end of February, as at that time I shall be able to pay part of my debt, and keep a sum sufficient to carry on the business.

Financing of
the sugar
business.

Exemption
from the
customs
duty.

3. I must also take the liberty of reminding you of your promise to use your endeavours to clear me of any customs on sugar or rum through the Nawab's country, for, although there has been as yet none required, it is likely that, when he finds that this business is to come forward in the Baramahal, he will then put a tax on it that may entirely upset all my expectations.

4. In my estimate I have not included the four hundred and eighteen star pagodas which you have already been kind enough to advance me, and which I have no means of paying without further assistance, and I hope that you will take this into consideration and enable me to carry on the business, as I propose setting the manufacturers to work on the 1st December, and I must have some assistance before I begin.

ENCLOSURE.

General estimates of money required for carrying on the sugar plantations in the Baramahal with the supposed quantity of produce and the time of its being delivered at Fort St. George.

Estimate of advances.			Estimated produce.				
Months of the years 1797 and 1798.	Tirupattūr-nattam and Alangarai— Goshwāra.	Total.	Months in which payment will be made.	Sugar.	Rum.	Total amount.	
1797.			1798.				
October	20	...	20	MAUNDS.	GALLS.	STAR PAGS. F. C.	
November	20	50	70	Mareh	650	650	559 0 0
December	45	50	95	May	650	650	559 0 0
				July	650	650	559 0 0
1798.			August				
January	45	275	320		622	622	526 37 0
February	90	125	215				
Total	220	500	720	Total	2,572	2,572	2,208 37 0

LXXIII

Letter—from S. R. LUSHINGTON, Esq., Secretary, Board of Revenue.

To—Lieut.-Col. A. READ, Superintendent of the Ceded Districts.

Dated—Fort St. George, the 23rd December 1797.

Your letter of the 1st September respecting the plantations and manufactures established by you in the Ceded Districts having been submitted to Government, I am directed to transmit for your information and guidance the enclosed copy of the Board's letter on this subject and of the Right Hon'ble President's reply.

ENCLOSURE No. 1.

Extract of a letter to Government, dated the 11th November 1797.

The Board's
remarks on
Col. Read's
report on
plantations
and manufac-
tures in the
Ceded
Districts.

We intimated in our general report, dated the 30th of June 1796, that we had received a letter from Captain Read advising us of his having introduced into his districts some valuable plantations and manufactures, that he did not doubt of being able to produce a considerable quantity of sugar and rum, that he entertained very favourable hopes of the cultivation of the indigo, that he should be able in a short time to disseminate the Mauritius cotton over his districts and that the culture of the nopal required so little trouble, and the curing of the insect was so easy that any assurance of success appeared unnecessary; he advised us also that he had engaged in other speculations, and proposed when other business would admit to report upon them fully.

2. We expressed ourselves well satisfied with his endeavours for the introduction of objects of improvement in his districts, and that he would no doubt keep in view the importance of inducing the Natives to engage in the culture of these valuable articles as pointed out by Government in their resolutions transmitted to him in August 1795 and reminded him of the necessity of submitting to us an early report for your Lordship's particular information.

3. Subsequent to this period (30th June 1796) Lieut-Colonel Read forwarded at different times as samples three boxes and thirty-two bags of sugar manufactured in the districts under his charge which by your Lordship's orders were delivered over to the export warehouse-keeper for importation to England, four chests of indigo, five hundred and four skeins of white and yellow silk, and two hundred and thirty-three pounds of cochineal were also made over to Mr. Darvall for the same purpose.

The Board's remarks on Col. Read's report.

4. Having before us no information of the progress of the plantations, Lieut.-Col. Read was reminded of the necessity of enabling us to afford your Lordship particular information on the subject, and we have now the honour to submit all the documents received in which the Superintendent has assigned his reasons for the delay in their transmission, and has solicited authority for bringing to account the disbursements made from the first formation of the plantations.

5. Your Lordship will observe what is stated by Lieut.-Col. Read that Mr. Lyte, an experienced West India planter, who has been two years employed at Tiruppattūr is so well satisfied in regard to the prospect of advantage from the sugar plantation at Tiruppattūr that he has taken all the lands planted, with the cane, likewise the sugar manufactory, on his own account, a transfer we approve, agreeing to deliver their produce to the Company at the Presidency if desired at 4 pags. per cwt. and the rum at 18 fans. per gallon. The Superintendent states that he apprehends these terms are advantageous to the Company and requests to know soon if Government wish to have these articles for the Europe market; upon the article of sugar we have to observe that the price at which Mr. Lyte proposes to deliver it (4 pags. per cwt. or 17 pags. 30 fans. 68 cash per candy) nearly equals the cost of the first sort of Ganjām sugar when brought to Madras.

6. This high price arises from the expense of land carriage to the Presidency from Tiruppattūr and as it cannot be reduced, there is little prospect that either the sugar or rum manufactured there can ever be brought with advantage to this market. We therefore submit to your Lordship Lieut.-Colonel Read's suggestion that Mr. Lyte be permitted to dispose of them wherever he may find the best sale.

7. Under the circumstances stated by Lieut.-Col. Read we recommend he may be authorized to bring his disbursements for the plantations amounting to pags. 6,259 to account though according to the statement of the different heads composing his disbursements, they may be said to have cost the Company only pagodas 1,920.

8. In our minutes of the 9th June last we observed we had directed an experiment to be made of the practicability of transporting sugar by water from the Southern Districts under Lieut.-Col. Read as on that would depend our being able to obtain sugar from that quarter at such a price as to become an object for the Europe market; the navigation of the Cauvery by boats of 25 or 30 tons having been very satisfactorily ascertained by Mr. Hamilton, the encouragement of the sugar manufactured in these districts appears for the reasons stated by Lieut.-Col. Read deserving of much consideration and we have no doubt if carried on under skilful encouragement must be productive of improvement advantageous to the country and the Company. Whether as a commercial object the employment of Lieut. Foulis, formerly a West India planter, in the way pointed out by Lieut.-Col. Read be eligible, we must submit to your Lordship's determination.

9. We beg your Lordship's reference to the 5th, 6th and 7th articles of Col. Read's report for information of the state of the other plantations and manufactures alluded to in the first paragraph of this letter. The 7th volume of the Superintendent's proceedings to which he refers we have also the honour to lay before you.

ENCLOSURE No. 2.

Extract of a letter from J. B. TRAVERS, Esq., Deputy Secretary to Government, dated the 16th December 1797.

We have received your letter of the 11th ultimo with its enclosures.

1. We authorize you to grant permission to the Collector of the Bāramahal for bringing to account the expenses of the public plantations under his charge.

2. Hearing that the sugar and rum of the Tiruppattūr plantation cannot be made advantageous, we approve your suggestion for making it over to Mr. Lyte with permission to dispose of the produce in the way which he himself may prefer.

3. With regard to the Southern plantations though we have much satisfaction in observing that it is practicable to convey the produce of them by water carriage to the Coast, yet, uncertain as we are how far these speculations to the extent suggested by the Collector may meet the approbation of the Court of Directors, we do not feel ourselves at liberty to undertake them without a reference to England; we desire therefore, that until the sentiments of the Hon'ble Court can be received, the Collector may be directed to preserve the plantations upon the most economical footing, or to dispose of them for a temporary period to individuals, as he may judge most for the interest of the Company.

Orders of Government on the above.

LXXIV

Copy of Mr. Lytes Bond, dated the 1st April 1798.

Mr. Lyte's
bond.

Be it known that I Eyre Walcott Lyte of the Island of Barbadoes in the West Indies but now residing at Tiruppattûr in the Bâramahal under the the Presidency of Fort St. George am held and firmly bound with the Hon'ble East India Company in the penal sum of star pagodas one thousand two hundred current money, to the payment whereof well and truly to be made to the said Company, their executors and administrators or assigns. I do hereby bind myself my heirs, executors and administrators or assigns firmly by these presents. In witness whereof I have hereunto set my hand and seal this first day of April in the year of our Lord one thousand seven hundred and ninety-eight.

Whereas the above Eyre Walcott Lyte hath received from the aforesaid Hon'ble Company the full and lawful sum of eight hundred star pagodas this to run at interest at six per cent. per annum payable in one year and nine months from the date hereof in two instalments agreeable to the following dates and sums, viz. :—

First instalment to be paid on the 1st day of January 1799—

	PAGS.	F.	C.	PAGS.	F.	C.
The amount of interest for 9 months at 6 per cent. per annum.	36	0	0			
To half the amount of principal	400	0	0			
Total ...				436	0	0

Second instalment to be paid on the 11th January 1800—

Interest on the amount due at 6 per cent.	24	0	0			
And the amount due	400	0	0			
Total principal and interest ...				860	0	0

NOTE.—The condition of this obligation is such that if the beforesaid Eyre Walcott Lyte, his heirs, executors and administrators or assigns shall well and truly pay or cause to be paid unto the aforesaid Hon'ble East India Company, their executors, administrators or assigns the full and just sum of eight hundred star pagodas together with such interest as shall or may become due thereupon as before specified that this obligation to be void and of no effect, otherwise to continue in full force and virtue.

(Signed) E. W. LYTE.

Witnesses—ALEXANDER READ.
ROBERT MUNRO.

LXXV

Letter—from A. READ, Esq., Assistant Collector.

To—Captain MACLEOD.

Dated—Tiruppattûr, the 5th May 1798.

Mulberry
plantations
at Tiruppattûr.

The Superintendent having observed the unpromising state of the mulberry plantations at this place and being convinced from experience that the soil is too stiff and unfavourable for that plant, he has desired me to communicate with you on the subject, to know whether you think a mulberry plantation set on foot in your Division would answer.

2 Should you be of opinion that such an undertaking would succeed near you, I shall then dispatch as many plants as you wish, and should there not be a sufficient number of thieves at Salem, or in the Division to perform the work, as many as you may have occasion for can be sent from Tiruppattûr.

3. I am directed to say, that there will be no necessity for building any worm house, or employing more servants than one, as a superintendent for a twelve month or two, when the plants have gained strength and size, will admit of their leaves being plucked. Our stripping them of their leaves too soon has no doubt in a great measure retarded their growth, there being none on our plantations the height of a man yet, although planted three years ago.

LXXVI

Letter—from W. MACLEOD, Esq., Assistant Collector.

To—ALEXANDER READ, Esq., Junior, Tiruppattūr.

Dated—Salem, the 9th May 1798.

I have to acknowledge the receipt of your letter of the 5th instant. I do not hesitate to give it as my opinion that the mulberry would with ordinary attention flourish in several parts of the Southern Division. The parts which are watered by the Cauvery or near the bottom of the Sēdamangalam mountains, which could at all seasons be watered either by running streams or picottas, I would at first recommend. The best unoccupied land should be pitched upon. It is a mistake to suppose that it will thrive in every soil. In general trees will require a better soil than grains. If I am not mistaken the grounds occupied for the Tiruppattūr plantations was the worst land in the neighbourhood.

Mulberry plantations in the Southern Division.

I should suppose that it would be better to establish plantations by means of common labourers than the thieves, who would require the additional expense of batta to a guard of sepoys which would nearly counterbalance the saving made by employing them. Besides many of them would make their escape and there could be no reliance on the constancy of their labour.

2. Being unacquainted with the success of mulberry plantations in the Jâghîr or in the Circârs, where I understand experiments on large scales and with considerable expense have been made, I feel rather diffident in venturing an opinion which from want of information might be contrary to experience. But if the Board of Revenue make allowance for keeping up a mulberry plantation, and seem desirous of continuing it, there cannot be a doubt but the experiment would have a fairer chance of success in the Southern Division than at Tiruppattūr. If Colonel Read has reason to believe the Board will sanction a monthly expense of about 30 pagodas per month for labourers etc. in the Southern Division, I shall with pleasure point out favourable situations for mulberry plantations and give as much attention to the appropriation of the cash laid out upon it as I do to any other branch of public business. But I would not recommend the undertaking, unless the sanction of the Board was first obtained for giving it a fair trial.

LXXVII

Letter—from J. WEBBE, Esq., Secretary to Government, Public Department.

To—Lieut.-Col. READ, Collector of the Bâramahal.

Dated—the 19th May 1798.

I am directed to enclose for your information copy of a letter from the Superintendent of the Company's Nopalry and to desire that you will pay the greatest attention to the instructions you may receive from Dr. Berry who has been authorized to forward to you a proportion of these valuable plants.

Introduction of useful plants from the Spice Islands in the Bâramahal.

ENCLOSURE.

Letter—from Dr. ANDREW BERRY, Superintendent, Hon'ble Company's Nopalry.

To—the Hon'ble Lieut.-General HARRIS, Governor in Council, Fort St. George.

Dated—the 9th May 1798.

I have the honor to inform you that I have received by the ship *Fairlie* lately arrived from the eastward many boxes that had been filled with the most valuable and useful plants of the Spice Islands for this Coast, collected by Mr. Smith, whose industry and attention has been great to fulfil the object of the Supreme Government, the disseminating over the Company's possessions the productions of these Islands, as will appear by the enclosed list of what was intended for this, and I am sorry to add that notwithstanding all the attention paid to them by Mr. Tait, Surgeon, under whose care they came, only the nutmeg plants have been received in a healthy state, all the cloves being dead, as also the other plants, with the exception of a few of the acid Tomy Tomy and *Inocarpus Edulis*, the Almond, or Ratta of Otaheite, which unfortunate loss is to be attributed to the tedious voyage, and shifting from different ships.

Culture of
nutmeg
plants.

2. The number of nutmeg plants received are however an object of importance, and the little success that attended the distribution of those formerly received points out the necessity of some arrangement for the greatest part at least being sent to situations where there is more moisture in the atmosphere, than in most parts of the Coast, and such are to be found to the southward.

3. Mr. G. S. Martin has, I am told, a garden that is kept constantly cool and moist by its vicinity to the Travancore Hills; there I am sure they would be attended to, and probably thrive and if the Collector of the Dindigul district were requested to have ground prepared among the hills that are watered by the Malabar monsoon, and where the wild nutmeg is found, there could be no doubt of success; the failure of the former plants sent there, being to be attributed to their being kept at Dindigul, instead of their being planted among the hills as was then recommended; some also might be sent to Lieutenant-Colonel Read to be planted at Râyakottai, and the most elevated situations in the Bâramahal, and a few only kept for distribution on the Coast, as I have only been able to preserve at the Nopalry by constant attention to shade, and watering, one clove, and four nutmeg trees, and that it is not probable they will ever attain, in this dry atmosphere any great height. I have taken the liberty, Hon'ble Sir, of thus pointing out where they should be sent, in the hope that you will approve, and that I may be able with a prospect of success, and certainty of their being taken care of, in the month of July or August when the weather will be more favourable than now, send them to these places; and till then every attention in my power shall be paid to enable these gentlemen to receive them in a healthy state.

LXXVIII

Letter—from Mr. E. W. LYTE.

To—Lieut.-Col. A. READ, Superintendent, etc., etc.

Dated—Tiruppattâr, the 7th June 1798.

Customs
duty on
sugar.

On my taking the plantations you were kind enough to promise me, that you would use your endeavours to clear me of the customs on sugar through the Nawâb's country. This I have no doubt but you have done; but the Nawâb's people not having received any orders to prevent their demanding the customs, they levy on each gunny or 10 maunds one rupee; but, they say, in case I bring a certificate, such a one as went down from you with the Company's sugar, they will let it pass unmolested; this if it can be done as far as lies in your power, I will be much obliged to you in conferring on me that request immediately, as I expect the bandies are now stopped for my arrival at Vellore, either waiting till I bring this certificate or money to pay the customs, and as to the latter I am incapable of it.

2. I must further request you will be so kind as to use your endeavours according to promise to clear me of the customs from this to Madras or otherwise it will be needless for me to attempt carrying on the manufactory of sugar any longer as for this expense alone one-third of the nett sales will be expended.

Hoping you will take all these matters in consideration, etc.

LXXIX

Letter—from Dr. ANDREW BERRY, Superintendent of the Hon'ble Company's Nopalry.

To—Lieut.-Col. A. READ, Collector, Bâramahal.

Dated—Fort St. George, the 13th June 1798.

Culture of
nutmeg trees
in the Bâra-
mahal.

Government have informed you of the number of nutmeg trees received here, and, having approved of my sending a part of them to the Bâramahal, they have directed me to correspond with you, and point out what may be necessary. From every information I learn that Sankaridrug will be the most favourable situation for them, that near the Fort in the neighbourhood of the Cauvery which is filled during the hot season, and sheltered by large forests, there are many places, the best adapted in the Bâramahal for plants of low latitudes and a warm moist atmosphere; if you should approve of this, Mr. Peyton, the Assistant Surgeon, from his fondness for gardening would be the most proper person I know to be Superintendent. I have at present near 3,000 nutmeg plants hitherto in the highest

health—three-fourths of these will be sent to the Dindigul districts to be planted in the neighbourhood of the Travancore hills and there the Government must look for turning to account, as an object of trade, so great a number of valuable trees, being the best adapted on this side India, and approaching nearest the climate of the Moluccas from its low latitude and moisture; the southern parts of this Peninsula being only to be rivalled by Penang, Sumatra, and from the greater security of our possession here to be preferred for such establishments; of the remainder the greatest proportion will be sent to Mr. Martin to be planted in the Company's Hill Plantation at Tenkâsi and to you. They shall be sent you about the middle or end of July when the weather is more favourable for land carriage; some will be in small baskets to be put in the ground, basket and all, and the others will be in boxes, so much asunder as to admit of their being easily taken out without detriment. You may expect to receive 3 or 400; so that if you approve of Sankaridrug, I have to request your directing 8 or 10 acres in the most sheltered situation as near the river and garrison as may be judged best to be cleared, leaving a few large trees standing here and there to break strong winds, employing a sufficient number of gardeners to work the ground after it is cleared, an attentive European acquainted with the care of trees if possible to be always on the spot, which would be of great advantage, having such allowance as to engage his whole attention to it. The nutmeg delights in a loose rich soil, moist but not wet; is therefore often overturned, and to prevent this at Banda trees with spreading roots that take firm hold of the ground and do not cause too deep a shade are planted among them; if such trees cannot be left here and there, fences should be made as soon as possible to shelter them, seeds of quick growing trees should be sown and the ground well dug over, so that on their arrival they may be immediately planted in the best situations and best manner; as I hope to be able to have delivered to you whatever is sent in as healthy a condition as they are at present, some may be sent to Mr. Hankey who will take great care of them, and who I am told has been at great pains to make a garden at Salem; and I would only recommend a few for Râyakottâi, the winds of that elevated country being probably too cold for Natives of the Moluccas. Never was there so fair a prospect as at present of establishing the spices in the Company's possessions, the object of the Supreme Government, and I trust no necessary expense for their care and culture will be withheld.

Culture of
nutmeg
trees.

LXXX

Letter—from Lieut.-Col. A. READ, Superintendent and Collector.

To—Captain MUNRO, Assistant Collector, Central Division.

Dated—the 27th June 1798.

I herewith transmit you copy of a letter I have received from Dr. Berry on the subject of nutmeg trees, the greatest number of which he proposes shall be planted in the neighbourhood of Sankaridrug under the charge of Mr. Peyton; and as I understand you are shortly going to that quarter, request you will look out for such a situation as you and Mr. Peyton may think the best calculated for them, and, in case you find one likely to answer, that you immediately begin to prepare as much land as may be deemed necessary for their reception and furnish me with an estimate of the establishment that may be required for their cultivation, exclusive of felons that may be employed in it.

LXXXI

Letter—from Lieut.-Col. A. READ.

To—THOMSON HANKEY, Esq., Salem.

Dated—the 27th June 1798.

I have the pleasure of enclosing you a copy of a letter I have received from Dr. Berry relative to a number of nutmeg trees he has received from the Moluccas, some of which he proposes to send into these districts and that a part of them shall be consigned to your care. I request to know how you think they will answer at Salem and how many you wish should be sent to you.

LXXXII

Letter—from Lieut.-Col. A. READ.

To—Captain MACLEOD, Assistant Collector, Southern Division

Dated—the 27th June 1798.

Culture of
nutmeg
trees.

With this you will receive copy of a letter from Dr. Berry respecting some nutmeg trees he is sending to these districts, and request to know which situation in your division you may think would be the best for them.

LXXXIII

Letter—from Lieut.-Col. A. READ, Superintendent and Collector, Baramahal.

To—Major DOVERON, Commanding at Rayakottai.

Dated—the 27th June 1798.

Doctor Berry intending to send a number of nutmeg trees into these districts and proposing that some of them shall be planted at Royakottai, I do myself the pleasure of sending you copy of a letter I have received from him on the subject and request to be informed how many you can conveniently receive in charge, also your opinion as to the situation of your garden or the ground below it for them.

It appears to be moist and well sheltered, two circumstances which the Doctor says are essential to the preservation and culture of them.

LXXXIV

Letter—from WILLIAM MACLEOD, Esq., Assistant Collector.

To—Lieut.-Col. A. READ.

Date—Námakkal, the 2nd July 1798.

Nutmeg
plantations.

I am favored with your letter of the 27th of last month covering one from Dr. Berry to you on the subject of nutmeg plantations—

(1) Whatever portion you may judge should be sent to the Southern Division ought I think be divided into four parts nearly equal among the following places: New Salem at the foot of the Hills southward of Salem which is well sheltered and a favorable situation; at the foot of the Sêndamangalam hills about four miles from the Cusbah in a north-easterly direction—the soil is rich and well sheltered with bamboos and tamarinds: the east side of Kollaimalai (or the Sêndamangalam Hill) close to the foot of it—the soil is fertile and well covered from the westerly winds; and the fourth place which I would pitch upon is Peddunâyakkanpâlaiyam, a village 8 miles west from Atur. Should you approve of those situations, be so good as to let me hear from you on the subject, that the ground may be immediately prepared for them. It would also be desirable that you would acquaint me of the number you intend to send to the Southern Division. My motive in proposing to have them in four places is that there may be the greater chance of success by trying in different situations.

(2) The bank of the Cauvery which Mr. Berry says would be a favourable situation is exposed to such strong westerly winds that in my opinion the nutmeg would not thrive there from want of shelter. For the nearer you approach the Cauvery the stronger those winds prevail and the nearer the hills the milder they are.

LXXXV

Letter—from Major G. DOVETON, Commanding at Ráyakóttai.
To—Lieut.-Col. A. READ, Superintendent, etc., Ceded Districts.
Dated—the 4th July 1798.

I have the honour to acknowledge the receipt of your letter of the 27th ultimo with its enclosure.

Culture of nutmeg plants.

The situation of my garden and the quality of its soil, which is rich, loose, and moist, seem to point it out as a spot in which the nutmeg would thrive. On the other hand the general sharpness of the air in this elevated district will probably as Dr. Berry conjectures, prove unfavourable to its growth. It is however worth trying the experiment and if you will be pleased to send me six or eight of the young trees when you receive them I shall attend to them most particularly and in the meantime I shall be careful to have a small piece of ground prepared for their reception in the manner pointed out by Dr. Berry.

LXXXVI

Letter—from Mr. E. W. LYTE.
To—Lieut.-Col. A. READ, Superintendent of the Ceded Districts.
Dated—Tiruppattúr, the 4th July 1798.

It is with the greatest respect and submission I take the liberty of addressing you and hope you will be kind enough to lay this before the Board of Révenue.

Sugar plantations at Tiruppattúr.

2. Inclosed is an estimate of the articles of produce from sugar plantations under my charge, that is to say, what I have now in hand, agreeable to the Assistant Collector Mr. Alexander Read's desire.

3. I must now further request of your goodness to try and use your endeavours with the Revenue Board to let the articles purchased by me on the 13th July 1797 still remain in the Honourable Company's name and I instead of buying them only, to pay an annual rent so far as the interest of the amount laid out at 12 per cent. per annum.

4. I have had the honour of speaking to some of the gentlemen of the Revenue Board who are of opinion that this application will be granted in case you will be kind enough to proceed in it for me. You are well acquainted with my circumstances and as a new beginner I hope you will try to clear me of this burden which will be my entire ruin in case of a war.

5. I am sensible that agreeable to my bond my first instalment is due. But all the articles I carried to Madras did not amount to more than 294 pagodas out of which you know I had to pay the sum of 100 pags. to Mr. D. Young; the expense of land carriage, and other necessary charges running very high, it is not in my power at present to pay the instalment and I hope that you will be kind enough to wait until the result on this letter be known.

ENCLOSURE.

Estimate of produce of the sugar plantations now on hand.

Numbers.	Sugar.	Rum.	Amount in Star Pagodas.	Remarks.
	MAUNDS.	GALLONS.		
1	250	...	225 0 0	This is calculated agreeable with the market I have met with (Signed) E. W. LYTE.
2	...	110	44 0 0	
3	...	110	44 0 0	
4	...	63	25 9 0	
5	...	63	25 9 0	
6	...	63	25 9 0	
7	...	63	25 9 0	
8	...	63	25 9 0	
9	...	56	22 0 0	
...	250	591	461 0 0	

LXXXVII

Letter—from THOMSON HANKEY, Esq., Deputy Commercial Resident.

To—Lieut.-Col. A. READ, Superintendent, etc., Baramahal.

Dated—Salem, the 8th July 1798.

Culture of
nutmeg
plants.

I have the pleasure to acknowledge the receipt of your letter with its enclosure from Dr. Berry.

It is not my wish to undertake the culture of nutmeg plant, the soil of my garden being little better than sand, and its distance from hence more than two miles. Such ground as is required can be had only by the Collector under whose care the undertaking promises more success.

LXXXVIII

Letter—from S. R. LUSHINGTON, Esq., Secretary, Board of Revenue.

To—Lieut.-Col. A. READ, Superintendent and Collector of the Baramahal and Salem Districts.

Dated—Fort St. George, the 10th August 1798.

Silk manu-
facture
discontinued.

Government having determined to prosecute no further the silk manufacture on the public account on this Coast, and to dispose of the buildings which have been erected and the plantations which have been made on the Company's account to the best advantage, I am directed to require your sentiments upon the best mode of executing these instructions; as they relate to the plantations in the districts under you; all expenses on that account to cease on receipt hereof.

2. You will transmit with your reply a statement showing the whole extent of the plantations and that cultivated with mulberry, also the dimension of the buildings and stock thereon.

LXXXIX

Letter—from J. B. TRAVERS, Esq., Deputy Secretary.

To—Lieut.-Col. A. READ, Superintendent and Collector in the Baramahal and Salem Districts.

Dated—Fort St. George, the 17th August 1798.

Exemption
from Land
customs duty
at Madras.

I am directed to inform you that Government have exempted sugar, the produce of the Company's districts, from the payment of duties at the Land Custom-house at Madras.

2. The Board therefore desire you will furnish all parties purchasing this article in the districts under your charge, with a certificate specifying where manufactured, the quantity and the name of the persons exporting it to the Presidency, that it may be presented to the Land Customer as his authority and voucher for passing it duty free.

XC

Letter—from W. MACLEOD, Esq., Assistant Collector.

To—Lieut.-Col. A. READ.

Dated—the 24th November 1798.

I have the pleasure to forward the accompanying running abstract of the several articles of expense incurred from the beginning, on account of opuntia plantations, and the purchase of cochineal; etc., by which you will please to observe that the price of what has been sent to Madras (1,278 pounds) to the 22nd instant including pags. 364 paid for plantations has amounted to not more than Madras fanams $28-51\frac{10}{18}$ per pound.

Expenses on
Opuntia
plantations
and
purchase of
cochineal.

When the insects are brought in the raw state to either of the District cutcherries for sale they are purchased at the rate of about 12 cash for one rupee weight of insects, which are prepared by the cutcherry peons without any additional expense excepting occasional small donations to the individuals to whose charge it may be committed. When brought prepared, they are purchased at about 30 fanams per pound. But although the preparing the insect is very simple and seen daily at the cutcherries by any inhabitant that chooses to observe the process, it is very seldom that any is brought for sale in a prepared state, notwithstanding the price held out for it.

The proportion between the weight of insects in the raw state to that of dried insects is ascertained to be as five or six is to one; that is to say, that from 5 to 6 lb. of the raw insects will weigh one pound when perfectly dried and cleared.

Should the rearing of this dye be hereafter deemed an object worthy of public consideration, I perceive no material difficulty against succeeding in it, by Collectors allowing a premium for planting the opuntia and allowing the planters the exclusive privilege of gathering the insects in their own plantations. A great proportion of the plants would be destroyed by the insects before they could grow to a certain age, but many plants might be expected to escape at least so as to produce quantities of the insect.

To prevent any possibility of the plant being entirely extinguished, each Collector may have a few plantations on a small scale surrounded by a high wall for furnishing plants alone, and every care should be taken to prevent the insects from reaching them.

The premium which I allowed was $15\frac{1}{2}$ fanams for thousand plants put in the ground at any period between May and September.

Abstract of expenses on opuntia plantations and on the purchase of cochineal.

ENCLOSURE.

Account particulars of Opuntia Plantations and the disbursements for purchasing Cochineal in the Southern division from the 1st October 1796 to the 22nd November 1798 inclusive.

	Cochineal.					Opuntia plantations.			Total cash disbursed for planting opuntia and purchase of cochineal to the 22nd November 1798.	Cochineal sent to the Revenue Board.	Remarks.
	Purchase of insects either prepared or raw.	Rewards to peons, etc. for preparing the insects.	Packing in leather bottles.	Hire of cattle to Madras and batta of peons, etc.	Total.	Paid for gardeners, wells, tools, cooly, etc.	Paid to the ryots as a premium for planting opuntia at rs. 15 and 18 cash per 1,000.	Total.			
31st October 1796	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	P. F. C.	LB.	
30th November 1796	.....	.....	.....	.....	.....	5 6 10	.....	5 6 10	5 6 10	.....
31st December 1796	.....	.....	.....	.....	.....	20 9 14	.....	20 9 14	20 9 14	.....
31st January 1797	.....	.....	.....	.....	.....	14 21 27	.....	14 21 27	14 21 27	.....
25th February 1797	.....	.....	.....	.....	.....	15 17 5	4 21 3	19 38 7	19 38 7	.....
31st March 1797	.....	.....	.....	.....	.....	18 18 47	.....	18 18 47	18 18 47	.....
30th April 1797	.....	.....	.....	.....	.....	16 33 1	.....	16 33 1	16 33 1	.....
31st May 1797	.....	.....	.....	.....	.....	17 8 39	.....	17 8 39	17 8 39	.....
30th June 1797	.....	.....	.....	.....	.....	17 10 31	.....	17 10 31	17 10 31	.....
1st to 12th July 1797	8 10 21	.....	.....	.....	8 10 21	14 21 28	.....	14 21 28	14 21 28	.....
	8 10 21	.....	.....	.....	8 10 21	16 29 60	.....	16 29 60	16 29 60	.....
Add the exchange difference of 45 to 36 fanams per pagoda.	.....	.....	.....	.....	.....	.....	.....	1 0 0	1 0 0	.....
Total in Faali 1206	.....	.....	.....	.....	8 10 21	.....	.....	161 16 24	169 26 45	.....
13th to 31st July 1797	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31st August 1797	52 28 4	.....	.....	.....	52 28 4	13 29 3	.....	13 29 3	66 18 7	.....
30th September 1797	12 6 49	.....	.....	.....	12 6 49	16 12 64	.....	16 12 64	28 19 33	.....
31st October 1797	14 6 8	.....	.....	.....	14 6 8	16 12 64	.....	16 12 64	30 19 64	.....
30th November 1797	20 28 1	.....	.....	.....	20 28 1	19 13 41	.....	19 13 41	39 41 42	.....
31st December 1797	24 24 66	.....	.....	.....	24 24 66	16 13 64	.....	16 13 64	40 37 50	.....
31st January 1798	19 13 9	.....	.....	.....	19 13 9	16 34 0	.....	16 34 0	36 2 9	.....
28th February 1798	23 17 42	.....	.....	.....	23 17 42	15 30 53	.....	15 30 53	49 3 15	.....
31st March 1798	21 28 29	.....	.....	10 25 0	32 8 50	15 37 35	.....	15 37 35	48 0 55	621	
30th April 1798	35 43 6	.....	.....	.....	35 43 6	12 1 74	.....	12 1 74	48 0 1	.....
31st May 1798	27 28 78	.....	.....	.....	27 28 78	11 27 34	.....	11 27 34	39 11 32	.....
30th June 1798	20 21 59	.....	.....	.....	20 21 59	.....	48 7 4	48 7 4	68 18 63	.....
1st to 12th July 1798	45 7 15	.....	.....	.....	45 7 15	.....	.....	.....	45 17 15	.....
	827 88 82	.....	.....	10 25 0	838 18 82	153 32 83	48 7 4	201 39 37	540 12 69	.....
Add the exchange difference	.....	.....	.....	.....	1 9 0	.....	.....	9 0	2 18 0	.....
Total Faali 1207	.....	.....	.....	.....	839 27 82	.....	.....	208 3 37	542 30 69	.....
13th to 31st July 1798	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31st August 1798	16 29 62	.....	.....	.....	16 29 62	.....	.....	.....	16 29 62	.....
30th September 1798	14 22 62	.....	.....	.....	14 22 62	.....	.....	.....	14 22 62	.....
31st October 1798	35 31 0	.....	.....	.....	35 31 0	.....	.....	.....	35 31 0	.....
22nd November 1798	6 25 49	4 23 45	6 0 0	12 30 0	29 34 14	.....	.....	.....	29 34 14	651	
	78 19 13	4 23 45	6 0 0	12 30 0	96 27 58	.....	.....	.....	96 27 58	.....
Add the exchange difference	.....	.....	.....	.....	0 18 0	.....	.....	.....	0 18 0	.....
Total in Faali 1208—Nov. 1798	.....	.....	.....	.....	97 9 58	.....	.....	.....	97 9 58	.....
Total	409 22 66	4 23 45	6 0 0	12 30 0	443 1 31	809 27 55	52 28 6	302 10 61	805 23 12	.....
Add the exchange difference	.....	.....	.....	.....	2 0 0	.....	.....	2 9 0	4 9 0	.....
Total	.....	.....	.....	.....	445 11 31	.....	.....	304 19 61	809 31 12	1,272	

P.S.—
Total amount of disbursements to 31st March 1798 ... P. F. C. 510 18 3

Price per pound of 621 lbs. sent on March after charging all disbursements at fanams 45 per pagoda per lb.—Fanams 36-78 77 1/4

Total disbursements from 1st April to 22nd November 1798. Price per pound of 651 lbs. sent to Madras on 22nd November 1798 at 45 fanams per pagoda per lb.—fanams 20-55 1/4

Total as per receipts lbs. 1,272 fanams 28-51 1/4 per lb. and 45 fanams per pagoda ... 809 31 12

WILLIAM MACLEOD.

8th January 1800.

XCI

Letter—from ROBERT HAMILTON, Esq., Assistant Collector, Ceded Districts.

To—Major A. READ, Superintendent of the Ceded Districts.

Dated—Trichinopoly, the 30th July 1796.

Conceiving that you will be anxious to know what success we have had in ascertaining how far a navigation for boats may be practicable on the Cauvery, I take the earliest opportunity of communicating it to you. The principal objects which I conceived most material to ascertain were the quantity of water at this time in the river (which from the best information is about one-fourth full), the strength of the current, whether a rocky bottom or otherwise, the falls in the river, the number of villages as well on Tippoo Sultan's side as on the Company's, and the chief commodities dealt in, or trades that were followed in the principal villages; a complete statement of which I have the honor to enclose, including everything worthy of remark, and which I hope will be satisfactory.

Navigation on the Cauvery ascertained for the transport of products to the Coast.

2. We commenced our voyage at Komârapâlaiyam opposite the Bhavâni, as you directed, the depth of water from thence to Kosavampâlaiyam (a distance of about 18 miles) is fully sufficient to float down any goods, the medium being at least 4 feet, but the bottom is so rocky and full of large stones I conceive it dangerous for boats to attempt it particularly as the water through these rocks runs from three and a half to four miles an hour.

3. From Kosavampâlaiyam to Eraiyamangalam (8 miles) the river alters from being very rocky to a few only though still stony; the channel being in breadth from thirty to fifty feet and about eight feet deep there can be little apprehension as the rocks may be easily avoided, showing themselves very conspicuously by the disturbance they create in the stream. From Komârapâlaiyam to Kosavampâlaiyam there are several rapid falls, from thence there is a fall a little above Kokkarâyanpêttai near the Gun road or General Medows's Tud not however of consequence.

4. From Eraiyamangalam to Mulasi (a distance of about three miles) the river begins to be very smooth and fine, a little below this there is a creek which may certainly be converted into some use, as it reaches a mile and a half or two miles up the country. This place (Mulasi) appears to be best situated to load any boats with the produce of the Ceded Countries as it is as near to Salem as Komârapâlaiyam or any place above, attended with no risk there being but one fall from thence to Trichinopoly worth notice, which is between Arasampâlaiyam and Sêdar-pâlaiyam; I do not conceive this to be of consequence, however should it appear so on trial a canal may easily be cut at a small expense, as there is at present an anicut at the head of the fall, which may be converted into a canal deep enough for any purpose that may be wanted.

5. The river from this fall to Trichinopoly is a fine sandy bottom and in the channel never less than from three to ten feet water. The country being low for some distance above Trichinopoly, the river widens considerably and the current being less confined the water is not so deep and there are a number of sands, which from the ignorance of our boatmen we found considerable difficulty in getting over but the people who are accustomed to go up and down the river as far as the Nawâb's territories extend (being acquainted with the channel) bring down their boats loaded with grain or any produce (carrying sixteen-bullock load or nearly one ton and a half and drawing two feet water) without the least difficulty.

6. There are at this place four large flat bottomed boats constructed for the purpose of conveying guns, elephants or any heavy articles across the river; they can each carry three hundred troops with their accoutrements, which may be computed at near thirty tons; it appears to me that this boat is well suited for the purpose of conveying any produce from the Ceded districts to the Coast, with the least risk and expense; they have been down to Devikôttai frequently and brought up such stores as may have been wanted by the Nawâb, one of them I

Navigation on the Cauvery ascertained for the transport of goods to the Coast.

learn brought up from thence 12 casks of arrack for the use of the garrison of Trichinopoly. I have the pleasure to enclose the dimensions of one of these boats by which you will easily see its convenience; when empty it draws 7 inches water, and when loaded one foot and a half. From the best information I can get the river for six months in the year has seldom less water in it than at present; should it meet with your approbation, we can put the practicability beyond all doubt, by hiring one of these boats as moderately as we can and send it to Mulasi to be loaded with any articles you may think proper. I have just spoken to a mânjhi or headman of one of these boats and he thinks he can get one up in ten days; however, should he accomplish it in fifteen, the experiment may be worth the trial.

7. Aware of the value of your time in accomplishing the important object in which you are at present engaged I have been as explicit as I am able on this subject, knowing your anxiety for the success of the undertaking; and I hope that the information I have collected will be satisfactory and at least save you some trouble. The importance of a navigation from the Ceded Countries to the Coast and the advantages to be derived from it to their now increasing prosperity can alone be pointed by your superior judgment.

Should I meet with further intelligence of any importance I shall lose no time in communicating it to you.

ENCLOSURE No. 1.

A Statement showing the number of villages with their principal trades and employments on the banks of the Cauvery, the depth and velocity of the water and occasional remarks

[N.B.—Those villages that are marked with an asterisk belong to Tippoo.]

Districts.	Numbers of villages.	Names of villages.	Distance in English miles.	Employments or trades.			Medium depth of water in feet.	Velocity of current per hour.	Remarks.
				Farmers.	Merchants.	Weavers.			
Sankaridrug.	1	Komarpalayam .. ..	..	..	..	Weavers.	5	4	Very rocky bottom—river about 4 yards broad.
	2	Bhavani* ... ..	..	..	Merchants.	..	..	..	The Bhavani river joins.
	3	Puduppalayam	3	Farmers.	..	..	..	..	A considerable fall.
	4	Samayasangili	2	Do.	..	..	..	..	A considerable fall. Erode one mile to the right.
	5	Attampalayam	1½	Do.	..	..	5 to 12	..	Less rocky.
	6	Pallipalayam	1½	Do.	..	..	..	..	Do.
	7	Pudupatti	½	..	Merchants.	..	..	3½	Less rocky. The road leading to Erode, etc.
	8	Vrapalli	3	Farmers.	..	..	..	..	A fall.
	9	Kosavampalayam	3½	Do.	..	..	..	..	Breadth of the river, 500 yards.
	10	Erkalampalayam	½	Do.	..	..	..	..	A pagoda on a rock in the middle of the river.
	11	Puttur	2	..	Merchants.	Weavers.	8	..	Last of the rocky bottom.
	12	Kangyampalayam* ... ..	..	Farmers.	..	..	..	..	..
	13	Eraiyamangalam	3	Do.	..	..	..	..	Gravelly bottom.
	14	Kalamangalam* ... ..	..	Do.	..	..	..	..	..
	15	Kalvelampalayam*	½	Do.	..	..	..	..	..
	16	Manapalli* ... ..	..	Do.	..	..	..	..	..
	17	Mulasi	1½	Do.	..	Weavers.	6	..	..
	18	Reddipalayam	½	Do.	..	..	..	..	A creek reaching one mile.
Parambi.	19	Solasiramani	½	Do.	..	Weavers.	..	..	Fine sand with some large stones.
	20	Pasur* ... ..	..	Do.	..	..	..	..	..
	21	Elampalli	1½	Do.	..	..	..	..	..
	22	Vadugapalayam ... ..	..	Do.	..	Weavers.	..	..	..
	23	Kurumbal Mahadevi ... ..	..	Do.	..	..	10	..	Breadth of the river, about 600 yards.
	24	Kollamkadi* ... ..	..	Do.	..	..	..	..	..
	25	Kolanhalli* ... ..	..	Do.	..	..	..	..	..

ENCLOSURE No. 1—cont.

A Statement showing the number of villages with their principal trades and employments on the banks of the Cauvery, the depth and velocity of the water and occasional remarks—cont.

Districts.	Numbers of villages.	Names of villages.	Distance in English miles.	Employments or trades.			Medium depth of water in feet.	Velocity of current per hour.	Remarks.
				Farmers.	Merchants.	Weavers.			
Paramati—cont.	26	Arasampālaiyam	Farmers.	Villages on the banks of the Cauvery with their trades, etc.
	27	Karvālpālaiyam *	...	Do.	...	...	...	...
	28	Sēdarpālaiyam ...	3	Do.	...	...	...	...
	29	Villipālaiyam *	...	Do.	...	...	...	...
	30	Vaḍakaraiyāttūr ...	...	Do.	...	...	12 to 15	3
	31	Kāipālaiyam *	...	Do.	...	...	...	...
	32	Unjalūr * ...	...	Boatmen	...	...	...	...
	33	Kandampālaiyam ..	...	Farmers.	...	Weavers.	...	...
	34	Ānangūr ...	...	Do.	...	...	...	...
	35	Jampālaiyam ...	...	Do.	...	...	9	...
	36	Vengampūr *	...	Do.	...	...	...	...
	37	Kunnattūr ...	...	Farmers.	...	...	...	...
	38	Naravapālaiyam ...	1½	and Goldsmiths.	...	...	...	...
	39	Kodumudi *	...	Farmers.	...	...	...	...
	40	Pilikkilipālaiyam ...	2	Do.	...	...	11	...
	41	Chinnayampālaiyam ...	2	Do.	...	...	...	...
	42	Surakkāpālaiyam *	...	Do.	...	...	...	...
	43	Kondalām ...	2	Do.	...	...	...	2½
	44	Nekkuppam *	...	Do.	...	...	5	...
	45	Karukkāpālaiyam ...	1½	Do.	...	...	...	...
	46	Māravapālaiyam *	...	Do.	...	...	...	...
	47	Vengarai ...	2	Do.	...	...	...	...
	48	Senanji *	...	Do.	...	...	...	...
	49	Kāchīpālaiyam ...	...	Do.	...	...	...	...
	50	Kumpālaiyam *	...	Do.	...	...	...	...
	51	Puduppālaiyam ...	1½	Do.	...	Weavers.	...	...
	52	Kālipālaiyam *	...	Do.	...	...	...	...
	53	Vēlūr ...	3	Do.	Merchants.	Weavers.	...	2½	
	54	Pogalūr ...	2	Do.	...	...	4	...
	55	Arichīpālaiyam ...	...	Do.	...	...	...	...
	56	Vedīār ...	...	Do.	...	...	...	...
	57	Toṭṭakkurichi *	...	Do.	...	...	...	...
	58	Gūlalūr ...	...	Do.	...	...	...	...
	59	Kumerīpālaiyam *	...	Do.	...	...	...	...
	60	Kalmutapālaiyam ...	...	Do.	...	...	5	...
	61	Talaiyampālaiyam *	...	Do.	...	...	...	...
	62	Kamārapālaiyam ...	...	Do.	...	Weavers	...	...
63	Kaḍambakurichi *	...	Do.	...	Do.	...	...
64	Konīpālaiyam ...	...	Do.	...	...	...	...
65	Nanniyūr ...	...	Do.	...	...	...	...
66	Kaḍappalli ...	1½	Do.	...	...	...	...
67	Chedindapālaiyam *	...	Do.	...	...	...	...
68	Pillāipālaiyam ...	3	Farmers and Boatmen.	...	...	...	2½	
69	Kōvilpālaiyam *	...	Farmers.	...	...	...	...
70	Mōhanūr ...	1½	Do.	Merchants.	Weavers.	9	...		

ENCLOSURE No. 1—cont.

A Statement showing the number of villages with their principal trades and employments on the banks of the Cauvery, the depth and velocity of the water and occasional remarks—cont.

Districts.	Numbers of villages.	Names of villages.	Distance in English miles.	Employments or trades.			Median depth of water in feet.	Velocity of current per hour.	Remarks.
				Farmers.	Merchants.	Weavers.			
Karupattūr nopoly.	71	Vāngal *	Farmers	Here the Amarāvanār joins. The first bank is thrown up to prevent the water from overflowing the country and it is continued of either side as the course of the current may prove too strong. The country in several places below this is even lower than the bed of the river. Breadth of the river very uncertain and irregular.
	72	Oravandūr ...	3	Do.	...	Weavers.	...	...
	73	Malampuram * ...	...	Do.	...	...	...	...
	74	Unniyūr ...	3	Do.	...	Weavers.	...	...
	75	Nerūr * ...	...	Do.	...	Do.	...	...
	76	Sinniyāpālayam ...	½	Do.	...	...	4	2½
	77	Tirmaknal * ...	...	Do.	...	...	...	...
	78	Illūr Left ...	2½	Do.	...	...	...	...
	79	Kattalai Right ...	...	Do.	...	...	...	...
	80	Silappillāputtūr Left ...	1	Do.	...	...	...	...
Trichinopoly.	81	Māyanūr Right ...	...	Do.	...	...	...	...
	82	Nattam Left ...	2½	Do.	...	...	...	...
	83	Kimapuram Right ...	...	Do.	...	...	...	...
	84	Puttūr Left ...	½	Do.	...	...	...	...
	85	Metamudanapuram Right ...	...	Do.	...	...	...	...
	86	Karikāli ...	1½	Do.	...	...	...	...
	87	Mahādānapuram Right ...	...	Farmers and Boatmen.	...	...	5	...
	88	Tirunārāyāpuram Left ...	½	Farmers.	...	...	...	...
	89	Vetakutti Right ...	...	...	Merchants and Boatmen.	...	...	3
	90	Varadarāpuram Left ...	1½	Farmers and Boatmen.	...	...	...	...
	91	Lālapettai Right ...	...	Farmers.	Merchants.	...	...	...
92	Mahēndramangalam Left ...	1½	Do.	...	...	...	...
93	Karupattūr Right ...	...	Do.	...	Weavers.	...	...
94	Srinivāsanallūr Left ...	1½	Farmers and Boatmen.	...	...	5 to 6	...	
95	Timmāchipuram Right ...	...	Farmers.	...	...	...	...
96	Maṣamēḍu Left ...	1½	...	Merchants.	Weavers.	...	...
97	Vayalūr Right ...	...	Farmers.	...	...	...	...
98	Sandipālayam Left ...	1½	Farmers and Boatmen.	...	...	10 to 15	...	
99	Maṣatattai Right ...	...	Farmers.	...	...	...	...
100	Maṣiri Left ...	4½	Do.	...	...	...	...
101	Kuṭṭitalai Right ...	...	Do.	...	Weavers.	7	...	

ENCLOSURE No. 1—cont.

A Statement showing the number of villages with their principal trades and employments on the banks of the Cauvery, the depth and velocity of the water and occasional remarks—cont.

Districts.	Numbers of villages.	Names of villages.	Distance in English miles.	Employments or trades.			Medium depth of water in feet.	Velocity of current per hour.	Remarks.
				Farmers.	Merchants.	Weavers.			
Trichinopoly—cont.	102	Umayáparam Left ...	3	Farmers.	Villages on the banks of the Cauvery with their trades, etc.
	103	Baindrumtenipúndi Right.	...	Do.	...	...	...	2
	104	Yellú Left ...	...	Do.	...	...	...	...
	105	Marudú Right ...	...	Do.	...	...	4 to 6	...
	106	Sundakká Left ...	...	Farmers and Boatmen.	...	...	...	...
	107	Palaya Cauvery Right ...	...	Do.	...	...	...	1½
	108	Amú Left ...	2	Do.	...	...	...	...
	109	Sirukamaní Right ...	...	Do.	...	...	...	...
	110	Váttalaigúdalú Left ...	...	Do.	...	...	...	...
	111	Tiruppalátturai Right ...	...	Farmers and Merchants.	...	...	...	1½
	112	Kariyamáppikkam Left ...	...	Farmers and Boatmen.	...	...	...	...
	113	Amargudi Right *	...	Do.	...	...	4	...
	114	Kiliyanallú Left *	1½	Do.	...	...	...	...
	115	Andanallú Right ...	1½	Do.	...	...	...	...
	116	Jevandináthapuram Right ...	1½	Do.	...	...	3	...
	117	Murungappéttai Right ...	3	Merchants and Boatmen.	...	...	...	...
	118	Muttarasanallú Right ...	...	Farmers and Boatmen.	...	...	...	...
	119	Kambarasampéttai Right.	...	Do.	...	...	...	...
	120	Trichinopoly ...	2½	...	...	...	...	...
			Total ...	108½					

It must be understood that this estimate of the depth and velocity of the river is founded on a supposition of its being only one-fourth full and therefore that it will vary in proportion to the quantity of water.

ENCLOSURE No. 2.

The following are the dimensions of a flat-bottomed boat or lighter employed at Trichinopoly in carrying across the river guns, elephants, horses, grain, etc., and occasionally in bringing from Devikóttai supplies of liquor and stores to Trichinopoly and will carry from 25 to 30 burthen :—

	F.E.E.T.
Extreme length above ...	40
Do. breadth ...	14
Do. at each end ...	9
Length of keel ...	20
Slope at each end ...	10
Height within board ...	3
Draws when loaded ...	18 inches water
Do. light ...	6 "
Number of timbers without knees alternately ...	50-6 inches by 4.

ENCLOSURE No. 2—*cont.*

Navigation
on the
Cauvery as-
certained
for the
conveyance
of goods to
the Coast.

A boat of these dimensions will carry 100 bales of cloth each 4 feet long, 2 feet broad, and 2 feet high, which carriage will amount at 3 pags. per bale to 300 pags.

	PAGS.
Such a boat when complete will cost	140 or 150
20 men to manage her at 2 pags. per month	40
One European at 10 pags. per month	10
	<hr/>
	200
	300
	<hr/>
Profits on one trip	100 exclusive of returns.

There are 4 boats of these dimensions employed at Trichinopoly and managed by 10 men each and cost each when new Rs. 500 who independent of the state of the river or wind would undertake to make one trip from Mūlasi to the Coast and return within one month.

XCII

Letter—from Major A. READ, Superintendent and Collector, Baramahal and Salem.

To—ROBERT HAMILTON, Esq.

Dated—Salem, the 3rd August 1796.

I have had the pleasure to receive your letter with its accompaniments, which evincing your activity, attention to the objects of the execution, and containing very useful information, are highly satisfactory. From your report of the navigation at this time, when the Cauvery is so low, there can be no doubt of deriving from it great advantages to this country, and now we have entered upon it (which my numerous avocations alone have delayed) I am anxious to have the practicability of conveying goods from thence to the Coast demonstrated without loss of time as it may be expected that the river will continue to fall all the rest of the season. I wish you for this purpose to hire, if you can, one of the largest boats you describe, in order to ascertain what length of time it will require to bring it up to Mūlasi. I apprehend, however, that the mouth of the Tirumanimuttār or Salem river would still be a better place for a port than Mūlasi on account of its being 30 miles lower down the Cauvery and only 55 from Trichinopoly, also below the fall between Arasampālaiyam and Sēdarpālaiyam which you describe as the only one worth notice. A creek may be a convenience and it appears by my map that there is one at the place I mention. I wish therefore that though you may proceed to Mūlasi, you examine the Tirumanimuttu and come up it as far as Paramati from which it cannot be farther than 3 or 4 miles. Examine likewise the mouth of the Karuvāttār, which runs by Karuppattūr for that may be equally commodious for a port and it is 28 miles lower down, consequently within 27 of Trichinopoly. Since a trade is carried on between Trichinopoly and places above it in grain which is probably sent to the Coast, I wish you to enquire where the market is and the present price, for there is a quantity of amāni grain on hand which I wish to dispose of. Communicate at the same time with Captain Macleod who has charge of this grain on the subject, and if you can effect this purpose by negotiating with any dealer in grain at Trichinopoly or elsewhere, hire as many boats as may be necessary for transporting it from Karuppattūr Paramati, Mūlasi or whatever place it may be most convenient to ship it according to Captain Macleod's information in regard to the place where it is at present. If you find the grain can be disposed of as Captain Macleod may think to advantage you may do it, in conjunction with him, without waiting for further instructions from me on the subject.

2. Leave Mr. Mather to carry on the survey of the Cauvery agreeably to the instructions I gave him when at Salem.

3. When the business you now have in hand is executed and you return to these districts, I shall request you to inspect the water-courses in the Paramati, Nâmakkal and Karuppattûr districts, in order to determine which will be the best situations, for plantations of sugarcane, indigo, mulberry, betelnut and other productions for foreign markets from which I am certain these districts may acquire great wealth now the transporting them by water is found to be practicable.

Navigation on the Cauvery ascertained for the conveyance of goods to the Coast.

XCIII

Letter—from ROBERT HAMILTON, Esq., Assistant Collector, Central Division.

To—Major ALEXANDER READ, Superintendent, Salem.

Dated—Trichinopoly, the 12th August 1796.

In consequence of your instructions of the 3rd instant, which I received duly, I have used every exertion to hire one of the large boats in order to make the experiment of the navigation of the river; the Nawâb declines lending one without permission of the Nawâb at Madras, as he says complaints have been made on account of his not having more boats.

2. There are at present two boats on the Cauvery and one on the Coleroon employed solely in conveying people across the rivers and I thought that one might be spared, as there is no Company's business going on or likely to be.

3. I have learnt that there is wood already prepared for constructing two of these boats and that they can be put together in ten days; in consequence of which I have waited on the Nawâb; and informed him of the purpose on which I came and requested that he would order one of them to be got ready as fast as possible, the expense of which would be defrayed by Government; he promised that one should be got ready but that he must have leave of the Nawâb at Madras before he could deliver it to me; and for which leave therefore I must wait.

4. I shall pay particular attention to your instructions in regard to the Tirumanimuttu and Karuvât rivers in my way up, and likewise in examining the creeks that appear best adapted for loading and discharging boats.

Agreeable to your directions I have written to Captain Macleod on the subject of the amâni grain and inclosed him the price current of grain here, and though there is little hope of disposing of it here, I trust in conjunction with him to find a market elsewhere.

XCIV

Letter—from R. HAMILTON, Esq., Assistant Collector, Central Division.

To—Major ALEXANDER READ, Superintendent, etc., Salem.

Dated—Mulasi, 5th September 1796.

I received charge of a large boat on the 21st instant, and despatched it to Andanallûr the day after; it being an old boat I would by no means advise that any cargo should be put into it, but that with your permission it should be employed solely, in ascertaining the river. The Nawâb allowing only four people to attend the boat up, I have been obliged to hire sixteen more and finding it necessary to have some rope, I indented on the stores at Trichinopoly for such of the old cordage as I conceived would be sufficient; I joined the boat on the 24th and proceeded to Marudûr, reached Timmâchipuram on the 25th, Silappillâputtûr on the 26th and Môhanûr on the 27th where owing to some objections made by the Nawâb's people, who it appeared were ordered to go no further, we were detained until the 1st of September when by persuasion and threats they were prevailed upon to go on, we reached Gûddalûr that evening, Kondalam on the 2nd, Sêdarpâlaiyam on the 3rd and this place Mulasi on the 4th which is a distance of at least 80 miles from Trichinopoly and performed in the space of nine days deducting those we were unavoidably

Navigation
on the Cau-
very ascer-
tained for the
conveyance
of goods to
the Coast.

detained at Mōhanūr, and this I conceive may be constantly done with ease at this season of the year provided the bushes, reeds and other impediments were cleared away from the banks of the river.

2. I have examined agreeable to your directions the Karuvât and Tirumanimuttu rivers.

3. The Karuvâtâr falls into the Cauvery between Nattam (a considerable village of the Nawâb) and Kâduvetti in the Kârupattâr District, I find it not so considerable, a river as I expected and navigable for boats of any description scarcely 800 yards up. The entrance of it may answer for a place to load boats at and being only $1\frac{3}{4}$ miles from Kâttuputtâr it might be turned to more uses than I am at present aware of.

4. The Tirumanimuttâr is also an inconsiderable river where it joins the Cauvery, the water being occupied above, in tanks and water-courses. It is not navigable even so far as the Karuvâtâr but it might like that river be converted into a place of some convenience to load boats at, as Paramati is but $3\frac{1}{2}$ miles distant from its entrance.

5. Water being so valuable in this country and occupied as far as both public and private interest can convey it, I am apprehensive that none of the lesser rivers can be turned to any account as aiding a navigation in the Cauvery.

6. I have been induced to inform you of my arrival at this place, as I at first conceived the navigation could be carried thus far if there was no difficulty in getting over the fall which I mentioned in my letter of the 13th July between Sêdarpâlayam and Arasampâlayam and which we got over without much inconvenience though I am apprehensive there might be some danger when the river is full and very rapid. I purpose trying how much further I can go on but I fear it will not be many miles.

Navigation
on the Cau-
very possible.

7. Having now proved beyond all doubt that a navigation may be carried on for several months in the year on the Cauvery, I hope it will meet with your approbation that after going down in the boat to Mōhanūr and it arriving safe there, I may discharge the boat and return to Salem.

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* The taluks of the Salem district have been divided into three parts, viz., (1) The Talaghât, (2) The Bâlâghât, and (3) The Bâramahal.

(1) Talaghât—the low country or country below the ghâts. The name applied to the taluks of Salem, Atur, Nâmakkal and Tiruchengôdu.

(2) Bâlâghât, the tract above (bâlâ) the ghâts. Generally used for the Hosûr taluk.

(3) Bâramahal, the twelve places, signifies 'the tract ruled from the 12 palaces.' The name is applied to the taluks of Tiruppattûr, Krishnagiri, Dharmapuri and Ôttankarai—vide Manual of the Salem district, 1883, vol. II.

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* One who speaks two languages.

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(a) Denotes a heap, a quantity.

(b) Dry cultivation.

(c) Means a certain no. of threads, whence it has come to denote a class of cotton cloths varying in quality according to the number of threads in the wool.

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