M.R.O. 1—38,000—16-10-29.

MADRAS RECORD OFFICE.

Government of Madras.

Revenue **DEPARTMENT**

G.O. No.	1945	Press ~~Mis.~~	
263-64 Dated	13-7-	19	1868

Not to be folded or roughly handled

Proceedings of the Madras Government, Revenue Department,
13th July 1868.

No. 243. Read the following letter from H. RIVETT-CARNAC, Esq., Cotton Commissioner, Central Provinces and the Berars, to the Secretary to Government, Madras, dated Camp ——— , 26th June 1868, No. 1,810 :—

1. In continuation of my letter No. 1,584, of 18th instant, I would desire to submit copy of correspondence, regarding the Hingunghat Cotton plant, addressed to the Government of Bombay, and which has been printed by that Government, and published in the "Bombay Government Gazette," of the 18th instant.

2. The Memorandum on the Hingunghat plant has already been forwarded to you, but I should be glad if the attention of all who undertake experiments with this seed in the Provinces under the control of the Madras Government, could be drawn to paragraph 3 of my letter, No. 1,329, dated 28th ultimo, to the Secretary to the Government of Bombay, in which the importance of selecting the seed is alluded to.

No. 244. ORDER THEREON, 13th July 1868, No. 1,945.

Miscellaneous.

1. Forwarded to the Board of Revenue and the Sydapett Farm Committee, in continuation of G. O., under date 30th June 1868, No. 1,826.

2. The Memorandum and correspondence with the Bombay Government will be published in the "Fort St. George Gazette" for general information.

(True Extract)

(Signed) R. A. DALYELL,
Acting Secretary to Government.

To the Board of Revenue.
,, the Farm Committee.
,, the Superintendent of the Government Press.

Exd. S. T. Augustin.

MEMORANDUM ON THE CULTIVATION OF COTTON.

As several gentlemen, who are desirous of making experiments in Bengal this season with Hingunghat Cotton Seed, have requested me to give them information on certain points regarding the locality and soil in which the cotton thrives, and the manner of its cultivation, I have drawn up the following brief note which, I hope, may be of some use to those who are inclined to assist in extending the cultivation of this superior class of indigenous cotton.

Hingunghat cotton is grown in the Wurdah district of the Central Provinces in the neighbourhood of the town of Hingunghat—an important cotton market—from which place the cotton takes its name.

The cotton is celebrated for its cleanness (freedom from leaf and dirt), brightness of colour, length, strength, evenness, and silkiness of staple. In all these points—all of which are regarded as of great importance by the spinner—the Hingunghat variety is superior to most of the Indian cottons. As compared with the cotton of Bengal, that grown in the Hingunghat country, besides being superior in all the respects noticed above, is particularly glossy and soft, whilst Bengal Cotton is wooly and dull in appearance, and rough and harsh to the touch.

There can be little doubt that the superior quality of this cotton is to be attributed to the physical advantages of the tract in which it is grown. The Wurdah district is situated on the northern extremity of the great Deccan sheet of trap, which extends from Mudnoor—far south in the territory of H. H. the Nizam—to the low hills which form the northern boundary of the Wurdah district. The height of the cultivated plateau is not more than 900 feet about the sea level. The soil is of the well known "*regur*," or black cotton soil, composed of the debris of the trap rock, the basis of the geological formation of the district. The following description and scientific analysis of this soil is extracted from Ansted's Geology, p. 343 :—

"Its colour is bluish black, greenish, or dark grey. It forms into a paste with water, and gives a clayey odour. It absorbs moisture rapidly, and parts with it in dry and hot weather. Its thickness varies from 3 to about 20 feet. It is cultivated very easily, yielding a rotation of crops, consisting of cotton and two kinds of corn. It rarely requires to be left fallow, and demands but little husbandry, although for the last 2,000 years this soil has continued in cultivation without manure, retaining the utmost fertility."

The following is an analysis of the "*Regur*" :—

Silica	48·20
Alumina	20·30
Carbonate of Lime	16·00
Carbonate of Magnesia	10·20
Oxide of Iron	1·00
Water and Organic matter	4·30
	100·00

In the Hingunghat country this soil varies in depth from 2 to 15 feet, but the average depth of the best cotton-growing lands does not exceed 6 or 8 feet. Beneath this rich coating, kunker, a sort of hard gravel, is found, and below this again is the trap-rock already noticed.

The country slopes gradually southward towards the river Wurdah, which forms the southern boundary of the tract, and as the village lands, following the upheavings of the volcanic crust beneath, lie in huge waves of soil, the direction of which is at right angles to the course of the river, the drainage is excellent, the rainwater being carried off by streams flowing down between the troughs of these waves, and discharging themselves into the Wurdah. The rainfall in the tract is moderate, not exceeding on an average 39 inches. Last season the monsoon was unusually heavy, and very much harm was in consequence caused to the cotton crops.

It will be seen from the above that the tract in which the cotton is grown possesses two great physical advantages—a good soil, and excellent drainage. And of the two the drainage is if anything of even greater importance than the soil. For although due provision must be made for the tap-root of the plant, which strikes straight down into the ground, it is not necessary that the soil should be more than from 4 to 5 feet deep. Cotton is of course often sown in soil the depth of which is not one quarter of the above, but the poorness of the soil tells upon the plant and its produce. On the other hand cotton is apt to be clogged and smothered in the very deep rich soil, and this is one of the reasons, I believe, for the plant not being very extensively cultivated in the Nurbudda valley, the lands of which are much better adapted for wheat, which is grown in, and exported in large quantities from the Nurbudda districts. In the Wurdah district the deepest soil is to be found in the Mandgaon pergunnah, and here, too, wheat takes the place of cotton, which the people say thrives better in a lighter soil.

In selecting the fields for the experimental culture of Hingunghat cotton, I would recommend then that particular attention be paid to the drainage of the ground. At the same time a fair average soil should be allotted to the crop.

As regards the cultivation, I hardly know the seasons in which cotton is planted in the Bengal province, or the manner in which the crop is now treated. I am unable, therefore, to offer any suggestions regarding improvements to be made in the present mode of cultivation there. I will, however, mention briefly the method in force in the Hingunghat country, and as that system is sufficiently successful, it would perhaps be well if the gentlemen who are good enough to make experiments with the Hingunghat seed, were to follow that system, unless their experience suggests that it is not adapted to the circumstances of the country. Where opportunity offers it would be well to cultivate one field according to the Hingunghat plan, and to treat another in the manner peculiar to the District in which the experiment is made.

In the Hingunghat country the cotton is sown during the first break in the weather following the setting-in of the rains.* The field selected is generally one that has borne a grain crop the previous year, for, of course, cotton should never be sown two seasons running in the same ground. Previous to the commencement of the monsoon the ground is prepared for the crop by being ploughed or rather scraped by the "*bukhur*," a rough instrument which is peculiar to this part of the country, and which takes the place of the plough of Eastern India. The *bukhur* is passed over the field five or six times according to circumstances, and has the effect of scraping up and loosening the soil, and preparing it to drink in the rain, which, instead of running off the surface, as on the hard untilled ground, sinks through the loose earth moistening and softening it so as to admit of the working of the drill-plough, and the commencement of sowing operations. In this part of India, cotton is never sown broadcast, but always in rows, sometimes with the drill-plough, or, when the soil is light, with the aid of the *bukhur*, and a bamboo tube down which the seed is poured, and which serves the part of the feeder in the drill-plough. The seed, from the circumstance of much of the cotton fibre adhering to it, often clogs the feeder, and, to obviate this, the cultivators in this part of the country generally roll the seed in cow-dung or dry earth, which process helps it to run more freely down the tube. I mention this, as the Hingunghat seed may perhaps, without the use of this precaution, give some trouble to the sowers in Bengal. In this part of the country the seed is sown very close, too close together, and the rows are as a rule, not far enough apart. As however the plant is small, and does not branch out, it admits of being more closely packed than many other varieties, but I would recommend that the rows be not less than 2½ to 3 feet apart. Soon after the plant appears above ground, the soil between the rows, which the action of the rain has hardened and caked, is loosened with a sort of hoe, a small edition of the *bukhur*, which fits in between the lines. The young plant is thus helped to push its way above ground, and is now left pretty well to itself until the weeds begin to appear. The weeds should then be carefully removed, the weeding being done by hand, and this process should be repeated sufficiently often to keep the field perfectly free from grass.

As the plants progress, care should be taken to thin the field in places where the plants are found to have been sown too close together. In foreign soil the Hingunghat plant has sometimes been found to shoot up very rapidly, and to show a tendency to run to wood. In its own country it is a short, sturdy little plant, small, seldom more than 3 feet in height, but yielding a good quantity of cotton (the great point), and when it appears to be outgrowing its strength it would be well to "top it," by cutting off a few inches from the top of the plant. And too much care cannot be bestowed in following the plan of "rogueing" the crop, as advocated by Major Trevor Clarke, and thereby ensuring the purity and high quality of the plant. In the Hingunghat country this valuable process has only recently been introduced, and although the seed sent to Bengal and other parts of India has been selected from the best lands and with considerble care, I cannot too strongly urge the importance of rogueing the crop, and selecting the seed as recommended in Major Trevor Clarke's pamphlet. Spare copies of the pamphlet will be forwarded, but for facility of reference an extract from this valuable paper is here annexed:—

"But I must now turn your attention to a fresh subject, already, however, alluded to in my former letters, namely, the use of pure seed, to be effected by the rigid isolation of sorts. Next to a constant supply from any indicated source, the manufacturer requires a *constant quality of staple*. From accounts I have received, from credible eye-witnesses, the mixture of sorts in a cotton-field, especially in the West Indies, is inconceivable, the crop in some instances looking like a flower-garden with different sorts, sizes, and colours. In one case my informant described the not unfrequent appearance of a red blossomed sort, evidently the Indian G. Arboreum, in his fields.

"This is the work of the native labourer, who is either incapable or unwilling to see the difference between right and wrong, at any rate where his own interests are not concerned. His delight seems to be in reversing, confusing, or nullifying especial orders the moment the master's eye is off, and the mixture of seed is generally his preliminary operation. In my own experience I rarely receive unmixed samples, and wrongly named sorts are continually sent home, although probably in good faith as far as concerns the sender.

"The one and only remedy for this will be found in English skill, science, and energy, strongly exerted in this one direction. Experimental farms, at the expense of, or encouraged by Government are nothing new; for a century or two these have been carried on in spite of the perversity of man, as well as that of the elements, and have borne their fruit. My modification, however, of the system would be this: *Let such establishments be entirely devoted to seed farming*, the sole effort being restricted to the production of pure seed in the country where it is destined to be grown in future. In this country no grower of seed, either for agricultural or gardening purposes, would now obtain a sale for his produce were he to supply his customers with mixed or inferior seeds. In the establishments of such persons

* In some parts of the Chandah district, and on the Godavery, a small crop is raised by sowing the cotton after the rains. It ripens in April.

the master himself goes through his crops several times a year for the purpose of destroying every plant which proves inferior or untrue to sort. This weeding process is technically and expressively called 'rogueing' the crop, and is absolutely necessary to ensure purity and high quality. At the same time improvement by special selection is carried on: single plants showing high qualities are picked out for propagation, and the produce of these submitted even more rigidly to the same treatment." *

If these instructions be carefully followed, and the produce of the best plants be carefully selected on the pedigree system, and seed-gardens be established and sown with the selected produce, I have little doubt that the introduction of the Hingunghat cotton seed into Bengal will do much good.

The cotton plant begins to flower in September, during the following month the pods form, and in November the capsules burst and the cotton is ready to be picked. Care should be taken to pick the cotton whilst the plant is yet young and fresh, and before the leaves wither and die and become mixed up with the cotton. Much of the cotton in this part of India is damaged, and suffers in price from the careless manner in which this process is performed.

The ginning, or the separation of the cotton from the seed, is performed here by the common Native "*Churka*," or "*Recha*," as it is more properly called. Where Platt's Macarthy Gins are at hand I would recommend that they be used.

It will be noticed that I have not recommended the use of manure. Its use should depend on the circumstances of the soil and the experience of the cultivators in that part of India where the experiment is made. What suits Hingunghat land may not be found to answer in Lower Bengal, but I may mention that here the cultivators do not generally manure their cotton-fields. They hold that if the rainfall is unusually heavy, manure may be found to answer, but that in their country, where the fall does not exceed 39 inches, manure is apt to excite the plant and drive it to wood, resulting in very fine cotton plants with hardly any cotton! Experiments are being made to test the correctness of this theory. In a new country, I should be glad to see as many experiments as possible tried, and it would be well not only to sow the seed in every sort of soil available, but also to try the effect of the cultivation with and without manure.

I would, however, advise all who undertake experiments with this seed to sow not less than 5 or 6 acres at a time. Any experiment conducted on a smaller scale than this will hardly be satisfactory. On an average from 8 to 10 lbs. of cotton seed are required for an acre, and thus from 50 to 60 lbs. of the seed will suffice for each trial.

Where convenient I should be glad if not less than 12 lbs. of *Kupas* (uncleaned cotton) from each field could be forwarded to my address at Nagpore, with a statement, in the accompanying form, showing the result of the experiment.

I need hardly say that I shall be at all times exceedingly glad to answer any questions, and to render any assistance in my power to all who take an interest in the subject.

HARRY RIVETT-CARNAC,
Cotton Commissioner for the Central Provinces and the Berars.

Camp Oomraotee, 18th March 1868.

Result of Experiments with Hingunghat Cotton Seed in _____

Size of Field and quantity of Seed sown.	Description of Soil.	Yield of *Kupas* (Cotton in the Seed) in lbs.	Yield of Cleaned Cotton in lbs.	Remarks.
				Here it would be convenient if a short description of locality could be entered, with particulars of the treatment the crop received, of the season, &c. &c.

* Major Trevor Clarke's "Improvement of Cotton by Purity of Seed," page 3. Published by the Cotton Supply Association, September 1866.

No. 1329 of 1868.

From H. RIVETT-CARNAC, Esquire,

Cotton Commissioner, Central Provinces and the Berars,

To The SECRETARY to the GOVERNMENT of BOMBAY.

Dated Camp Kamgaon, 28th May 1868.

Sir,—With reference to your letter, No. 3484, dated 10th October 1867, I desire now to report the steps that have been taken this season to supply Hingunghat Cotton seed to gentlemen in the Bombay Presidency, who have been willing to undertake experiments with this superior class of indigenous Cotton.

2. The names of the gentlemen who have applied for Hingunghat seed, and the quantity sent to each, is given below:—

Through Commissioner of Sind.

No. 1.	Superintendent Thurr and Parkur	160 lbs.
2.	Political Superintendent, Upper Sind Frontier	600 lbs.
3.	Collector of Kurrachee	600 lbs.

Through Officiating Commissioner, Southern Division.

No. 4.	Collector of Belgaum	2 maunds (of 82 lbs. each).
5.	Collector of Ahmednuggur	18 „ (ditto).
6.	Collector of Poona	50 lbs.
7.	Collector of Sattara	100 lbs.

Through Inspector in Chief, Cotton Department, Bombay.

No. 8.	Cotton Department in Sind	½ ton.
9.	Cotton Inspector, Dharwar	1 „
10.	Cotton Department, Surat and Broach	5 maunds (of 82 lbs. each).
11.	Ditto Sholapore and Poona.	13,000 lbs.

Applied for, and despatched direct.

No. 12.	C. Hogg, Esquire, Collector of Broach	10 maunds (of 82 lbs. each).
13.	J. McL. Campbell, 2nd Assistant Collector, Khandeish	8 maunds (ditto).

3. I have also the honour to enclose copy of a brief memorandum on the Hingunghat plant, drawn up at the suggestion of some officers in Lower Bengal, who are giving the seed a trial in that province. To this Memorandum I have at present but little to add, save that I would desire to urge, as strongly as possible, the importance of establishing seed gardens, and selecting the Hingunghat seed in the manner recommended by Major Trevor Clarke, extract from whose paper on the subject is given in the Memorandum herewith forwarded. If it is desired that Hingunghat cotton should succeed in other parts of India, it will be found necessary, I am certain, to be most careful in selecting the seed; and, as I attach so much importance to this matter, I may perhaps be excused if I quote here from a letter written to the Secretary Chief Commissioner Central Provinces, on the subject, in October 1866:—

"Many gentlemen with whom I have consulted in Bombay, have impressed on me that, without introducing new seed, which must be a work of time, much may be done at once to improve the cultivation of cotton, by carefully selecting the seed grown in our Districts.

"Under the present system, the cultivators seldom trouble themselves, when picking the Cotton, to choose and reserve the best seed for the next season's sowings. Although in one part of a field the plants may be fine, and strong with large 'bols' of Cotton, and healthy seed, whilst in another part, owing perhaps to inferiority of soil, the plants are poor and sickly, and the seed proportionately bad, still the 'kupas' (seed cotton) when picked is invariably massed together, and no attempt is made to keep the two sorts separate. After the Cotton has passed through the gin, it is impossible, I understand, to distinguish the good seed from the bad, the size of the seed being no criterion of the superiority of its quality, as large seeds are often but the bloated produce of some small unhealthy plant. The good and bad seed being thus mixed together, much of what would be really valuable for the next sowings goes to the cattle, and a large proportion of what is inferior seed finds its way back to the fields.

"I would, therefore, suggest that during the ensuing season, the Landholders be recommended to take particular care in selecting the best seed for next year's crop. For this purpose a certain number of the finest and healthiest plants, bearing the largest 'bols' should be selected, and the 'kupas' (seed cotton) picked from those plants should be set apart, and the seed obtained from the 'kupas' after cleaning should be reserved for the next season's sowings. A little care in selecting cotton seeds, would, I am convinced, do much to improve our cotton cultivation, and if some of the Landholders could be induced (as I hope hereafter to be able to induce them to do) to raise cotton for seed on carefully tended garden lands, a still greater improvement might be secured. Perhaps district Officers might be able to assist by planting carefully selected seeds in the rich fields which are sometimes attached to the public gardens."

4. I should be glad if the importance of selecting the seed could be impressed upon all gentlemen who have undertaken experiments with Hingunghat Cotton in Bombay. And I am particularly anxious that the plan recommended by Major Trevor Clarke should be followed in regard to Hingunghat cotton sown in the Bombay Presidency, because much of the seed supplied by me is not as pure and healthy as I could wish it to be. And by this I mean it is not seed that has been grown specially in Government seed gardens, and selected on the principle which I desire so strongly to advocate. Such gardens have been established in some places, but the produce is not sufficient for one-twentieth part of the demands that have been made upon me this season. The seed sent is that generally used in the Hingunghat district. It has been purchased in the best villages, celebrated for their cotton, but as I have already explained, this seed is susceptible of much improvement, and hence my anxiety for the adoption of Major Trevor Clarke's plan in all the cases in which this seed has been supplied.

I have the honour to be,

Sir,

Your obedient Servant,

H. RIVETT-CARNAC,

Cotton Commissioner for the Central Provinces and the Berars.

Rev: 2350/68

To Gazette
as a Supplement

Inserted
11th July 1868

P. 13th July/68
PD 243-244

From 15th July/68 Ln Lg 243.