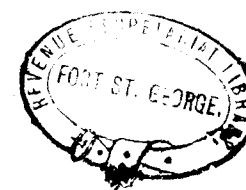




to be printed by the printer

NOTE
ON
INDIAN COTTON.

*By
Schepherd
1858*



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NOTE ON INDIAN COTTON.

IN writing this note (or rather summary) it has been thought better, in
Introductory. order not to tire the reader, to limit it to—

- (i) a brief account of the early and continued efforts to improve and develop cotton culture and trade;
- (ii) area and outturn of cotton;
- (iii) trade in cotton;
- (iv) experiments with cotton (this might be dealt with under (i), but it has been found more convenient to reserve it to the last);

and to give similar but more detailed information for each Province in an appendix (A).

2. Indian cotton has been a subject of interest for many years, at least half a century. In Bengal cotton cultivation Indian cotton has attracted notice from an early period. appears to have been at one time in a thriving position, especially in Eastern Bengal with Dacca for a manufacturing centre. The remains of this cultivation are said to still exist in a small way in the country towards Assam, but the staple of former times must have been of greater length and softer in fibre than that of the present day to adapt it to the finely woven goods, for which the Dacca looms were widely celebrated in those days. In the North-Western Provinces and Oudh large cotton farms were in the beginning of the century—when the Company were merchants as well as rulers—established in Bandelkhand at Kalpi and Banda, both to improve the growth of the staple and to buy it up and send to Calcutta. This was before the American cotton had begun to take possession of the market. But the records relating to these early commercial enterprises have almost entirely disappeared. In the Punjab cotton cultivation attracted special attention at least a quarter of a century ago. In Berar the first exportation of cotton is said to have taken place in 1825-26 when a little more than 1,000 cwt. were despatched to Bombay, but it was not till the opening out of the Great Indian Peninsula Railway (about 25 years ago) that the trade here and in the Central Provinces received an impetus. As to the Bombay Presidency, the question of developing its cotton culture and trade was first taken up more than half a century ago, but it was only in 1863 that any energetic or real action was taken in the matter. In that year the "Cotton Frauds Act" (IX of 1863) was passed in order to improve the tone of the trade, but this Act was repealed in 1878, and in 1882 all special legislation on the subject was removed, chiefly because the merchants then considered that the measure was obstructive to the trade. This "Cotton Frauds Act" appears to have been in operation in Berar also.

3. It should here be mentioned that shortly after the American War (1861-65) special measures were taken in the Central Provinces and Berar in regard to cotton. An appointment of "Cotton Commissioner for the Central Provinces

and the Berars" was created in 1866. The circumstances which gave rise to this appointment are stated in the subjoined extracts from a Resolution of the Government of India, No. 3, dated 11th November 1871—

"When in consequence of the American War the United States had temporarily ceased to supply the raw material for the English cotton industry, and it came to be considered in England that it would be well if the attention of merchants and spinners were directed to other quarters, an association was formed in Manchester with the object of fostering and encouraging the production of cotton in various parts of the world, and specially in British Colonies and dependencies. India was considered by the Cotton Supply Association to offer a great field for the development of cotton cultivation, and the Association entered into correspondence with the Secretary of State for India on the subject of the most feasible means of improving the quality and increasing the quantity of the produce. After some desultory and tentative efforts had been made, a Cotton Commissioner was appointed in Bombay, and in 1866 the Secretary of State, in a letter to the Government of India, suggested that 'the appointment of an officer possessing powers and exercising duties similar to those held by Dr. Forbes (the Cotton Commissioner) in the Bombay Presidency, but whose attention should be directed to Berar and other cotton-producing tracts of Central India, might be productive of much advantage.'

"Thereupon, after consultation with the Chief Commissioner of the Central Provinces, the Government of India gave effect to the Secretary of State's suggestions in a Resolution of the 30th July 1866, and sanctioned the appointment of the Cotton Commissioner for the Central Provinces and Berar, the great cotton-producing centres in the Provinces administered by the Government of India. To this office Mr. Rivett-Carnac was appointed."

1. The attention of the Cotton Commissioner was at first confined to the cotton tracts in the Purna valley of the Berars and to the Nagpore Division of the Central Provinces in which the best Omrawuttee and Hingauhat cottons are grown, but by degrees his duties were extended to other parts of India, the designation of the appointment being in consideration of this enlarged sphere altered in December 1871 from "Cotton Commissioner for the Central Provinces and Berars" to "Commissioner of Cotton and Commerce with the Government of India." In November 1874 the appointment was abolished. The appointment when first constituted was useful; it was created at an opportune moment and was not costly. But it gradually became a source of considerable expense disproportionate to the duties of the office which contracted considerably as the cotton trade found its normal level after the excitement caused by the failure of the supply from America had passed away. During this period (1866—74) several farms, which were indifferently called cotton, experimental or model farms, were established in suitable parts of the country and placed in charge of gardeners sent out from England. In 1873 they were transferred from the control of the Cotton Commissioner to Provincial Governments; their number has since been greatly reduced, and those remaining were placed under the control of the Directors of Land Records and Agriculture in the various Provinces as soon as these appointments were created. The Directors' annual reports show that the subject of improving and developing cotton production is still receiving considerable attention.

5. The prominent attention given to this staple is not to be wondered at, considering the fact that it is the chief article of export from India, as will be seen from the average values given on the margin for the most important commodities leaving India.

	Crop.
Cotton	13.59
Opium	11.09
Oilseeds	9.16
Rice	8.40
Wheat	7.57

6. The best cotton and the largest area is to be found in the great basaltic formation called the Deccan trap, which occupies a third of the peninsula towards the north-west, or, roughly speaking, the triangular tract lying between Cutch, Jubbulpore, and Goa. This tract embraces portions of Central India, the Central Provinces, Berar, the Nizam's Dominions and Bombay, including the Native States of Kathiawar and Cutch. Inferior cotton is grown in Northern India and Bengal. The following table, showing

for three years for the more important cotton-producing Provinces the percentage of the area under cotton to the total cropped area, indicates the extent to which the plant is grown in each. The percentages have been worked out on the areas given in Form B of the returns of Agricultural Statistics for British India:—

Year.	Madras.	Bombay.	North-Western Provinces.	Oudh.	Punjab.	Central Provinces.	Berar.
1884-85	6.2	8.3	7.2	1.0	3.5	4.3	30.2
1885-86	6.0	8.7	6.3	.8	5.0	4.5	28.1
1886-87	6.4	11.0	7.0	1.0	5.9	4.9	32.0

In this table Berar comes first with the high percentage (average) of 30, and Bombay follows with a little over 9 per cent. In Bombay, the Punjab, and the Central Provinces the percentage has been increasing gradually. As regards the Central Provinces, these figures do not support the assertion made by the local officers that the cultivation here is diminishing. In Berar the percentage of 1886-87 has risen as compared with that in each of the two preceding years: in this Province the acreage decreased steadily during the four years 1882-83 to 1885-86. A reference to the cotton map prepared in 1886 for the Colonial and Indian Exhibition will show more clearly where cotton is most extensively grown. Copies of this map are to be had at the Surveyor General's Office, Calcutta.

7. The subjoined table professes to exhibit the normal area and outturn Area and Outturn. of cotton:—

Province or Presidency.	Area.	Outturn (clean cotton).	Outturn per acre (clean cotton).	Exportable surplus of local produce (clean cotton).	Average net exports.	Percentage of column 5 to column 3.
1	2	3	4	5	6	7
	Acres.	Cwt.	lb.	Cwt.	Cwt.	
Bombay	2,571,000	1,146,000	50	998,000	1,796,000	42
Sindh	70,000	95,000	152			
Native States in Bombay and Sindh	2,412,000	1,118,000	51	603,000	928,000	92
Berar	2,033,000	658,000	36			
North-Western Provinces and Oudh	1,073,000	916,000	63	616,000	847,000	68
Madras	1,661,000	547,000	37	382,000	495,500	70
Nizam's Dominions	1,016,000	307,000	34	176,000	300,000	57
Punjab	889,000	743,000	94	145,000	179,000	29
Central Provinces	627,000	237,000	42	144,500	30,000	61
Rajputana	536,000	633,000	132	451,000	620,000	59
Central India	295,000	134,000	51			
Bengal	*162,000	*139,000	96	...	...	...
Assam	39,800	53,000	149	20,000	7,000	38
Other Provinces	37,000	19,000	66	...	...	...
TOTAL	14,051,800	6,775,000	54	3,565,500	5,262,500	53

* Approximate only.

8. The above table shows cotton to occupy in India on an average 14 million acres, and this area it is believed is approximately correct. As regards outturn, it is difficult to say whether that given, *viz.*, 6 $\frac{3}{4}$ million cwt. of cleaned cotton, represents a fair estimate, but the probabilities appear to be that 8 $\frac{1}{2}$ instead of 6 $\frac{3}{4}$ millions of cwt. would be nearer the truth. The former quantity has been arrived at by adding to the latter the difference between columns 5 and 6 in the above table. Judging from the outturn per acre, it would appear that a higher average than half a hundredweight cannot be taken for the whole of India, though the variations in this respect in the case of each Province are

somewhat startling, the rates ranging from 34 to 152lb per acre. For Assam a rate of 149lb is given, and this has been found by frequent experiments to be fairly correct. The 152lb shown against Sindh are not the result of any such special testing. In America the average rate per acre was 169lb in 1884 and 174lb in 1885; in the former year the rates ranged from 92lb to 257lb, and in the latter year from 131lb to 235lb per acre: large outturns in that country are to be expected considering the fact that cotton is there reared under more scientific methods.

9. We have no recent *complete* information about the quantity consumed in India. Mr. Rivett-Carnac in his Cotton Report for 1868-69 (page 144) estimated it at 600,000 bales or 2½ million cwt. (a bale being equal to 3½ cwt.), the rate per head of population being 9lb. The consumption has without doubt increased during the last twenty years.

10. In the "Statistical Tables" published this year by the Department of Finance and Commerce the consumption is given for some Provinces, but the figures are not considered trustworthy. The average consumption has, however, been worked out from these tables, and the result is given below for what it is worth.

	Madras.	Bombay.	Punjab.	Berar.	Central Provinces.	Assam.	Nizam's Dominions.	Central India.	Rajputana.	TOTAL.
Average consumption { Total Cwt.	165,000	1,361,000	598,000	55,000	92,500	33,000	131,000	61,000	255,000	2,711,500
Per head of population . . . lb	6	65	29	23	9	8	14	7	28	22

* The figures given against these States are for 1885-87 only; earlier statistics not being available.

To the above estimate must, however, be added that for the remaining Provinces which is roughly estimated to be 775,000 cwt., *viz.* :—

	Bengal.	North-Western Provinces and Oudh.	Other Provinces.	TOTAL.
Average consumption { Total Cwt.	450,000	300,000	25,000	775,000
Per head of population . . . lb	7	7	4	7

11. In the North-Western Provinces and Oudh the local consumption is estimated in the provincial cotton forecasts at 300,000 cwt. or at ¾lb per head of population. The same rate may be applied to Bengal. Judging from the figures given on the margin, the consumption in this Province would appear to be 461,000† cwt. The consumption in Calcutta alone is apparently about 282,000 cwt. (*vide* paragraph 7, page 31 of Appendix A).

12. According to the above figures the consumption in India seems to be a little over three and a half million cwt. or 1½lb per head of population. Some of the estimates given in the "Statistical Tables" appear to have been pitched too high. For instance the Punjab, whose population is about half that of the North-Western Provinces and Oudh, consumes as much as 598,000 cwt., while the latter Provinces consume 300,000 cwt. only, the consumption per head of population being 3lb and ¾lb respectively. It is also not apparent why the consumption in Berar should be 23lb per head of population against 9lb only in the Central Provinces. Again, Rajputana, with a population of 10 million souls, is shown as consuming 255,000 cwt.,

while Central India, with a population of 9 million souls, is credited with 61,000 cwt. only, the rate of consumption per head of population being 2¾lb and ¾lb respectively. In Bombay the rate 6½lb is the highest, but this must be expected considering the large consumption in the cotton mills of the Presidency. In fact the total consumption for this Presidency, *viz.*, 1½ million cwt., has apparently been put too low as the cotton mills here take on an average over 1½ million cwt.

13. The mills in India are shown as consuming on an average a little over 2 million cwt. between them. The details are :—

Bombay.	Bengal.	Madras.	Central Provinces.	N.-W. Provinces.	Nizam's Territory.	Central India.	Mysore.	TOTAL.
Cwt. 1,546,000	247,000	100,000	53,000	40,000	21,000	9,000	3,000	2,025,000

14. In the absence of better data, there seems no alternative but to accept, for the present at any rate, as the total consumption in India, the quantity worked out in the manner just described, *viz.*, 3½ million cwt. The total outturn as corrected in paragraph 8 *supra* is estimated at 8½ million cwt. Deducting from this the probable consumption 3½ million cwt., there remain 5 million cwt. available for shipment.

Yearly surplus available for shipment. The exports from India by sea to foreign countries during the five years ending with 1886-87 have averaged 5½ million cwt.

15. It will be seen from columns 3 and 6 of table appended to paragraph 7 that in Berar the average net export exceeds the outturn. The apparent explanation of this anomaly is that either the yield, which represents *cleaned* cotton, has been under-estimated, or that the exports include a large proportion of *uncleaned* cotton. The figures in column 6 also exceed, with few exceptions, those in column 5: the exportable surplus exhibited in the latter column is for *cleaned* cotton only.

16. It should be explained here that the average area and outturn entered in the table appended to paragraph 7 are, with a few exceptions, for the five years ending 1885-86, and that they are based on figures which have been taken from the "Statistical Tables" published by the Department of Finance and Commerce, and which have been extracted in Appendix B. These figures have been accepted as they are more complete than those to be found elsewhere. The forecasts furnished to the Revenue and Agricultural Department contain later information (*i.e.*, for 1886-87 and 1887-88), though not so complete. The statistics in the latter have been tabulated below, the figures for 1885-86 being added for comparative purposes.

PROVINCES.	1885-86.		1886-87.		1887-88.	
	Area.	Outturn.	Area.	Outturn.	Area.	Outturn.
	Acres.	Cwt.	Acres.	Cwt.	Acres.	Cwt.
Bombay and Sindh, including Native States	4,925,900	2,900,000	5,512,500	3,035,200	5,574,000	2,791,600
Berar	1,846,500	576,700	2,668,000	*664,700	2,037,000	*654,700
North-Western Provinces and Oudh	1,659,400	790,000	1,855,500	900,000	1,472,000	630,000
Madras	1,605,200	529,000	1,487,200	†531,100	§ . . .	§ . . .
Punjab	1,035,000	834,000	1,093,400	834,000	644,500	437,300
Central Provinces	566,000	287,200	671,200	†251,700	585,100	†219,400

* Arrived at by applying the normal yield per acre (36 lb).
† Ditto ditto ditto (40 lb).
‡ Ditto ditto ditto (42 lb).
§ Not ascertainable from forecasts.

17. The year 1886-87 was favourable to cotton cultivation. The reverse was the case in 1887-88, especially in the Punjab where the decrease in acreage was more than 40 per cent. But on the whole the cotton season of these two years seems to have been better than that of the three preceding years which proved very unfavourable to cotton. This year (1888-89) a worse crop than even that of 1887-88 is expected in the Punjab owing chiefly to a deficient rainfall. A good crop is anticipated in the Central Provinces. No reports have been received from other Provinces. According to the latest reports (8th September 1888) of the Chambers of Commerce, the new crops towards Bombay, excepting Guzerat Circle, were doing well generally, but those in Upper India and Bengal were not so favourable.

18. It will be seen from the remarks recorded in Appendix A under each Province that the area under cotton has apparently been increasing during the last ten years in all Provinces except Berar and the Central Provinces where cotton is, it is stated, being displaced by wheat and linseed. For the reasons given in paragraph 6 the statement, so far as the Central Provinces are concerned, seems somewhat doubtful. An increase in cultivation and outturn must be expected considering the fact that in many Provinces cotton, like sugarcane, is a rent-crop, and also the fact that the cotton manufacturing industry is developing in India, especially in the Bombay town which now retains a much larger proportion of the cotton which it receives, the apparent result being, as will be shown further on, that the exports of the raw material from this town beyond the seas are diminishing gradually. The quantities worked up in the mills have been steadily increasing as will be seen from the figures for the three years given below—

	Bombay.	Bengal.	Madras.	Central Provinces.	North-Western Provinces and Oudh.
	*Cwt.	*Cwt.	*Cwt.	*Cwt.	*Cwt.
1887 .	1,800	262	116	75	53
1886 .	1,596	254	99	59	47
1885 .	1,243	226	85	44	29

Indian growths, where grown, when sown, picked and shipped, &c.

19. The following are the principal Indian growths of cotton which are known to the trade:—

Principal growth	Where grown.	Shipped from.
Dholleras .	Kathiawar	Bombay.
Bhavnuggers .	Ditto	Ditto.
Broach .	Broach and Surat	Ditto.
Bengals .	North-Western Provinces and Oudh and Punjab.	Bombay and Calcutta.
Ditto .	Rajputana and Central India	Bombay.
Hinganghat .	Central Provinces	Ditto.
Omrawuttee .	Berar	Ditto.
Ditto .	Khandesh	Ditto.
Ditto .	Barsee and Ahmednagar	Ditto.
Comptas } Dharwars }	Dharwar, Bijapur, Belgaum, &c.	Ditto.
Sindhi .	Sindh	Ditto.
Westerns .	Bellary, &c., Hyderabad, Sholapur, &c.	Bombay and Madras.
Northerns .	Cuddapah	Madras.
Salems or Coimbatore.	Salem, Coimbatore and Arcot	Ditto.
Cocanadas .	Kistna District	Cocanada.
Tinnevelleys .	Tinnevelly	Tuticorin.

* 000 omitted.

Except in Madras (where it is planted at the beginning of the north-east monsoon rains in October) cotton is sown in, say, June, but the date of flowering, picking, and first receipt at port of shipment varies from October to November in the case of North-Western Provinces and Punjab "Bengals," and to May-June in that of "Dharwars" and "Comptas."

20. The above information was very courteously furnished to the Government of India by the Bombay Chamber of Commerce, who also supplied the following statement giving further details as to the time of sowing, &c.:—

Description of cotton.	Date of preparation of land.	Date of sowing.	Date of flowering.	Date of commencement of picking.	Date of first receipt of new cotton at ports of shipment.
Broach	June	June-July	Oct.-Nov.	January	February.
Hinganghat	"	"	August	October	November.
Omrawuttee	"	"	"	October-November	November-December.
Jalgaon	"	"	"	"	"
Idharwars	Late June	July	Sept.-Oct.	January-February	March.
Bengals	May-June	July-August	September	October-November	November-December.
Dharwars (S. G.)	August	August	December	February-March	April-May.
Comptas	"	"	"	"	"
Westerns	June-July	August-Sept.	Jan.-Feb.	April	May-June.
Bhavnuggers	Late June	July	Sept.-Oct.	January	February.

Generally speaking, the shipping season, which by mercantile usage closes on the 30th June of each year, is virtually at an end with the setting-in of the rains. But in Madras the season only commences when that for the rest of India is closing, the bulk of the Madras crops being sown on the setting-in of the north-east monsoon, whereas the rest of India depends on the south-west monsoon rains for sowing cotton.

The following table, which shows (1) the percentages of the imports in each quarter to the total imports into the maritime Provinces, and (2) similar percentages for the exports from each Province, gives a fair idea as to the periods when most of the produce leaves the Provinces and arrives at the seaport towns. These percentages are based on three years' figures, viz., 1885-86 to 1887-88—

PROVINCES.	PERCENTAGE OF IMPORTS IN QUARTER ENDING				PERCENTAGE OF EXPORTS IN QUARTER ENDING				REMARKS.
	31st March.	30th June.	30th September.	31st December.	31st March.	30th June.	30th September.	31st December.	
Madras	8	32	43	17	5	46	35	14	These exports refer to local produce sent to the seaports either for shipment or local consumption.
Bombay	54	26	3	17	34	54	5	7	
Indh	54	26	4	16	59	38	4	8	
Central	43	26	5	32	31	37	19	13	
North-Western Provinces and Oudh	...	...	...	...	17	14	4	35	
Punjab	...	...	...	...	52	27	3	18	
Central Provinces	...	...	...	...	49	18	2	31	
Berar	...	...	...	...	60	25	1	14	
Assam	...	...	...	...	61	18	12	9	
Rajputana and Central India	...	...	...	...	49	39	5	7	

21. As with all crops, it is difficult to determine the cost of cultivation of cotton. The details given by some of the Provinces will be found below; they vary considerably.

Cost of cultivation.	Madras.			Bombay.			North-Western Provinces and Oudh.		
	R.	a.	p.	R.	a.	p.	R.	a.	p.
Seed	0	8	0	0	4	0	0	2	0
Ploughing	2	0	0				3	0	0
Sowing							0	13	0
Clod-crushing				5	4	0	0	4	0
Weeding	1	8	0				3	0	0
Picking	1	8	0				4	0	0
Cleaning							1	14	0
Total	5	8	0	5	8	0	13	1	0
Manure				Seldom used			3	0	0
Rent	1	4	0	2	0	0	6	8	0
GRAND TOTAL	6	12	0	7	8	0	22	9	0

In the Punjab the cost in the case of cultivation on land which is unirrigated, but manured, is said to range from R6-10-9 to R25-15-6 per acre. In Berar the cost is put down at from R13 to R15.

22. The trade in cotton, internal and external, will now be dealt with.

Trade. As regards the internal trade, the total quantity carried by rail and river in 1886-87, from one Province to another, was 6½ million cwt., valued at nearly 15 crores. The trade is, practically speaking, confined to the despatch of cotton from the various Provinces to the sea-ports (Bombay, Karachi, Madras, and Calcutta), whence the greater portion is re-exported beyond the seas. In exports the contributors were—

	Net Exports. Cwt.		Net Exports. Cwt.
Bombay with	2,089,000	Punjab	224,500
Berar	1,213,000	Central Provinces	152,200
North-Western Provinces and Oudh	1,097,400	Sindh	137,600
Rajputana and Central India	670,400	Nizam's Territory	77,900
Madras	401,000	Assam	20,200

Nearly the whole of the cotton despatched from the Bombay Presidency, Berar, Rajputana, and Central India, and the Central Provinces is absorbed by Bombay town. The exports from the North-Western Provinces and Oudh are principally for Calcutta and Bombay town, Calcutta taking much the larger share. The Punjab supplies in about equal proportions Bombay town, Calcutta, and Karachi. The exports from the Nizam's Territory are divided between Bombay and Madras towns. The consignments from Sindh are virtually for Karachi, those from Madras for Madras town, and those from Assam for Calcutta. Appendix C shows for the three years ending with 1886-87 (1) the arrivals at the chief sea-ports and in Lower Burma by rail, road, river and coast; and (2) the sources of supply. The percentage of the total imports taken by the sea-ports and Lower Burma are as follows:—

Bombay.	Calcutta.	Madras.	Karachi.	Lower Burma.
78	12	5	4	1

23. The figures given below show that the flow of cotton from the North-Western Provinces and Oudh, Central Provinces, Berar, and Rajputana and Central India to the sea-ports increased considerably during the three years for which figures are given.

	1884-85. Cwt.	1885-86. Cwt.	1886-87. Cwt.
North-Western Provinces and Oudh	475,000	678,700	1,115,800
Central Provinces	15,400	53,700	67,900
Berar	558,700	871,900	1,211,400
Rajputana and Central India	321,200	349,300	593,400

There was also a large increase in the exports from Madras, Sindh, and the Punjab in 1886-87 as compared with those for 1885-86. The statistics of these Provinces for 1884-85 are not complete.

24. The trade by land with countries bordering on the frontier, viz., Kabul, Kashmir, Nepal, &c., is insignificant, the total imports and exports hardly exceeding 15,000 cwt.

25. The imports of cotton into India by sea are small, being on an average less than 50,000 cwt., most of which is supplied by Persia, Mekran, and Sonmiani for the Bombay Cotton Mills. This cotton is mixed with Indian cotton before it is used for spinning purposes.

26. The exports by sea of cotton, which is the most important article of produce shipped from India, have always been subject to great variations. During the American War of Secession (1861-65), the exports by sea reached an abnormally high figure. The exports during this period are given below in millions of cwt. and crores of rupees.

	1861-62.	1862-63.	1863-64.	1864-65.	1865-66.
Cwt.	3.5	4.2	4.9	4.7	7.1
Rupees	10.2	18.7	35.8	37.5	35.5

In 1866-67 the value fell to 16½ crores and the quantity to 3.8 million cwt.: the quantity exported in 1865-66, viz., 7.1 million cwt., has since been exceeded once and that was in 1871-72 when 7½ million cwt. were exported, but the value was only 21.2 crores. The following table exhibits the exports during the four quinquennial periods ending with 1886-87:—

I. 1867-68	Quantity. Cwt.	Value. R.	III. 1877-78	Quantity. Cwt.	Value. R.
1868-69	5,482,643	20,925,698	1878-79	3,459,077	9,38,35,340
1869-70	6,228,846	20,14,38,248	1879-80	2,966,060	7,91,30,458
1870-71	4,953,879	19,07,91,383	1880-81	3,918,476	11,14,54,528
1871-72	5,157,149	19,16,08,988	1881-82	4,541,539	13,24,17,341
	7,225,411	21,27,24,297		5,627,453	14,93,59,595
Average	5,809,586	20,01,09,723	Average	4,108,521	11,32,39,452
II. 1872-73	4,412,629	14,02,21,082	IV. 1882-83	6,168,278	16,04,90,174
1873-74	4,199,698	13,21,22,409	1883-84	5,979,494	14,38,37,278
1874-75	5,600,086	15,25,73,416	1884-85	5,066,057	13,28,63,673
1875-76	5,009,788	13,27,89,635	1885-86	4,189,718	10,77,72,041
1876-77	4,557,914	11,74,61,836	1886-87	5,432,648	13,46,84,294
Average	4,816,023	13,50,33,676	Average	5,367,239	13,59,29,492

The trade diminished considerably during the second and third periods, but recovered itself in the fourth or last period, though the quantity for the latter period was 7.6 per cent. below that of the first period, the value showing greater falling off, viz., 32 per cent.

27. It will be seen from Appendix D that the average exports during the five years ending with 1886-87 were 5½ million cwt., valued at 13½ crores of rupees. Of these exports Bombay engrossed 77, Madras and Bengal 10 each, Sindh 2, and Burma 1 per cent. In Bombay the exports declined from 4½ million cwt. in 1882-83 to 4½ million cwt. in 1883-84, and in the two subsequent years there was a further falling off, 3½ million cwt. being returned for 1885-86. The cause of this diminution is attributed by the Collector of Customs to the poor crop of 1883-84 in consequence of drought and unseasonable rains in almost every district of the Bombay Presidency. The season of 1884-85 was also unfavourable. In 1886-87 the exports rose to 3½ million cwt. The season of 1886-87 was on the whole fair, but the exports in 1887-88 did not increase materially, being only 11,000 cwt. above those of the preceding year. Judging from the figures given below, it would appear that a larger pro-

portion of the crop is now being retained in Bombay town owing to the development of the cotton-manufacturing industry there:—

	1881-85. Cwt.	1885-89. Cwt.	1890-94. Cwt.
Imports by all routes	4,983,800	4,429,000	5,278,800
Exports by sea and coast	4,193,561	3,399,829	4,026,583
Excess of imports over exports	790,239	1,108,171	1,252,217

The cotton comprised in these *net* imports is, after being converted into manufactures (*i.e.*, yarns and piece-goods), exported to other places in India and to a much larger extent to Foreign Countries. The total exports from India by sea of twist and yarn have increased from nearly two crores in 1883-84 to four crores in 1887-88, and those of piece-goods and other manufactures from Rs 24 lakhs to Rs 115 lakhs during the same period. Bombay virtually engrosses this trade. The markets in China and Japan are absorbing increasing quantities of Bombay made yarn.

28. The largest shipments are to the United Kingdom which takes about 42 per cent. of the exports. Italy comes next with 15 per cent. The following table shows the share taken by each country in these shipments during the five years ending with 1886-87:—

Woolen Exports.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	Average.
United Kingdom	46.4	45.1	42.1	34.2	37.6	41.6
Italy	15.2	14.7	11.6	19.1	11.8	15.5
Austria	12.4	10.0	11.3	12.0	13.0	11.9
France	9.5	11.2	11.4	11.3	11.6	10.9
Belgium	5.4	7.6	10.5	14.8	13.0	10.1
China	5.9	5.2	4.6	4.9	2.3	4.6
Germany	1.9	2.2	1.7	4	2.5	1.8
Other countries	3.2	3.8	3.6	3.2	3.3	3.4

The supplies to the United Kingdom have been decreasing during the period for which figures are given, while those to Austria and Belgium have shown a tendency to increase owing probably to these countries drawing supplies more freely direct from India instead of through the United Kingdom. Since the opening of the Suez Canal and the opportunities thereby given for direct shipment to the Continent, England has steadily lost her position as the depôt from which the rest of Europe draws its requirements of Indian cotton. She has also recently received less from India owing to the contraction of the shipments. Part of the cotton sent to Italy is, it appears, destined ultimately for transport to South Germany, but the greater part is worked up in the cotton mills at Lombardy and elsewhere in Italy. A part of this cotton comes back to us from Italy in the shape of Turkey red twist (page 14, Sea-borne Trade Review, 1877-78).

The following extract taken from the Review of the Department of Finance and Commerce on the Sea-borne Trade Returns for 1874-75 will be found interesting as explaining why continental Europe takes a larger share of Indian cotton than England:—

“In continental Europe Indian cotton is regarded with more favour than in the English-manufacturing districts. English machinery was originally adapted to the treatment of cotton of longer staple than the Indian fibre, and as long as manufacturers can obtain a supply sufficient for their purposes of the longer-stapled American, Egyptian, or Brazilian cotton (of which not more than 2 or 10 per cent. of the imports into England are re-exported), the Indian fibre is regarded with disfavour. In some cases, indeed, cotton operatives have refused to work with Indian cotton as being too troublesome to manage. This is not the case on the Continent,

where mills exist possessing machinery specially adapted to the treatment of short-stapled cotton, and in these quarters there seems to be a growing demand for our staple. While more than half the cotton sent from India to England is again shipped off to the Continent, an increasing direct trade between India and the States of continental Europe is becoming manifest.”

China is stated to be importing less cotton recently because the Chinese, instead of manufacturing yarn themselves, prefer to buy it ready manufactured from the Bombay mills.

29. More than 50 per cent. of the Indian cotton sent to the United Kingdom eventually goes to the Continent now. As will be seen from the subjoined table shewing the imports into the United Kingdom during the five years ending with 1887, England consumes at least four times as much American as East Indian cotton:—

	1883.		1884.		1885.		1886.		1887.	
	Cwt.	P. C.	Cwt.	P. C.	Cwt.	P. C.	Cwt.	P. C.	Cwt.	P. C.
United States	10,986,539	72	10,755,184	70	9,270,061	75	11,449,445	75	11,170,166	70
Brazil	433,874	3	352,696	2	322,213	2	271,379	2	615,325	4
Egypt	1,495,641	9	1,562,753	10	1,550,723	12	1,491,488	10	1,542,755	10
British East Indies	2,321,952	15	2,689,170	17	1,295,187	10	1,829,998	12	2,469,567	15
Other countries	126,868	1	146,048	1	147,822	1	145,389	1	105,304	1
TOTAL	15,367,874	...	15,505,851	...	12,586,009	...	15,187,299	...	15,903,117	...

Of the quantity imported by far the largest part is American, then comes East Indian, then Egyptian, and lastly Brazilian.

30. The average prices per cwt. of cotton exported from each Province are given for five years in the following statement, the figures in which have been extracted from the “Statistical Tables for British India”:—

PROVINCES.	AVERAGE PRICES PER CWT. OF COTTON EXPORTED FROM EACH PROVINCE.				
	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
	R a.	R a.	R a.	R a.	R a.
Madras	24 5	25 0	23 1	24 8	25 5
Bombay and Sindh	26 11	25 1	24 5(b)	25 6(b)	25 15(b)
Do. Native States	(a)	(a)	(a)	(a)	(a)
Bengal	26 5(b)	25 1(b)	23 14	23 13(b)	23 15(b)
North-Western Provinces	20 7	18 8	18 13½	20 10½	21 12
Oudh	21 9	19 3	19 6½	21 11½	22 15
Punjab	18 3(c)	16 13	16 12½	18 3	19 9½
Central Provinces	22 15	21 12	21 0	18 8	23 0
Hyderabad Assigned Districts	23 12	21 13	21 13	23 0	22 0(d)
Nizam's Dominions	10 5	10 7	11 10	15 11	18 6
Mysore	23 5	20 9	20 4	22 9	22 7
Lower Burma	18 5	18 13	21 5	22 7	23 0
Assam	8 6(c)	6 2(c)	25 15	25 14	26 13
Central India	...	...	...	...	17 6
Rajputana	...	...	...	...	16 10
TOTAL	...	...	...	...	22 1½

(a) No information available.

(b) Estimated by dividing the total value of exports by the total quantity exported.

(c) These are the prices of uncleaned cotton.

(d) This is the average of the rates obtaining in the Amraoti and Khamgaon markets.

31. *Exotic Seed.*—Detailed accounts of the experiments with exotic cotton-seeds in the various Provinces will be found in Appendix A. Excepting parts of

Experiments.

Bombay where it is said the valuable staple acclimatized from American seed is well established, the success attained has been limited and not general, the people not having as a rule taken kindly to the finer and long-stapled fibres of American and tropical varieties; and, perhaps this is not to be wondered at considering the fact that there has always been a good demand for the indigenous varieties which, though too rough and short to popularize it with the manufacturers in England, is sufficiently good for the coarser gins and looms of Indian mills, as also for the mills in continental Europe where it is in demand for coarse tissues. Moreover, the cultivation of the indigenous cotton gives the ryot less trouble and ensures him a good return in the long run. The long staples are almost useless to the coarser machinery of Indian mills. Mr. Rivett-Carnac, when Cotton Commissioner for the Central Provinces and the Berars, expressed his opinion that, instead of pressing the cultivation of foreign varieties on the ryot, it would perhaps be better to induce them to produce indigenous cotton of a better staple by selection of indigenous seed and improved treatment; and his opinion appears to have been subsequently confirmed by those officers who have taken an interest in the subject.

32. American varieties are reported to grow well in the Central Provinces and the Berars, and the local officers are desirous of its success in order to eradicate the very inferior cotton called Jari or Vilayati Khandesh in those Provinces and Varadi or Berari in Khandesh (Bombay), the cultivation of which is said to be extending rapidly. This cotton is largely mixed with superior qualities, the result being, it is said, that the cotton of Central and Western India is fast losing the high reputation which it has hitherto held. All efforts to stamp out "Khandeshi" have proved futile. Encouragement is given to its growth; the price is good; the climate is suitable; the people prefer it and are allowed to grow it, and, what is more, they find that it suits the degenerated demand of the trade, and that the mixture for which it is used is recognised by the trade.

33. Frequent suggestions have been made to Government to prevent this reckless adulteration by adopting repressive measures and reviving the "Cotton Frauds Act" which was in operation in Bombay and Berar from 1863 to 1882. It is said that many regret the abolition of this Act and consider that it might well have been left in force, though perhaps less stringent in application. The decision of Government on these suggestions was that no legislative steps to stop the supply of a commodity which is grown to meet a demand by consumers can be taken. For further details on this subject the accounts under Bombay and Berar in the Appendix should be consulted. There seems no doubt that this conclusion is right. So long as there is a demand at profitable rates, the cultivators will continue to grow this inferior cotton until they learn from experience that they have made a mistake.

34. Meanwhile the Director of Land Records and Agriculture, Bombay, is, it will be seen, doing all he can, in concert with the Chamber of Commerce and the Cotton Trades Association, Bombay, to stop the growth of the evil.

35. It has already been mentioned that acclimatized American seed has succeeded well in parts of Bombay. The Director of Land Records and Agriculture is endeavouring to extend its cultivation, and his efforts so far appear to have met with success, especially in those places which are on or near the coast or which possess close and easy communication with the sea-ports for disposing of this class of produce.

36. Some mention should here be made of the trials with Nankin cotton. In 1884 the Government of India distributed seed to test the suitability of the Nankin or Khaki-coloured cotton for soldiers' summer clothing in place of dyed cloth, and guaranteed to buy the produce at a certain rate. Last year the special

encouragement of this variety was withdrawn as it was not procurable in sufficient and regular quantities and the permanency and uniformity of the colour of the cloth could not be relied on. The material also was not approved. The trials proved that Nankin cotton can be grown well in certain localities. In some places it has been cultivated with favourable results for some time and woven successfully. But at present there is, beyond military requirements, little or no demand for such cotton. The Chamber of Commerce and the Director of Land Records and Agriculture, Bombay, are opposed to its growth in places other than those where it is indigenous as its introduction elsewhere is likely to lead to deterioration owing to the tendency of Nankin cotton to hybridise with other varieties.

37. A brief allusion to the introduction of these improved appliances for cleaning and ginning cotton will be sufficient. The saw-gins tried have been found useful for cleaning

exotic but not indigenous cotton, though in Sindh they are, it is reported, very much appreciated by the people for indigenous cotton. The Director of Land Records and Agriculture, Central Provinces, in pointing out that Upland Georgian gains in value by being saw-ginned while local cotton is greatly injured by this process, remarks that "this practically involves the rejection of all improved ginning machines in favour of the slow and clumsy hand-roller gin in common use."

38. In 1886, 164 cotton presses were returned as in operation in India.

Cotton presses.

The details are—

	No.
Bombay	60
Sindh	4
Madras	37
Berar	21
Rajputana	12
North-Western Provinces and Oudh	10
Punjab	8
Nizam's Territory	4
Central Provinces	3
Central India	3
Burma	2
TOTAL	164

The above information has been extracted from the "Statistical Tables of British India." The few cotton presses working in Bengal appear to have been omitted from these tables. In the Central Provinces the cotton-pressing season lasts from 1st November to the end of April or later. Similar information is not given for other Provinces.

F. M. W. SCHOFIELD.

DEPT. OF REV. AND AGRI.,
GOVT. OF INDIA,

Dated Simla, the 15th September 1888.

APPENDIX A.

BRITISH PROVINCES.

MADRAS.

The principal cotton-producing districts are Bellary, Kistna, Kurnool (which run along the Kistna and Tangabadra rivers), Anantapur (south-east of Bellary), Cuddapah (south of Kurnool), and Coimbatore, Madura, and Tinnevely, the three latter districts being situated in the south of the Presidency. On the whole the area of cultivation ranges between $1\frac{1}{2}$ to $1\frac{3}{4}$ millions of acres in this Presidency. It can be increased to any extent, but at present there is not much inducement for extension, as the cotton produced is of inferior quality and cannot compete with American cotton or even Egyptian cotton in Europe. A very large portion of the cotton produced is consumed in the country and there are large exports to Mysore and Bombay. The cotton grown on the black and red soils of this Presidency is for the most part pressed into bales and shipped to Europe. The principal ports from which cotton is exported are Tuticorin, Madras, and Cocanada. (Pages 335 and 359, Vol. I, Madras Manual.)

2. The subjoined particulars as to the time cotton is sown and harvested in the chief producing districts has been taken from a report furnished by the Government of Madras in 1878 in reply to the enquiries made by the Famine Commission—

	Sown.	Reaped.
Bellary . . .	3rd July to 23rd September.	9th March to 19th June.
Kistna . . .	August to October.	January to April.
Kurnool . . .	August.	March.
Anantapur . . .	July to September.	„ to June.
Cuddapah . . .	July.	3rd, 5th and 7th months after sowing.
Coimbatore . . .	15th July to 14th September.	14th June to 14th August.
Madura . . .	October or November.	January to April.
Tinnevely . . .	September to January.	„ August.

Judging from the above table sowings take place from July to January and the crop is harvested from January to August. It will be seen, however, from the following extract taken from the provincial cotton report for 1882-83 and detailing the species grown that cotton is sown as early as May :—

“*Species cultivated.*—There are two species of indigenous cotton usually grown in this Presidency—the one depending on the south-west monsoon, and the other on the north-east. The former is sown between May and July, and the latter between September and November. In Tinnevely, however, both species are sown in the same season, i.e., October to November. They are known in the Telugu districts as the white and the red species, and in the Tamil districts as Uppam or Ukkam and Ladam or Nadam. In the Ganjam and Vizagapatnam districts, they are also known as the Punasa Pratti* and Paira or Borada Pratti. The latter is grown on irrigated lands in the Ganjam district.

* Pratti means cotton.

In all other districts, the crop is grown on dry or unirrigated lands and is often sown with dry grains. The white or the Uppam kind (short staple) is sown in black cotton soil, and its fibre is considered superior to that of the ‘yerra’ or red cotton. The plant lasts from six to twelve months. The Ladam species is grown generally on red or gravelly soils and lasts from three to four or five years in the Tinnevely, Coimbatore, and Salem districts. The Collector of Tinnevely reports that this crop yields about 62½ lb of uncleaned cotton per acre in the first year in the tenth month after sowing, and about 125 lb per acre in each of the second and third years from the ninth month after the picking of the previous crop. The fibre is said to be thin and fine, and to be used in the manufacture of superior cloths. The plants grow to a height of from five to six feet, and in Salem yield two harvests in the second year—one in September and the other in January. In the third year, the plants are lopped at a height of one foot from the ground, and then only one crop is obtained.”

3. The following extracts from a report furnished by the Collector of Coimbatore in 1883 contain an interesting account of the cultivation of the *Uppam*, *Nadam*, or *Ladam* and Bourbon species in Coimbatore :—

“In this district there are three kinds of cotton, viz., Ukkam (Uppam), Shem parutti (Punnul), and Nadam. The first named is that grown on black soil, the second and the third are those grown on red or gravelly soils; in only a few places is Ukkam grown on red soils, and there only where loamy and good. The qualities generally are now in the order named, the first being of short staple, but pretty well esteemed. The Ukkam cotton only lasts for six months, viz., from Arpisi (October-November) when it is sown till Chitrai (April-May) when the crop is picked and the plant pulled up; in some places it is left for two or three months longer, when, if there be rain in April-May, it will yield a small second crop in June. The Shem parutti is that known as Bourbon, and will last as long as five or six years; it grows only on red or gravel soils, especially the calcareous and quartzose; hence one reason why it is extensively grown in Erode Taluk, in which there is not an acre of black cotton soil.

“Bourbon is found in Erode and Dhárāpuram Taluks, especially in the Perundurai and Kāngyam Firkas. The following explanation has been given me of its spread in those taluks: about 1820, Mr. Heath bought the cotton seedlings in this part from the East India Company and introduced the Bourbon cotton; he was succeeded

by Mr. G. D. Fischer in 1824, and this firm traded largely in Bourbon cotton, and this induced extensive cultivation; gradually the firm's dealings fell off, and with it the cultivation of Bourbon for reasons to be noted. The firm's go-downs, it will be noted, were chiefly at Erode, near Perundurai, Chennimalai, and in the Kāngyam Firkā. The whole course of the cultivation and trade is a striking comment on the importance of private enterprise and British capital in developing the country and improving cultivation. Messrs. Fischer & Co. did infinitely more than all Dr. Wight's costly experiments, but the cultivation has again fallen off as the demand ceased.

"Ukkam is a dwarf cotton about two feet high, lasting only six months; flowers yellow, leaves of medium size; its lint is of better staple, but harsher than Nadam, and bulk for bulk more weighty; it is rather more valuable than Nadam. Its seeds are somewhat yellowish and more full of oil than those of Nadam cotton. The Ukkam lint adheres to the boll and seeds like Nadam. Nadam is a tall, woody shrub about six feet high, branches rising at acute angles with the stem; very small leaf, yellow flowers, lint of short staple, adhering to the boll and strongly to the seeds; it lasts for about four years and grows chiefly on the gravelly soils; it is grown in great quantity in Erode Taluk.

"Bourbon is about three feet high, with large leaves, reddish flowers; lint separates readily from the boll, so that it has to be gathered at once; this, I think, is one of the chief reasons for its falling out of favour. When properly cultivated, the lint is whiter and softer and staple better than that of the other two sorts and is more easily separated from the seeds, which are black. The Bourbon and Nadam cottons are grown as a mixed crop and are generally planted in Adi (July-August), but occasionally in Chittrai (April-May), if there be rain. The plant lasts for four years, but the yield is only good in the second year and moderate in the third."

4. In a subsequent report the Collector of Coimbatore wrote:—

"Messrs. Stanes & Co. also inform me that Bourbon, though of excellent quality and much in demand if properly cultivated, is now, as grown in Coimbatore, of miserable quality and hardly worth buying. The reason is to be found in the wretched cultivation, the lack of manure, the continual cropping of the same ground, the complete removal of the plant, stem, lint and seed from the ground, and the deterioration of seed from want of renewal. It is understood that Messrs. Fischer & Co. used to obtain and distribute fresh seed, and the ryots, as regards their indigenous cotton, expressly state that seed costs more than the market price because they have to choose only good seed. Apparently the exotic cotton deteriorates unless fresh seed is supplied; whether this should be the care of the Agricultural Department or be left to the enterprise of merchants is a question. But there can be no doubt that all cotton outturn in Coimbatore has much deteriorated, and that the quantity and quality of the lint and seed are poor.

"It may also be noted that the cotton going south is intimately mixed with Tinnevely cotton and exported as such, and that the admixture has been detected by the home brokers. It is a pity that such risks should be run by the trade when every effort ought to be made to improve the name of Indian cotton."

5. The above report elicited the following remarks from the local Board of Revenue:—

"The Board regret to learn that the quality of the Bourbon cotton is declining in the Coimbatore district. From Mr. Nicholson's report its diminished quantity and deteriorated quality are plainly due to exhaustion of the soil resulting from the continued cropping of unmanured land. The superiority of Bourbon cotton to the indigenous variety has been clearly demonstrated to the ryots of Coimbatore, and no expenditure by Government on the importation and distribution of fresh seed would have any permanent effect, nor indeed be justifiable so long as the ryots pursue their present exhaustive methods of cultivation."

6. The annexed statement shows the cost of cultivation per acre as given by Collectors in 1882-83 and the value of the average outturn of cleaned cotton at annas 3-6 per lb.

Districts.	AVERAGE COST PER ACRE.						Value of Out- turn per Acre at 3½ annas per lb.
	Including Assessment.		Excluding Assessment.		Excluding Assessment and Cost of Manuring and Fencing.		
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	
North Arcot			Not given.				
Trichinopoly	9	15 0	8	14 4	5	13 6	3 15 0
South Arcot	10	6 9	8	10 8	6	6 3	4 13 0
Nellore	7	7 10	6	6 6	3	9 8	5 4 0
Anantapur	2	13 2	2	5 0	2	5 0	5 11 0
Bellary	3	6 10	2	7 1	2	2 3	5 14 6
Kurnool	4	1 2	2	14 0	2	14 0	6 9 0
Kistna	8	5 0	6	5 0	3	5 0	6 12 6
Madura	8	13 5	7	5 9	5	2 2	8 15 6
Tanjore	10	1 2	8	13 9	7	1 3	9 6 6
Coimbatore	6	12 0	5	8 0	5	8 0	9 10 0
Ganjam	12	11 9	10	15 6	7	15 6	9 10 0
Godavari	7	9 11	5	11 7	5	6 4	9 10 0
Cuddapah	5	8 0	4	0 0	3	4 0	10 4 6
Salem	10	14 0	9	8 0	5	8 0	10 4 6
Vizagapatam	11	2 11	8	5 6	5	1 0	11 9 6
Tinnevely	7	9 8	6	12 9	5	2 4	15 8 6
South Canara	14	0 0	...	...	...	...	19 4 0

The Government of Madras commented on the above table as follows:—

"Analysing the details of the items given in the district reports, it is observed that the value of seed varies from 2 to 3 annas in Kurnool, Bellary, Anantapur, and Kistna, to more than double that rate in Cuddapah, South Arcot, Tanjore, Trichinopoly, Coimbatore, and Salem. The cost of ploughing is given at more than

R3 per acre in South Arcot, as against less than half the amount in several of the other districts. There are similar disparities in the other items also. The total average cost for the Ganjam district is more than double that given in Fasli 1291 (1881-82). The explanation furnished by the Collector is that many of the items do not involve actual outlay. In Mr. Nicholson's report the cost of cultivation in black cotton soils is worked out at R7* per acre, which is probably nearer the truth." (Paragraph 8, Cotton Report, 1882-83.)

7. The normal area under cotton is 1,661,000 acres and the normal outturn of cleaned cotton 547,000 cwt. The areas for 10 years are given below.

Year.	Acres.
1876-77	926,000
1877-78	1,166,000
1878-79	1,248,000
1879-80	1,351,000
1880-81	1,508,000
1881-82	1,655,000
1882-83	1,708,000
1883-84	1,770,000
1884-85	1,567,000
1885-86	1,605,000

Apparently cotton cultivation has been increasing during these years.

8. The average imports into Madras from external blocks during the three years ending with 1886-87 (nearly all from Bombay and the Nizam's Territory) were 63,500 cwt. The normal yield is 547,000 cwt. and the local consumption 165,000 cwt. According to these figures about 445,500† cwt. are available yearly for export. But the average exports during the three years ending with 1886-87 were 559,000 cwt. Apparently the average outturn has been under-estimated.

9. The imports by all routes into the Madras sea-ports (Madras, Pondicherry, Negapatam, and Tuticorin) were in 1885-86, 216,000 cwt. and in 1886-87, 445,000 cwt., but these quantities do not include the somewhat large receipts by roads and canals from places within the Presidency which cannot be less than 150,000 cwt., judging from the exports by sea and coast which average about 520,000 cwt. Nearly the whole of this export represents the produce of the Madras Presidency.

10. The following interesting statement, which has been extracted from the provincial cotton report for 1882-83, shows the mode in which cotton is conveyed to the ports of shipment from the interior of the Presidency:—

Districts.	To what Places sent.	Mode of Conveyance.	In what Shape carried.
Anantapur	Madras	By rail	Mostly in pressed bales.
Bellary	Madras and Bombay	Do.	In pressed bales.
Canara, South	Mangalore and Barkur	By road	In unpressed bales.
Cuddapah	Madras	By rail	In pressed bales.
Godavari	Cocanada	By canal and road	In pressed and half-pressed bales.
Kistna	Cocanada, Madras, and Masulipatam.	By road and canal	In pressed bales.
Kurnool	Madras and Bombay	By road and rail and in boats	In loose bales.
Madura	Tuticorin and Madras	By road and rail	In unpressed bales.
Malabar	Beyport, Cannanore, and Calicut.	By rail and road	In pressed and unpressed bales.
Tinnevely	Tuticorin	By road and rail	Do. do.
Trichinopoly	Madras and Tuticorin	By rail	
Tanjore	Negapatam	Do.	In pressed bales.

The bulk of the cotton produced in the Ceded districts (Bellary, Anantapur, Cuddapah) and Kurnool is sent to Madras by rail for export. Some portion is also sent to Bombay for shipment. The cotton produced in Godavari, Kistna, and Nellore is sent by canal and road to Cocanada, and since the opening of the Buckingham canal a portion is sent to the chief port (Madras). The produce of the southern districts is exported from Tuticorin to which it is conveyed partly by rail and partly by road. (Paragraph 15, Cotton Report, 1881-82.)

11. A number of experiments is reported as having been made in past years in several districts with exotic cotton, but the trials all proved more or less unsuccessful. In 1882-83 Bourbon cotton was, as stated in an earlier part of this note, grown to a large extent in Coim-

batore, but its cultivation was said then to be declining and deteriorating rapidly owing to overcropping, and no mention of this variety is made in any subsequent report. During the last few years several experiments were made with cotton of different varieties (country and exotic) on the Government farm at Sydapet (in Madras). This farm was abolished in 1855-56. The experiments afforded ground for thinking that with due care and a judicious use of manure the cultivation of foreign cotton of finer quality than the indigenous cotton of local origin could be successfully introduced into the Presidency. (Pages 289 and 290, Vol. I, Madras Manual, 1855.)

BOMBAY.

Bombay, including Sindh and Native States, exhibits the largest area and outturn under cotton in India. The normal area and outturn of cleaned cotton are for—

	Area. Acres.	Outturn. Cwt.
Bombay	2,571,000	1,145,000
Sindh	70,000	95,000
Native States	2,112,000	1,118,000
TOTAL	5,083,000	2,359,000

2. The total area under cotton is given below for 10 years.

	Acres.		Acres.
1876-77	3,223,000	1881-82	4,811,000
1877-78	2,863,000	1882-83	5,609,000
1878-79	2,981,000	1883-84	5,132,000
1879-80	3,758,000	1884-85	4,850,000
1880-81	4,193,000	1885-86	4,925,000

The area increased steadily up to 1882-83, the year in which the largest area is recorded in the above table; after that the cultivation apparently contracted. 500,000 acres were thrown out of cotton cultivation in 1883-84 owing to low prices and a bad season, and the year 1884-85 was even worse.

3. The following details for 1885-86 which have been extracted from the cotton forecasts indicate to what extent cotton is grown in the different localities:—

British Districts.	Native States.	Total.
Acres.	Acres.	Acres.
Deccan	5,000	726,000
Guzerat	2,525,000	3,189,000
Karnatak	178,000	950,000
Sindh	3,000	76,000
TOTAL	2,711,000	4,941,000

4. In the Deccan, Khandesh, where the largest area is sown, occupied 93 per cent. of the cultivation under cotton in this tract. This district occupies the second place among the cotton-producing tracts in the Presidency. Cotton is sown in June and July and picked from 15th October to 15th January.

In Guzerat the chief cotton producers are, among British districts, Ahmedabad (317,000 acres) and Broach (243,000 acres), and among Native States, Kathiawar (1,757,000 acres) and Baroda (418,000 acres). Kathiawar occupies the first rank in the matter of cotton production in the Presidency. Cotton is sown in July and picking goes on from December to April.

In the Karnatak, which consists of extensive plains of black or cotton soil in a high state of cultivation, the most extensive cultivation is in Dharwar (462,000 acres) among British districts and in Kolhapur (30,000 acres) among Native States. In Dharwar cotton is sown in August and September and picked from February to April. In Kolhapur these operations take place in the months of August and February respectively.

In Sindh, Hyderabad is the only district in which cotton is grown to any large extent. Here the sowing takes place in June and the harvesting in November and December.

* Averages for the years 1881-82 and 1883-83.

† There is a difference of 16,000 acres between this total and that entered in the "Statistical Tables," which is not explained.

5. The cost of cultivation per acre on an average field in a good season is stated in the *Bombay Gazetteer* to be as follows for two of the chief cotton-producing districts mentioned above:—

	Khandesh. £ s. d.	Broach. £ s. d.
Labour	0 9 0	0 12 0
Manure	seldom used.	
Seed	0 0 7	0 0 4½
Rental	0 2 0	0 6 0
TOTAL	0 11 7	0 18 4½

In the *Gazetteer* for Dharwar it is stated (page 285) that "the cost of growing cotton is difficult to determine. Much depends on the grower, the number of cattle he owns, the area of land he holds, the number of persons in his house and many other conditions which more or less affect his actual cash outlay in growing cotton. Roughly the acre cost of growing American and local cotton is 11s. 4½d. (Rs. 11-0). As the value of the American crop may be set down at £1 10s. (Rs. 15) and the value of the local crop at £1 4s. 9d. (Rs. 12-6-0), the American leaves a net profit of 18s. 7½d. (Rs. 9-5-0) and the local of 13s. 4½d. (Rs. 11-0). To the net profit on the country cotton a small amount may be added, as in many cases the husbandman's family themselves clean the cotton."

6. The following details for 1886-87 and 1887-88 indicate the different kinds of cotton cultivated in the Presidency, the localities where they are to be found and the extent to which they are grown in those localities. Similar details for 1885-86 are not available.

Variety.	Districts.	AREA.		OUTTURN IN BALES OF 302½.	
		1886-87.	1887-88.	1886-87.	1887-88.
DHOLLERA .	Ahmedabad	283,000	405,592	60,000	50,080
	Kaira	10,661	10,143	1,100	2,454
	Cutch	187,173	207,356	*31,200	34,250
	Kathiawar	1,682,366	1,793,929	†280,000	†299,000
	Palampur	68,964	87,455	10,250	10,039
	Mahikantha	4,890	3,933	1,100	703
	Kadiand Amreli (Baroda)	174,664	147,261	37,700	22,095
	Cambay	1,645	1,121	260	393
	TOTAL	2,411,366	2,656,790	421,410	419,014
BROACH .	Broach	213,657	251,769	34,000	53,857
	Surat	101,001	98,257	*16,800	16,260
	Panch Mahals	795	575	170	79
	Navsari and Baroda (Baroda)	225,413	219,491	40,700	42,483
	Rewakantha	28,863	28,046	4,300	4,292
	Surat States	4,315	5,131	*540	609
	TOTAL	574,044	603,269	96,510	117,580
KHANDESH .	Khandesh	977,195	923,970	186,000	91,965
	Nasik	19,930	22,513	1,200	2,054
	TOTAL	997,125	946,483	187,200	94,019
BARSI AND NAGAR	Ahmednagar	56,037	30,298	4,350	1,196
	Sholapur	29,306	8,443	1,280	413
	Poona	10,716	1,147	950	22
	Satara	12,921	12,478	1,660	1,583
	Akalkot and Satara Jaghirs	12,676	14,521	1,060	1,586
	TOTAL	121,656	66,887	9,300	4,800

* Worked out rateably from the figures given for 1887-88.

† Worked out by taking the anna yield given for Cutch.

Variety.	Districts.	ANNA.		OUTTURN IN BALS OF 362B.	
		1886-87.	1887-88.	1886-87.	1887-88.
SAW-GINNED, DHARWAR (EX- OTIC).	Dharwar	198,090	168,429	15,300	18,167
	Bijapur	33,788	23,687	1,660	655
	Belgaum	853	912	10	212
	Kolhapur	37	14	...	...
	Other Southern Mahratta States	66,919	66,322	*10,200	10,200
	TOTAL	300,587	259,364	27,170	29,234
COMPTA (INDIGEN- OUS).	Dharwar	288,897	301,362	39,000	43,456
	Bijapur	376,323	337,916	27,350	25,550
	Belgaum	188,857	186,781	10,700	25,845
	Kolhapur	33,941	32,711	*2,600	12,500
	Other Southern Mahratta States	144,825	126,981	*16,100	13,532
	TOTAL	1,032,843	984,831	96,350	110,883
	TOTAL BOMBAY EXCLUD- ING SINDH.	5,437,621	5,517,624	{ 837,940 =2,932,790 cwt. }	775,530 =2,714,365 cwt.
SINDH	Hyderabad	55,750	38,060	Not furnished	Not furnished.
	Karachi	1,036	843	ditto	ditto
	Shikarpur	9,503	8,129	ditto	ditto
	Upper Sind Frontier	2,288	2,698	ditto	ditto
	Thar and Parkar	3,524	4,163	ditto	ditto
	Khairpur (State)	2,790	2,634	ditto	ditto
	TOTAL	74,891	56,527	{ 29,255 =102,394 cwt. }	22,092 =77,286 cwt.
	GRAND TOTAL INCLUDING SINDH	5,512,512	5,574,151	{ 867,195 =3,035,184 cwt. }	797,612 =2,791,641 cwt.

* Worked out rateably from the figures for 1887-88.

† Worked out on the anna yield given for Bijapur.

‡ Worked out from the average yield per acre for the years 1881-82 and 1882-83.

7. The trade of the Presidency (excluding Sindh) with external blocks during the three years ending with 1886-87 was as follows :—

		Imports. Cwt.	Exports. Cwt.
1884-85	By rail	1,267,501	7,454
	" road	217,369	6,542
	" coast	34,335	128,952
	" sea	67,951	4,068,265
	TOTAL	1,591,156	4,211,212
1885-86	By rail	1,665,150	6,960
	" road	228,257	1,630
	" coast	28,452	131,208
	" sea	75,647	3,261,507
	TOTAL	1,997,406	3,401,305
1886-87	By rail	2,444,305	45,697
	" road	302,048	2,500
	" coast	21,950	108,654
	" sea	56,444	3,921,143
	TOTAL	2,824,747	4,077,994
	AVERAGE	2,137,770	3,890,837

8. As regards the trade of Sindh, it will be more convenient to deal with it separately. Future references to the Presidency in this section must, so far as the land trade is concerned, be understood as excluding Sindh.

9. Most of the trade of the Presidency consists in consignments of cotton to Bombay Port for shipment. The above table shows that the imports have been advancing steadily during the last three years. The arrivals by road are nearly all from the Nizam's Territory into Sholapur and Ahmednagar whence they take the rail for Bombay town.

10. The arrivals at Bombay Port by all routes during the three years ending with 1886-87 were as follows :—

Whence exported.	1884-85. Cwt.	1885-86. Cwt.	1886-87. Cwt.
Madras	76,262	35,165	50,025
Bombay	3,519,458	2,702,153	3,311,809
Sindh	91,456	65,204	111,404
North-Western Provinces and Oudh	181,941	273,986	315,839
Punjab	53,854	62,387	82,498
Central Provinces	15,435	53,717	67,949
Berar	558,754	871,993	1,211,485
Rajputana and Central India	315,769	344,818	571,535
Hyderabad	70,620	14,051	47,313
Other places	70,235	75,551	57,913
TOTAL	4,983,784	4,499,021	5,827,770

The Presidency itself contributes 60 per cent. of these receipts. Of the remainder, Berar supplies about half and the rest comes mostly from Rajputana and Central India, the Nizam's Territory (Hyderabad), and the North-Western Provinces and Oudh. The supplies from Berar, Rajputana, and Central India and the North-Western Provinces and Oudh, especially from the former, are apparently increasing considerably. According to the above table the Nizam's Territory despatched on an average 44,000 cwt. only: to this should, however, be added the quantity conveyed, as stated before, by road to Sholapur and Ahmednagar and thence railed to Bombay Port; the exact figures (which are included in the imports into the port from the Presidency) are not known, but they are probably about 200,000 cwt. which would raise the total receipts from the Nizam's Territory to 244,000 cwt.

11. The average imports from the Bombay Presidency into the Bombay Port (excluding the imports from the Nizam's Territory by road) may be taken as three million cwt., this representing the local produce, but at the beginning of this section the normal outturn is shown as 2½ million cwt. only: this would seem to indicate that the outturn reported for the Presidency has been under-estimated. The arrivals at the port from external blocks apparently average about two million cwt. and are mostly for shipment.

12. The figures below compare the imports into the Bombay Port with the exports beyond the seas—

	1884-85. Cwt.	1885-86. Cwt.	1886-87. Cwt.
Imports	4,983,700	4,499,000	5,827,700
Exports	4,197,200	3,392,700	4,029,800
DIFFERENCE	786,500	1,106,300	1,797,900

It would appear from these figures that 1½ million cwt. are consumed in Bombay town.

According to the Statistical Tables published by the Department of Finance and Commerce, the estimated quantity consumed by the mills in the Presidency is about 1½ million cwt.

13. Now as to the trade of Sindh. The imports and exports from external blocks for two years were—

	Imports. Cwt.	Exports. Cwt.
1885-86	By rail	12,657
	" river	48,960
	" sea	...
	TOTAL	61,617
1886-87	By rail	46,990
	" river	92,234
	" sea	...
	TOTAL	139,224
AVERAGE	100,420	137,249

The imports are all from the Punjab and practically speaking for export beyond the seas either direct or through Bombay.

14. The imports into Karachi only were—

Whence exported.	1885-86. Cwt.	1886-87. Cwt.
Sindh	139,500	132,000
Punjab	60,400	137,300
TOTAL	199,900	269,300

The figures entered against Sindh represent apparently local produce: they are exclusive of the quantity imported by river into Sindh and thence railed into Karachi. If such be the case, the outturn of 95,000 cwt. given on page 18 is evidently too low.

15. The exports by sea were in 1885-86, 124,575 cwt. and in 1886-87, 149,431 cwt.; these figures should be compared with the imports into Karachi given above.

16. The subject of the improvement of the cotton culture and trade of the Bombay Presidency has occupied the attention of Government and of the commercial public for more than half a century. The introduction of American and other varieties commenced as far back as 70 years ago; but, as now, so then the evil existed of mixing indigenous with exotic varieties and thus bringing discredit on the whole business. It was not till after 1860 that measures were planned for endeavouring to stop the evil. In that year the practice of mixing local and New Orleans brought New Orleans into disrepute, and it lost much of its value. Shortly after Government appointed a Commission to enquire into the subject. The Commissioners found that—

“during the season in which the enquiries were made, little or no local or American cotton had been shipped clean or unmixed. Besides the mixing of different varieties of cotton the dealers admitted that their cotton was mixed with seeds and other rubbish, and that it compared badly with the exports of other years. Many of the local dealers were anxious that the trade should be regulated by law and placed under inspection. In their report the Commissioners stated that the evils of the Dharwar cotton trade were beyond usual remedies and affected not only local but general interests. Nothing but the energetic action of Government could check so widespread an evil. Existing laws were insufficient; a fresh Act was required. With their report they submitted the draft of a Cotton Frauds Bill. This measure became law in July 1863 as the Bombay Cotton Frauds Act IX of 1863. The first Cotton Inspector appointed for Dharwar was Captain (now Colonel) R. Hassard of the Bombay Staff Corps, who had already received charge of the Dharwar factory from Dr. Forbes on his appointment as Cotton Commissioner.” (Pages 294 and 295, Dharwar Gazetteer.)

17. The Act seems to have proved more or less inoperative. The Inspector found it very difficult to prove the mixing at the gins fraudulent under its provisions. Its working brought to light a flaw in the provisions regarding fraudulent mixing.

“To be fraudulent mixing must take place in cotton either offered for sale or offered for pressing. There were no presses in Dharwar and the cotton was sold not in Dharwar but in Bombay. So the Inspector might see in a ginning yard a heap of local, a heap of American, and a third heap of seed to be added as a make-weight and yet fail to secure a conviction.” (Page 296, Dharwar Gazetteer.)

The result was that out of many prosecutions, all of which were aggravated cases clearly within the spirit of the law, very few were successful. In 1873 all of the European merchants of the district as well as the local officers pressed for a more stringent Act. In 1874 Government appointed a Commission to enquire into the necessity for continuing the special law to suppress cotton frauds.

“The majority of the Commission after collecting a large amount of evidence were of opinion that though it was not advisable to annul the Act it was advisable to place it in abeyance for a time. When the matter was referred to the Secretary of State, the Bombay Government were directed to prepare a fresh Act with the object of remedying the defects of the existing measure.” (Page 299, Dharwar Gazetteer.)

Act IX of 1863 was repealed by Act VII of 1875. These Acts appear to have been extended to Berar but not to the Central Provinces (*vide* page 215, Cotton Commissioner's Report for 1868-69). In September 1879 the Government of India recommended that all special legislation for the suppression of cotton frauds should cease. The Secretary of State did not then agree with the view held by the Government of India, though in March 1880 he sanctioned its proposals and desired the Bombay Government to do away with the special cotton fraud prevention establishment. Act VII of 1878 was repealed by Act I of 1882.

“According to Mr. Walton (Cotton Inspector) the opinion of the local European Agents and Native merchants was opposed to the giving up of Government efforts to check frauds. According to Mr. P. Chrystal, a Bombay merchant who is well acquainted with the Belgaum and Dharwar cotton trade, the Bombay dealers and merchants in American Dharwar and Compta cotton think (1883) that the Cotton Frauds Act failed to stop adulteration in the Bombay-Karnatak. Mr. Chrystal thinks that since the Act has been stopped there has been no noticeable increase in the adulteration.” (Page 301, Dharwar Gazetteer.)

18. Though adulteration has continued so long there has on the whole been an undoubted increase during the last ten years in cotton cultivation and in the volume of the *internal* trade. The long continued efforts to improve the quality of the fibre by promoting the cultivation of exotic cotton may also be said to have met with success, though this success has latterly been vitiated again to a great extent by the increasing growth of an indigenous variety of short stapled cotton called varadi. This cotton is used mainly for purposes of admixture with better stapled varieties. The reputation of Khandesh and certain parts of Berar cotton is said to have been seriously injured by the admixture, and serious complaints are reported as coming from Europe in connection therewith.

The Collector of Khandesh when referring to this admixture in 1878-79 pointed out that—

“admixture begins with the sowing. The Khandesh ryots do not keep a portion of their crop for seed, as is customary in the Deccan, but depend for seed on the bania. The bania receives all kinds of cotton. That purchased from the pickers, who receive their wages in kind, must often be mixed. He sells this and what he has received direct from the cultivators to the large dealer who has it ginned and pressed. The admixture so far may be done in ignorance, but on Mr. Robertson's authority I say that wilful admixture takes place at the hands of the large dealers and of the agents of the large ginning and pressing factories. At no single stage of this complicated business would honest and wise conduct succeed in preventing the evil. If the ryots sow pure seed, and keep their seed pure, the banias will mix it. If the banias were to guarantee good seed and to sell only such they would have to charge a higher price for it, and the ryots would probably prefer using cheaper stuff which they would manage to find. If the large firms were to reject mixed cotton, their factories will be idle. Combined action is essential but as unlikely as it is essential.

19. The Director of Land Records and Agriculture, Bombay, is, as will be seen from the extracts from his report given further on, doing his utmost to improve the tone of the industry. As regards adulteration he writes as follows:—

1884-85.

“The subject of adulteration is of such importance that I feel it my duty here to state carefully the whole case before Government, for only a full statement can explain the final deliberate decision that practically nothing at all can be done.

“The Secretary of State forwarded a communication received from the Liverpool Chamber of Commerce calling attention to the increased adulteration of East India cotton—a subject of very great gravity—a growing evil which seriously imperils the foremost staple of India, at the same time affecting and disturbing most grievously the cotton trade. In due course the opinion of the Bombay Cotton Trade Association was solicited. This body informed Government that their attention had already been directed to the matter in such a way that they had been induced to appoint a special Committee to consider the question of mixing and adulteration in all its bearings. The conclusion arrived at was then announced—

“Having thoroughly considered previous legislative enactments on cotton frauds, and the discussions connected therewith, by the light of more recent experience, and having further before them the resolutions come to by the Liverpool Chamber of Commerce, they had nevertheless come to the conclusion that special legislation was not advisable.

“The Association then formulated its advice to Government, *viz.*:—

- (1) That Government should discourage the growing practice of ginning different growths together, thus producing a mixed and deteriorated seed.
- (2) That Government should point out to the cultivators the benefit of persevering with the cultivation of the finer descriptions of the staple.
- (3) And that Government should aid them in procuring improved seed for that purpose.

“With this advice it was suggested that the action initiated by Mr. A. T. Crawford, Commissioner, S. D., in Dharwar, was a step in the right direction, and might be imitated in other districts with advantage.

“The proceedings of the meeting held to consider the report of the special Committee were at the same time forwarded to Government.

“The Chairman premised his remarks by stating that some of the members of the special Committee after perusal of the pamphlet issued by the Liverpool Chamber had entered on their deliberations with strong views in favour of special legislation, but that when the effect on the trade caused by the late Cotton Frauds Act was discussed, and when the manner in which the trade has been conducted since the withdrawal of special legislation was considered, the feeling became universal that further legislation was not advisable.

“It was admitted that ‘a certain amount of admixture’ had become prevalent since the abolition of the Cotton Frauds Act, and that this admixture was a decided evil, hurtful to the trade, and a source of loss to merchants. (It could not be expected that this meeting should concern themselves with the effect of admixture on the producers. That was not their province.)

“The Chairman gave his opinion that mixing had during the past season been of a less consistent character, and that professional mixers had not been so successful. He charged the native dealers with the origination of the plan of mixing, turning thereby their special knowledge of cotton to account. Mixed bales passed muster, and they became bolder. But the growth of the practice soon brought matters to a crisis, and a set of rules was formulated to combat the evil. The penalty clauses were, however, soon found unworkable. Contracts were made by the native dealers *inter se* with the omission of these clauses, and the European merchants were compelled to make them optional. But even with this relaxation of the stand taken against mixing, the Chairman thought that an improvement had set in.

“The deliberations of the Committee were then described as to the form which legislation, if decided on, should take. Fatal objections appeared to arise against every suggested penal provision. In fine, it seemed

clear that a mild Act would be unworkable, and that any other form of legislation would entail a completely equipped staff of Inspectors, armed with extensive powers, which would simply be the re-institution of the Cotton Frauds Department with all the features detrimental to trade which had brought about its abolition. Therefore it was decided to ask Government for aid.

"It was prominently—but no emphasis could be too strong—stated that deterioration of seed was the great evil to be feared, and the grievous fact was noticed that during the previous year large quantities of Dholera cotton had been brought into Broach, and ginned with the fine Broach *kupás*. This, of course, meant irremediable mixture of seed, which would surely show itself in the coming crop.

"Next, the improvement effected by Mr. Ashburner, by substituting Hinganghāti seed for the indigenous growth of the Khandesh district, was referred to, and it was admitted that, *during the time in which the evil of admixture had risen and thriven*, the deterioration of Khandesh cotton had gone on. The deduction was justly drawn, that it was this admixture by the trade which fostered the deterioration,—in other words, which fostered the cultivation of the short-stapled Varadi.

"The Chairman, in proposing the form of letter in which the assistance of Government should be invoked, inserted a clause to the following effect—that it had been found from actual experience impossible, owing to the constitution of their own body, to establish and adhere to a set of trade rules which would effectually put a stop to the practice of mixing.

"This clause was omitted by a majority, on the ground that the Association was quite strong enough to make a rigid set of rules, which, if loyally adhered to, would go a long way to putting an end to the system of mixing.

"It remains to be seen whether this much-desired result can be effected by the Association. If the trade can and will stop the mixing, then Government's decision to do nothing at all will be fully justified. If, on the other hand, the trade cannot or will not stop mixing, it will, in my humble opinion, be incumbent on Government to seek to stop it without permitting interference with the trade or the obstruction caused by Inspectors, to weigh against the demands of the country and the welfare of the ryot. But I am anticipating.

"The Collector of Khandesh, Mr. W. H. Probert, was the first to lay before Government his estimate of the practicability of the advice offered by the Association.

"He pointed out that no effort had been relaxed by the Revenue officers—(1) to prevent the extension of Varadi, for he had oftentimes gone near overstepping the bounds of legal authority to check its spread; (2) to encourage the cultivation of improved varieties, for at the Maheji Exhibition handsome prizes had been yearly awarded for the best samples of exotic cotton; and (3) to supply good seed, for the Government Farm had for its main object the production and distribution of as much good seed as possible, but that in 1882 the ryots got out of hand for two reasons. First, they had become fully aware that no restraining authority remained in the hands of the Collector, and, secondly, the price given for Varadi had reached or nearly reached that accorded by the trade to the better staples of the Dharwari (acclimatized American) and Hinganghāti.

"He showed that the producer has very little voice in the question as to what crop should be sown. He gets his seed from the middleman, and his crop is virtually disposed of, seed and all, before it is grown.

"He admitted that the ryot prefers to grow the indigenous variety, which is reared with far more care and yields a heavier crop. When the demand rose for this commodity, it was very easy indeed for the middleman to extend its growth at will. And he asserted forcibly that if for one season (1883) the merchants had refused to buy Varadi, or had at any time within the past three or four years assisted him in his efforts to sustain the good name of Khandesh cotton, the Varadi cotton would have been virtually stamped out.

"Next, turning to the question of the distribution of good seed, he indicated his reluctance to look again to the Berars, because there was evidence that the system of admixture had worked harm there as well as in Khandesh, and there was little prospect of advantage from the re-importation of this Hinganghāti variety, which is not so valuable or generally suitable as the Dharwari. And so with regard to Dharwar; the fact of Mr. Crawford's movement to improve the cotton of that district shows that the staple has deteriorated there also. Therefore there is risk in applying for seed thence. But Mr. Probert argued that in Khandesh itself it is possible to collect a large quantity of good seed by separately picking the bolls of the exotic cotton grown in and among the indigenous crop, relying on the fact that the former ripens earlier than the latter.

"I may parenthetically remark that good cotton can be procured from Dharwar. Experience has shown that seed acclimatized there succeeds better in Khandesh than freshly imported seed; and though the Dharwar seed has deteriorated, its transfer to Khandesh will almost certainly give fair results. The plan recommended by Mr. Probert of collecting seed in Khandesh, too, is feasible. But, as is clearly argued, there is no possibility, under present adverse circumstances, of getting good seed sown. By the kind offices of one of the leading merchants in Bombay I was informed that his up-country agents could not, if they would, at present induce cultivators to sow the exotic cotton. Perhaps this opinion should be received with caution; for, as all the reports tend to show, the ryot is not the arbiter in this matter.

"Mr. Probert sums up with his advice that dishonest mixing should be made penal. He holds out the alternative that the Bombay merchants for one year should refuse to buy the mixed cotton. But the reply to this is that the merchants cannot afford to consider any such scheme.

"The Commissioner Mr. E. P. Robertson—after, I think very wisely, insisting that the coercive measures adopted by Mr. Ashburner some years ago were altogether over-estimated as regards their good results—says that Government have no right to interfere by dictating to the people what cotton they should sow, but fully supports the demand for a law to punish adulteration—very pertinently remarking that the merchants can hardly plead for the re-imposition of the law which their vehement opposition caused to be abolished, however much they may be convinced that that law is wanted.

"Independently I represented my view of the question. The object of my letter was to show that the advice of the Cotton Trade Association is futile, based on a misconception of the position of the ryot. I tried also to give reasons why the method of improvement initiated by Mr. Crawford in Dharwar would do no good in Khandesh. I called attention to the late discussions in the Berars, and to the late Mr. Riddale's able review of the whole matter, in which he showed that interference with the ryot is not justifiable on either administrative or economic grounds. This review was called forth by the resolution of a meeting that the action of Mr. Ashburner in 1873 had secured wonderful results in Khandesh, but had been detrimental to the Berars, in that it caused an influx into that Province of the seed of the short-stapled variety ousted from Khandesh (which in the Berars is called Khandeshi, and which in Khandesh is called Berari or Varadi), thereby working much

harm, and that the imitation of the policy of Mr. Ashburner would rehabilitate the cotton of the Province. The Government of India, Revenue and Agricultural Department, prevented any action being taken by the plain statement of the plain fact that Mr. Ashburner's policy in Khandesh had not secured lasting results. I endeavored to make it clear that though the Dharwari cotton does well in some parts and some soils in Khandesh, it is not suitable to others—that it would be an evil to attempt to stamp out Varadi (or Khandeshi cotton), inasmuch as that variety is the only paying one in its peculiar soils. Further, that the production of Varadi has its recognized and justifiable value, though the cotton is useless for export, except for purposes of admixture.

"I ventured to suggest that the earnest desire of the Cotton Trade Association to evolve a workable method of preventing fraudulent admixture, and the no less earnest anxiety of the District Officers to assist in the movement would be best fostered by the appointment of a Joint Commission of merchants and Revenue officers to enquire into and discuss the whole matter. On the one hand the merchants would see how unworkable the advice offered by them really is, and, on the other hand, the Revenue Officers would learn much as to the most feasible method of meeting the evil without disturbance of the trade.

"With well-aided information on the various points noticed, the Commission, I thought, would be in a position to recommend a feasible working-plan. The merchants would then be entitled to call on District Officers for co-operation, and the District Officers would know what support they could expect from the trade. At present in their eyes, in spite of the enlightened and well-intentioned declarations and warnings of the organized mercantile associations, the trade is doing everything it can to checkmate their efforts at every step.

"I casually hinted at the feasibility of establishing warehouses near the ginning and pressing factories where cotton received should be sorted and cleaned. I need only say that this plan is universally declared to be impractical, and I do not wish to pretend that I am able to elaborate a scheme in connection with it.

"All these papers were considered by the Chamber of Commerce and the Cotton Trade Association. They were practically a challenge to the trade, and the trade could not take up the challenge. The former body explicitly stated that the admixture is due to a demand in Europe for inferior stuff.

"So long as there exists a demand in the consuming market of Europe for the inferior descriptions of cotton, so long will merchants continue to purchase, middlemen to mix, and growers to cultivate it. No good end could be served by attempting to interfere with the natural course of the trade.

"The Chamber went on to urge that there are signs of a re-action against mixed cotton, and advised Government to take energetic steps to distribute good seed throughout the districts, presumably to be ready to meet an improved demand.

"The Cotton Trade Association in disposing of the reference contended that there are buyers in Europe of adulterated and mixed stuff on its merits, and that merchants are bound to deal in it. It is therefore presumable that much of the adulteration which now goes on is not fraudulent. Certainly the former proceedings of the Association give me, at any rate, a different idea of the matter. It seems to me to be merely removing the fraud one stage further on, for these buyers in Europe of adulterated and mixed stuff on its merits, paying the high price they do for the chief ingredient (worthless on its merits) of the mixture, cannot be credited with honest dealing.

"The orders of Government were that no steps to stop the supply of a commodity which is grown to meet a demand by consumers can be taken. As regards the latest advice of the Chamber, it was pointed out that, till the improved demand for good cotton does arise, it would be premature to distribute good seed.

"It must be drawn from these orders that Government do not approve of any legislation to check fraudulent mixing.

"The course of events must be watched; but whatever is done in the matter must be done without consultation with the trade. It is, in my humble opinion, hardly fair to ask the merchants to show how the ryots can be protected from by-injury resulting from the course of the trade. On the other hand, the perusal of the deliberations of the Cotton Trade Association gives the fullest confidence that whatever can be done on their part will be done.

"The Commissioner, N. D., Mr. G. F. Sheppard, brought to the notice of Government a specific instance of the importation into Broach of 179 tons of Dholera cotton to be ginned. It may be presumed that this was for the purposes of admixture. Clean cotton cannot be successfully mixed. Mr. Sheppard also noticed that annually a very inferior variety of cotton is exported to Dholera from the Kaira district. He enlarged on the greater danger from deterioration of the seed than from mere admixture of staples, and urged that the subject demands consideration in the interests, not of the trader, but of Government itself.

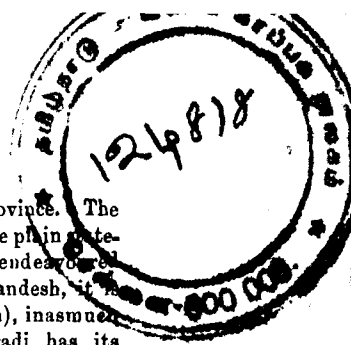
"He contended further that it is easier to prevent admixture of seed at the beginning, than to restore the high character which a crop has once lost. He advised that the Collectors of Broach, Surat, and Ahmedabad should be directed to watch importations of inferior "Kapas" and authorised to buy up the seed either pure or mixed. There can be no objection to such a plan. The seed would be useful for cattle food and the loss nothing, because it may be presumed that a lot of seed, stigmatized as mixed, would not knowingly be used for sowing. I trust that the Commissioner will carry his suggestion into practice.

"Mr. Stormont of the Bhadgaon Farm made a short tour chiefly to ascertain the extent of admixture in the field. The following may be quoted from his report:—

"Tour in Cotton Districts.—About the beginning of February the Collector directed me to make a short tour in the eastern talukas with the object mainly of finding out to what extent mixed cotton seed was sown by the cultivators; also whether, as alleged, merchants were paying preference prices for the short-stapled Varadi. My inspection embraced a circle of districts including Páchora, Bhusaval, Savda, Chopda, and Erandol. The results of the analysis of numerous samples are arranged in the margin.

TABLE VI.—ANALYSIS OF COTTON.

PLACE.	AVERAGE MIXTURE.		
	Varadi.	Hinganghāti.	American.
	Per Cent.	Per Cent.	Per Cent.
Páchora	25	30	45
Yaval	58	40	6
Arwad	70	25	...
Chopda	75	20	5
Bhadgaon	60	20	20
Erandol	68	20	12



5781.2
mss

A glance at the table will show that the crop of Khandesh still contains a fair percentage of good cotton. At Pachora it is nearly half American; the short-staple being only a quarter of the whole. This is admittedly due to the spare farm seed being annually sold in the neighbourhood. At Bhusaval no reliable sample was obtainable, but about Yaval the American element diminishes to 6 per cent.; at Arrawad and onward to Chopda it altogether disappears, until the vicinity of Dharangaon is reached, where with the Higan-ghati it makes up half the crop. Coming southward by Erandol the Varadi again predominates, being just outside the circle under the influence of the farm.

Opinion of Cotton Merchants.—At Dharangaon a number of merchants and others met me to discuss the question of cotton improvement. The smaller class of local dealers were strongly opposed to any measure of restraint, declaring that although the price of Varadi was comparatively low, still the cultivators liked to sow a certain mixture, it being the more reliable poor man's crop.

The Bombay buyers, on the other hand, were unanimous in opinion that only the operation of an Act could ever restore the reputation of Khandesh cotton and the consequent prosperity which its producers enjoyed for so many years. All, however, were agreed as to the beneficial results which must necessarily follow the distribution of large quantities of good seed.

"It seems to me that Mr. Stormont has missed one point, deducible from his enquiry,—that is, that the further he went from the railway and from cotton centres (e.g., Dharangaon) the less the percentage of good staple. This fact would seem to show that the suitability of the indigenous variety, apart from the support accorded by the demand for admixture, has a strong bearing on the increase of Varadi. The deduction may be wrong, but if it is correct, it is a warning that a place for this variety must be recognized as necessary (see paragraph 98 above).

1885-86.

"I have very little to place on record respecting this important staple. No further movement has taken place in the direction of check against admixture, and I have no district agency to record the damage done by carting seed cotton from districts, where the staple is bad, but the colour good and the cotton cheap, to be ginned with superior cotton. That this admixture goes on I have no doubt, and it is certain that the mixed seed is sown in the localities where the ginning is done to the great detriment of the crop. One circumstance, however, is worthy of note. The Liverpool Chamber of Commerce has established a new standard which will be known as *Bilati*. It will include the short-stapled Omrawuttee, and will apparently be a direct check against the export of the short-stapled Varadi as it is called in Khandesh, or Khandeshi as the Berar people chose to denote it under the standard of Omrawuttee. It remains to be seen from the quotations and trade returns the price which the new standard will command and the proportion it holds to the whole crop."

20. In referring to the introduction of exotic cotton into the Presidency the Director of Land Records and Agriculture says in his report for 1884-85:—

"(6) Prospects of American Cotton.

"The valuable staple acclimatized from American seed is well established. Its cultivation is liable to fluctuations with the rise and fall of the demand for good stapled cotton, but it will not disappear. Its hold is especially strong on the three talukas of Bankapur, Karajgi and Ranebennur in Dharwar, and the large areas of the surrounding Native States. It does not do well in the deep black-soil talukas. Its advantages are:—

1. That it can be put into the market sooner. It ripens earlier.
 2. Its outturn becomes sooner certain, and advances can therefore be earlier secured on the crop.
 3. Cleaned by the saw-gin it economizes manual labour, and this at the time when this labour is in great demand.
 4. In good years its yield is very high.
 5. Though more liable to blight than the indigenous variety, it possesses greater power of recovery.
- "The question of introducing this variety into neighbouring districts, e.g., Bijapur, is very important."

The experiments with exotic seed in this district proved unsatisfactory in 1884-85 and 1885-86, but another trial is to be made during the current year with fresh seed imported from America. This seed has been tried in Khandesh also, but the Director in his report for 1886-87 states that it has been clearly demonstrated by the trials that it would be unwise to force exotic American cotton on the Khandesh cultivator as the soil and climate of the district is unsuited to its growth.

21. The Egyptian black-seeded cotton was tried in Dharwar in 1884-85 but it was a failure. It has been tried several times in this district but always without success. In June 1886 the Government of India supplied the Director with Nankin cotton seed to test the suitability of the Nankin or Khaki-coloured cotton for the summer clothing of the troops in place of dye cloth. A guarantee was given that the produce would be purchased at 4 annas per lb of clean cotton. The Director writes as follows about the experiments in 1884-85:—

"The cultivation of Nankin cotton in this Presidency has not got beyond the experimental stage, and even experimental cultivation is in its infancy. The only instance known of a farmer growing this cotton on his own account is in the Shevgaon Taluka of the Ahmadnagar district, where one Narayan Raghunath, a Brahmin holder of some means, cultivates it yearly as a garden crop to the extent of 5 gunthas. The seed is said to have been imported from Delhi about twelve years ago. The cultivator manufactures the produce into cloth for his own use.

"My opinion of the trials was as follows:—

"On the whole, although the outturn under experiment was smaller than that of the local variety, it is not to be doubted that as large an area as may be desired can be grown with this cotton if the Government of India continues its offer of four annas per lb of clean lint; but without such a stimulus it is not at all likely to be grown at all. I am very much averse to attempting to force this variety on the country. It may injure our staples by hybridization. Its seed may get mixed with the other varieties, and a most harmful, undesirable mixture will result, which once established will take long to remedy. No alacrity is shown by the Military Department to utilize the natural Khaki cotton in lieu of the dyed material, and it is not unlikely that a mordant may soon be discovered which will prevent the now unsatisfactory variations in the colour of dyed Khaki. Again, experiment has yet to be carried on to decide whether the colour of the Nankin cotton can be relied on. I have instituted experiments on this point at the Hyderabad Farm. The Nankin cotton has no merit as to staple or yield; and my advice on the matter, as it stands at present, is that all attempts to force its growth should be abandoned. I earnestly ask that pressure may not be brought to bear on me to do more than experiment with this variety."

"The following extract from a letter of the Chamber of Commerce—to whom a small sample of the Shevgaon cotton, which was decidedly superior to that grown on the Bhadgaon Farm, was sent—also supports my view:—

"The staple is short, irregular and wasteful, and would be most unprofitable stuff to work. Under the circumstances the Committee would strongly advise that the cultivation of this description be confined to those places where it is indigenous, as there would be great danger of its hybridising with the local varieties to their detriment if introduced largely into this Presidency."

The experiments regarding the possibility of securing a uniform colour in Nankin cotton by selecting the seeds from bolls of the desired tint were concluded in 1886-87, when the Director stated that—

"The result of adequate trial is that it is very difficult to obtain clean cotton of a uniform colour, though it is possible to do so with great care in selection of seed, but as the variety of cotton is poor in yield and undesirable in every respect, the conclusion is not of great importance. The Military Department has now withdrawn its special encouragement of this variety by experimental results."

22. Trials have also been made with selected seed and special inducements have been held out to the cultivators to grow this seed; the results in both cases appear promising so far as the Hyderabad and Bhadgaon Farms and their neighbourhood are concerned.

23. The Director found that the exotic cotton seed (acclimatized American variety) had degenerated, and he therefore determined to import fresh seed from America. The result of his action appears to have been so far successful. The following extracts from his reports refer to the subject:—

1884-85.

(4) Want of fresh seed from America.

"I noticed in my report last year that there was a spontaneous demand for fresh seed in Bankapur of the white-seeded American variety, the only one of very numerous kinds which has really shown itself worthy of support. But I found that no further action had been taken. The seed has degenerated. It is harder and smaller than it was. Though a good year seems to check this degeneracy, there is, no doubt, need for new importation. The demand for new seed is not confined to Dharwar. From Kolhapur I have received a large indent. I have placed myself in communication with the Chamber of Commerce, and fresh seed will be imported."

"But I have decided on adopting a slightly different plan from that followed heretofore. Fresh seed is very expensive. It never does well the first year. I propose therefore to show the seed in that part of the district (e.g., Bankapur) where the variety succeeds best* (I may notice that in the deep black-soil talukas of Ron and Navalgrud it gives a poor crop in comparison with the yield of the lighter black districts of Bankapur, Karajgi, and Ranebennur) and to distribute the produce at a moderate charge. This plan I shall recommend to the Kolhapur State. Specific proposals will be made to Government for sanction to hire land for one year for the purpose."

* On this subject the Director remarked as follows in 1885-86:—
"Doctor Boyle pointed out (1840) one result of experiment which I believe by all result of experiment as correct, viz., that the black soil is not so well suited for American cotton as the poorer soils. I cannot but think that attempts to introduce the improved varieties without regard to this fact were so far misguided."

1886-87.

"I described last year the new importation of seed, and its distribution. I am now able to give a very satisfactory account of the results. In Dharwar in 6 villages of selected talukas, i.e., talukas where the exotic cotton has held its own without the aid of official pressure, sowings were made by Mr. Price. A little delay arose owing to an untoward break late in August 1886. The season was on the whole favourable. The average yield was 158 lb per acre of seed cotton. The proportion of clean cotton to seed was found to be 1 to 2½, a high proportion when compared with the produce of the old acclimatized seed, which is generally about 1 to 3. Mr. Raines, while Acting Director, inspected the fields and placed on record the following observations:—

- (1) The higher light black soil showed better results than the deep rich plain.
- (2) The better the growth of the crop, the less the injury by blight and discolouration.
- (3) The pods were larger though fewer than on the crop raised from old acclimatized seed.
- (4) The plants were stouter and lower in growth than the old cotton.

"It must be remembered that these results are for the first year of introduction while the process of acclimatization was only commencing. The smaller growth of the plants seems to point to some hybridization with indigenous cottons in the case of the old cotton.

"The crop was considerably better in some places than in others, but on the whole it was everywhere fairly good. The net cost to Government of the importation, experimental sowings and distribution has been only Rs233.

"Sowings of new American seed cotton in Dharwar, 1886.

NAME OF VILLAGE.	Area sown.	AMOUNT OF SEED		Date of sowing.	OFFICERS IN CHARGE	
		Per acre			Area Rate.	Total.
		A. G.	Total.			
HUBLI (Kusugai)	2 39	10	29	29th September	60	237
HUBLI (Halihal)	14 35	7	102	29th August	12	1,908
INGALGI (Ingalgai)	25 10	5	125	26th "	15	4,008
BANAKPUR (Banihal)	8 7	6	53	"	173	1,414
KARAJGI (Korjiri)	19 5	6	125	7th September	240	4,608
KARAJGI (Devguni)	16 9	7	125	14th "	97	1,570
TOTAL	86 25	6	560		158	13,728

"I have under the head Farms shown the result of experimental sowings at Bhadgaon. A large portion of the new seed was taken over by the Kolhapur Agency. In some States the season was unfavourable. The report received from Miraj Junior states: 'The cotton plant raised from the new American seed is 3 feet high as compared with 2½ feet in the case of the old cotton. The pods are fewer but larger, about in the proportion of 2 to 3, but the weight is greater, 10 pods of the new weighed 1½ tolas, while the same number of the old only 8½.' These notes correspond with Mr. Baines' observations.

"In the Panch Mahals Mr. B. A. Dalal sowed the new cotton. It gave a poor yield, but he likes the quality of the sample."

24. Doctor Forbes Watson had expressed his opinion that the seed from four and five-celled pods would produce a better yield and a better staple than that from the ordinary three-celled one. Experiments are being made on the Hyderabad Farm to test this theory; the result of the trial in 1886-87 was reported to be as follows:—

Kind of Seed.	PERCENTAGE OF BULKS IN PRODUCE.					
	Acclimatized American Cotton.			Sind Cotton.		
	3-celled.	4-celled.	5-celled.	3-celled.	4-celled.	5-celled.
3-celled	6.6	78.4	14.9	66.8	33.1	0.1
4 "	2.7	80.3	17.0	60.3	33.6	0.2
5 "	3.0	69.0	29.0	34.1	63.5	2.4
Uncollected	5.1	76.7	18.3	47.2	42.3	0.5

"The 3-celled capsule is a common characteristic of the indigenous, as the 4-celled capsule is of the exotic variety.

"Result.—The produce shows a slight tendency to imitate the seed. The experiment will be continued. If the results are persistent they will be of considerable value to cotton growers."

The extract below contains the result of an experiment made in 1886-87 in connection with cotton cultivation.

"Respecting the cultivation of cotton and the merit of the local expedient of interrowing comestible rows of jowari or tur, experiments made in the season under report prove that the cultivator even in a good cotton season secures a larger profit from the mixed sowings than from cotton alone, and that in a year unfavourable to cotton he ensures a fair return. But, on the other hand, the experiments do not show a similar merit in the local practice of ploughing up poor bottom and following with a late crop. It is better to interrow gram or linseed between the rows of poor cotton.

The crop was ginned by steam. The cost was per 240lb Rs1.8.0 as against Rs2.14.5 of the country hand-gin."

25. As regards ginning, the following extracts contain interesting information on the subject:—

1884-85.

"One of the most important questions in Dharwar is with respect to the saw-gin. A reference to the Dharwar Statistical Account, Vol. XIII, Santhoor will show the various steps which led to the introduction of this necessary concomitant of the American cotton which has established itself in the district, and the reasons why the management of the saw-gin factories still remains in the hands of Government. Three years ago it was discussed whether Government could not safely retire from the direct manufacture, distribution and repair of the gins but it was resolved to await the advent of the railway, when

it might reasonably be expected that steam saw-gins would be set up by private firms. The railway is opened, but there is no indication yet of any such enterprise. There are steam gins at Hubli and Gadag, but the roller pattern is used.

"I sought to ascertain whether the people could not now be left to themselves to arrange for the repair of their gins. There is a great deal of discontent among them. The factories are made self-supporting from a subscription of Rs6 per annum per gin from each owner. The tax may be evaded by the deposit of the saws and spindles at one of the factories. The owners are entitled to the services of trained hands on payment, over and above the general subscription, for wages and material. The complaint is that the trained workmen kept are too few, and that only those villagers who live close to the factory get any benefit. On the other hand, more labourers would entail a larger subscription, and apparently the people are not careful to have their gins repaired in the slack season, but wait till the ginning time comes, and then, finding something go wrong, all clamour for the factory men. At Hubli and Ingalgai the raya's assert that they can make their own arrangements, provided Government will assist them in procuring new saws and certain working parts and new gins when required; but everywhere else there was a consensus of opinion that Government must keep the factories, and I believe this is a necessity. It can only be hoped that private steam saw-ginning factories may yet be started.

"There is one gin worked by bullock power at Halyal near Hubli. At Dergiri I saw another being set up. There is a third, now not used, also near Hubli, and at Ingalgai there is a prospect of another. This utilization of bullock power must be encouraged. It will reduce the labour now falling on the factory workmen, for the raya who works a gin with bullocks is in a position to employ his own skilled hand. It may be advisable to seek to introduce Gordon & Co.'s bullock power into this district. This machine has no place to fill in Khandesh but there may be benefit in Dharwar.

"A new pattern of saw-gin has lately been introduced into Dharwar. It is a great improvement; but the people, I think naturally, complain that the improved grid might have been adapted to the old framework and other working parts instead of necessitating their purchasing an entirely new gin. They do not like the new grid. It is too good, and cleans the cotton too well to suit the degenerated demands of the trade. The larger outturn of the old grid is solely due to the large percentage of seed carried through. The same feeling shows itself also in respect to the foot-roller. This rude implement worked by women can compete, and does compete, successfully with the steam-rollers, because the trade is not particular, and prefers buying cheaply half-clean stuff to giving a remunerative price for well-cleaned cotton.

"I may mention that the foot-roller—for indigenous cotton only—is the implement used all over the Southern Marathi Country, but that strange to say, the hand charak, very similar to the Khandesh charak, is again found in the very south of the district."

1885-86.

"I am glad to report that the Halyal saw-gins are now worked by steam instead of by bullock power. This is, however, the only place in the whole Presidency except the two Government farms, where the steam saw-gin is used to clean cotton. No change has taken place regarding the manufacture, repair and distribution of hand saw-gins in Dharwar, described in paragraph 77 of last report.

"At Bhadgaon, now that Mr. Stormont has a steam engine, he will work saw-gins to clean the farm cotton and the small amount of the Dharwar American still grown in the neighbourhood from farm seed. At Hyderabad an experiment with the saw-gin for cleaning the indigenous cotton has been most successful. The whole of the farm crop was ginned with the improved saw-gin sent from the Bhadgaon Farm driven by a six horse power engine. Mr. Strachan reports that the cost was Rs1.3.1 per maund of 84lb as compared with Rs2½ to Rs2¾ for the native hand-charaka. The clean cotton sold for Rs15 per maund, while the ordinary native was selling for Rs13.8. The seed could have been sold for Rs1.10 per maund, but the price of the clean cotton alone was more than would have been got for both cotton and seed had it been sold unginned. The outturn of the gin was 18 maunds per day of 9 hours. The Karachi Chamber reported, 'saw-ginned Sind native cotton from selected seed appears to be a great success. The staple does not show any signs of having suffered from the process of ginning, and is valued at about Rs1½ to Rs2 more than the average native Tauda.' The hand-ginned samples of selected Sind cotton, i.e., grown from the selected seed, were valued at Rs1 to Rs1½ above the then existing average selection of Sind. It is noticed further by Mr. Strachan that the saw-gin does not crush the seed, and that the percentage of clean cotton is greater than that obtained by hand-cleaning."

1886-87.

"The Dharwar Factory is languishing. Perhaps the degeneration of staple in the exotic cotton is the cause. The extra price does not encourage or repay the use of the rather expensive gins. Private enterprise has not relieved Government of the necessity of maintaining the factory as was hoped. It has been decided, however, that if the Local Boards will not take over the factory, they will be closed on 31st August 1889. By this time the newly imported seed may alter the prospect of affairs.

"This gin is wonderfully appreciated in Sind for indigenous cotton. It is only used in Dharwar for exotic. I have in former reports given details of the working in the Sind Farm. Saw-gins were exhibited at the Shikarpur Show and were much liked. But a further indication of approval must be recorded. A large cotton dealer at Hyderabad, Sind, has contracted with the Government farm to gin considerable quantities of cotton with the saw-gin driven by the farm engine. The result of this working is not yet known."

BENGAL.

In the absence of statistics for the Lower Provinces, it is not known for certainty what is the area under cotton, but the following statistics for 1876-77 have been extracted from a report furnished by the Government of Bengal in 1878 (Agricultural Proceedings of the Bengal Government for November 1878, page 3):—

"There are, as far as can be ascertained, 1,02,000 acres under cotton cultivation in Bengal yielding 128,800 cwt. of cleaned cotton. The quantity exported from the districts amounted to 96,600 maunds (69,000 cwt.) the

value of which is estimated at Rs 9 lakhs. The largest area under cotton cultivation is in the district of Sarun, where 31,000 acres were under the plant during the year. Next in order of extent come the Chittagong Hill Tracts 29,000, Cuttack 20,000, Lohardugga 15,000, Durbhunga 12,000, Midnapore 10,000, and Manbhoon 10,000 acres. But although Sarun is shown to have had the largest area under cultivation, the outturn was not sufficient even for local requirements. The largest outturn was in the Chittagong Hill Tracts, where it amounted to 50,000 cwt. Next in order come Midnapore with an outturn of 12,900, Cuttack 12,500, and Julpigoree 10,200 cwt. The fact is that the cultivation of cotton is not of much importance in Bengal, except in the Chittagong Hill Tracts, in Cuttack and parts of Julpigoree."

2. Some further particulars are given in the subjoined extracts from the provincial reports:—

"The cultivation of cotton is not of very great importance in any of the districts of Bengal, with the exception of the Chittagong and Hill Tipperah Tracts, Cuttack, and parts of Julpigoree also. In the Government Estate of Khoorda in the District of Pooree, experiments have been made to grow a variety of Egyptian cotton.

The experiments* are said to have proved a great success, and the cotton is likely to be a favourite with the ryots. In the plains of Bengal, which are so fertile in other produce, the production of cotton is an inconsiderable industry, and nothing is exported, while much is imported from the North-Western Provinces. The cotton grown in Bengal is not sufficient for the requirements of the people and has to be supplemented by cotton imported by land or river from the west, and by an increasing importation of English piece-goods.

Generally speaking, then, it may be said that the production of cotton does not form an important industry of the cultivators in Bengal. It is cultivated, not as an article of commerce, but for the sake of variety and domestic use, the agricultural classes only preferring strong home-made spun cloth to the less durable machine-made European cotton piece-goods procurable in the bazar. There is no anxiety on the part of the cultivators to extend or improve the cultivation of cotton, which is gradually, but surely, being driven out of the market by the introduction and increasing use of foreign twist and cloth. (Pages 17 and 18, General Administration Report, 1882-83.)"

The last paragraph of the above extract appears to take a rather too gloomy view of the cotton culture in Bengal, for both the exports and cultivation appear from the particulars given further on (paragraph 8) to have increased during the five years ending 1886-87.

3. In his report for 1886-87 (page 8), the Director of Land Records and Agriculture writes as follows:—

"Cotton was formerly grown extensively in the Dacca and Mymensingh Districts, in a large tract of land the soil as well as the physical aspect of which are very well suited to the cultivation of it. The cotton raised here, though rather short in staple, was the finest known in the world, and formed the material out of which very delicate and extremely beautiful Dacca muslin was manufactured. Since the decline of that celebrated fabric, the cultivation of cotton has almost entirely ceased in this tract. Considering the high price that cotton fetches in most parts of Bengal and the improvement that has been effected in the yield of it by the introduction of some of the best American varieties, the cultivation of this important crop may be revived in the locality with great advantage."

4. The information given below of the time when cotton is sown and picked has been taken from the report published by the Government of Bengal in November 1878, as later particulars are not available; the information given has been confined to those districts which then had the largest areas under cotton cultivation:—

	When sown.	Gathering time.
MIDNAPORE	{ May or June. October to November.	September to March. February to June.
CHITTAGONG HILL TRACTS	{ April and May. October.	November and December. August and September.
DURBHUNGA	{ May or June. June and July.	March and April. April and May.
SARUN	{ January or February. June and July.	August and September. October and November.
CUTTACK	{ November and December. October.	May and June. April and May.
LOHARDUGGA	{ June. May to July.	November to January. October to December.
MANBHOON	{ September to December.	February to April.

5. In the same report the outturn in these districts of cleaned cotton per acre is shown as follows:—

Midnapore	144lb	Cuttack	70lb
Chittagong Hill Tracts	200 "	Lohardugga	56 "
Durbhunga	20 "	Manbhoon	90 "
Sarun	20 to 24lb		

In Mymensingh the outturn is put as high as 476lb. The outturns obtained in 1886-87 in the Bardwan Raj Experimental Station are given in paragraph 9 *infra*.

6. The most important features in connection with the land trade of Bengal will now be summarized. The exports from Bengal to places external to it hardly call for notice. The

imports are nearly all to Calcutta, these again being mostly for shipment to the United Kingdom and the Continent. What does not go to Calcutta (about 70,000 cwt.) is taken by Behar, apparently for local consumption.

7. The following table shows the trade of Calcutta by all routes during the last ten years:—

	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Imports	263,000	607,800	1,062,900	957,800	852,000	712,800	903,600	574,600	700,000	1,109,700
Exports	128,000	374,300	810,000	886,400	704,300	520,000	664,300	318,800	436,700	783,200

* The low imports in 1877-78 were due to an indifferent crop in the Upper Provinces in that year. The imports in 1886-87 were the highest on record during the ten years for which figures are given. The trade by each route for three years is exhibited below:—

SPECIFICATION OF ROUTES.	Imports.			Exports.		
	1884-85.	1885-86.	1886-87.	1884-85.	1885-86.	1886-87.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
By boat	34,120	24,040	28,620	6,620	20,560	25,090
" inland steamer	8,930	22,990	13,470	30	...	280
" East Indian Railway	351,480	469,030	904,500	1,540	1,200	2,200
" Eastern Bengal State Railway	17,330	33,070	20,200	26,950	7,960	2,160
" road	6,210	4,470	4,170	2,550	1,640	2,490
" sea	156,580	146,470	138,730	281,180	406,360	751,040
TOTAL	574,660	700,090	1,109,720	318,880	436,730	783,270

Judging from these details, about 64 per cent. of the total receipts are exported (nearly all by sea), the remainder (262,000 cwt.) being mostly consumed in the cotton mills established in the vicinity of Calcutta. The shipments by sea are dealt with in the chapter on the general trade of India in cotton (page 9, para. 27). Most of the cotton is brought into Calcutta by rail, the largest despatches being from Agra and Cawnpore (North-Western Provinces), where the cotton is collected for pressing before despatch. The imports by sea (coast) are chiefly from Bombay, Madras, and Lower Burma, by far the largest quantity coming from Bombay. The imports were derived from the sources detailed below:—

	1884-85.	1885-86.	1886-87.
	Cwt.	Cwt.	Cwt.
WHENCE REPORTED.			
North-Western Provinces and Oudh	293,184	404,699	799,931
Bombay	125,400	131,021	109,720
Punjab	49,089	57,927	76,844
Bengal	68,163	82,975	64,126
Rajputana and Central India	5,461	4,503	21,919
Madras	3,082	6,661	15,923
Lower Burma	23,431	2,499	8,559
Other places	6,854	9,405	12,699
TOTAL	574,660	700,090	1,109,720

8. The imports from Bengal [excluding Behar] into Calcutta during the last ten years were:—

	Cwt.		Cwt.
1877-78	18,890	1882-83	68,090
1878-79	29,450	1883-84	50,720
1879-80	21,380	1884-85	68,160
1880-81	41,320	1885-86	82,970
1881-82	64,120	1886-87	64,120
Average	33,030	Average	68,010

The average for the five years ending 1886-87 more than doubled that for the previous five years. This increase seems to point to an extension in the area under cotton cultivation. The imports into Calcutta from Bengal are mostly from Dacca and the other parts of Eastern

Bengal, and are apparently the produce of these tracts, as their supplies from outside the province are, comparatively speaking, insignificant. Further details are given below for three years:—

WHENCE IMPORTED.	1884-85.	1885-86.	1886-87.
	Cwt.	Cwt.	Cwt.
Dacca	12,230	30,800	27,500
24-Parganas	22,710	13,000	13,720
Chittagong	6,000	7,070	6,000
Furzedpore	9,300	11,840	5,970
Noakholy	4,380	1,940	4,500
Hooghly	7,270	5,370	4,300
Rangpore	1,620	7,620	2,890
Nuddea	1,950	1,720	1,960
Other districts in Behar	91,230	3,000	4,110
Bengal	1,910	3,350	2,480
	69,360	86,010	68,230

The above figures will probably give some idea as to the capabilities of Bengal as a cotton producer.

9. In an earlier part of this section on the cultivation of cotton in Bengal, casual mention is made of the introduction with success into this Province of varieties of American and Egyptian cotton. The following extracts from the provincial reports relate principally to the result of experiments with Nankin cotton:—

1885-86.

"It having been brought to notice that a species of indigenous khaki-coloured cotton is grown in Darbhanga, Chittagong, and Hill Tipperah, it was thought that the cultivation of Nankin cotton would be most likely to succeed in these or in the neighbouring districts. Arrangements have accordingly been made for the experimental cultivation of Nankin cotton in Mozufferpore, and Hill Tipperah. It has been found that this cotton can be grown with success in the Government Estate of Khoordah in the Orissa Division." (Agricultural Report, Bengal, 1885-86.)

1886-87.

"Eight different varieties of cotton were experimented upon. The plots were manured with bone-meal at the rate of 1,000 lb per acre—

NAME OF THE VARIETY.	Yield per acre.
	B.
1. Nankin	370½
2. Deba Lonacinn	97½
3. Lonacinn	468
4. Kapasia	156
5. Upland	136½
6. New Orleans	156
7. Hill Tipperah	} Failed to germinate.
8. Garo Hills	

"It will be noticed that, unlike previous experiments in Burdwan and unlike experiments made in other districts, very good results were obtained with Nankin cotton this year in the Burdwan farm. The plants looked quite healthy, and proved more hardy than any other varieties experimented upon. They have put forth new shoots and leaves, and a second crop is expected. Experiments on the cultivation of Nankin cotton were also tried in Mozufferpore and Hill Tipperah, but without success. Mr. Sen at first tried Nankin cotton as a winter crop, and as such it did not germinate; but planted in the beginning of the rainy season, in drills 30 inches apart, and manured with bone-meal, Nankin cotton, as the figures quoted above show, gave very good results. I do not, however, think it will ever be extensively grown in Bengal." (Agricultural Report, Bengal, 1886-87.)

10. Mr. Finucane's anticipation in the last paragraph extracted above will probably prove correct. The growth of this plant in several districts of Bengal is not unknown. Cotton of the natural *khaki* colour is grown extensively in some districts of the Patna Division. In 1883 khaki-coloured cotton seed was obtained from the Government Experimental Farm at Cawnpore and distributed to the Commissioners of Burdwan, Chittagong, Bhagulpore, Orissa, and Chota Nagpore to try the experiment in their respective divisions.† The results of the trials reported by them were not very promising. In the report on the trials in Manbhoon it is stated that—

"Dr. H. W. ill sowed broadcast the pound of seeds received by him. Only a small portion of these germinated, and the cotton produced was of small quantity and of a brownish red colour. Dr. Hill thinks that the khaki cotton is a hybrid between *Gossypium herbaceum* and *Gossypium arboreum*. He says that a species of this plant, if not indigenous, is cultivated to some extent in parts of Patkum and Barrabhoon, and chiefly by the Souths, who called it *khurrah kapas*, in contradistinction to *khurrah kapas*, or white cotton. The colour

† These figures are not included in those for 10 years given above (page 3).

of this *khurrah kapas* is of a much lighter shade than that of the khaki cotton experimented on, and the Souths spin and weave it into a sort of coarse cloth. The species found in the district is considered by Dr. Hill to be a hybrid of *Gossypium herbaceum*."

In the report from the Commissioner of the Orissa Division it is stated that the khaki-coloured cotton is liable to hybridise, which to a great extent destroys the uniformity of the colour.

NORTH-WESTERN PROVINCES AND OUDH.

The average area under cotton for the five years ending with 1885-86 was 1,673,000 acres, and the total outturn per acre of cleaned cotton 946,000 cwt. The following table shows the area under cotton during 10 years:—

	Acres.		Acres.
1876-77	1,238,000	1881-82	1,637,000
1877-78	973,000	1882-83	1,692,000
1878-79	1,358,000	1883-84	1,710,000
1879-80	1,270,000	1884-85	1,668,000
1880-81	1,419,000	1885-86	1,659,000

* Falling-off due to excessive drought.

On the whole cotton cultivation seems to have been extending during these ten years. Cotton, like sugarcane, is a rent crop, and consequently its area has a natural tendency to increase. Almost the entire cotton crop, of the united provinces is grown within an irregular belt of country running down the Ganges-Jumna Doab, to which Rohilkhand and Bundelkhand are appendages. Oudh and the Benares Division contribute only a small percentage of the total crop. Cotton is rarely grown alone. Its area is generally shared, in varying proportions, by arhar (*Cajanus indicus*), til (*Sesumum indicum*), and urd (*Phaseolus radiatus*). The til occupies generally a row or two round the outside of the field. The remainder of the field is occupied by arhar and cotton in alternate widths. Economy and shelter to the cotton-bolls from the cold winds of November-January are the cultivators' objects in this arrangement. The figures below, exhibiting the areas in 1885-86, indicate the extent to which cotton is sown as a mixed or unmixed crop (*cide* provincial cotton forecast for 1885-86):—

DIVISION.	AREA UNDER COTTON IN 1885.		
	Pure.	Mixed.	Total.
	Acres.	Acres.	Acres.
Meerut	60,884	311,904	372,788
Rohilkhand	17,204	163,878	181,082
Agra	9,665	508,151	517,816
Allahabad	4,970	402,449	407,419
Benares	1,605	40,830	42,435
Jhansi	6,583	77,946	84,529
Tarai (district)	1,090	3,354	4,444
North-Western Provinces	102,001	1,508,512	1,610,513
Lucknow	2,678	34,021	36,699
Sitapur	2,425	23,891	26,316
Fyzabad	702	15,189	15,891
Bac Bareilly	893	11,269	12,072
Oudh	6,608	84,370	90,978
North-Western Provinces and Oudh	108,609	1,592,882	1,701,491

* This estimate was subsequently reduced to 1,660,000 acres, but no details were given.

2. The following further particulars have been extracted from Duthie and Fuller's "Field and Garden Crops of the North-Western Provinces and Oudh" (Part I, p. 75):—

"In addition to the cotton which is one of the staple crops of the Western and Southern Districts of the Provinces, there is a species known as *Gossypium arboreum* with much fleshier and more shining leaves (in this respect resembling somewhat closely American cotton), which is sparingly cultivated in parts of Oudh and the more eastern North-Western Provinces districts. It is ordinarily known as *narma* or *manua*, the terms which native cultivators invariably apply to American cottons, and a superior variety of it grown in the Allahabad District is called *radys*. Both these differ greatly from the ordinary cotton (*kapas*) in the season of their growth, not bearing cotton till the hot weather months instead of at the end of the rains.

"Cotton is a kharif crop, being the one first sown after the commencement of the rains, and yielding its produce from October to January. This is with the ordinary variety, *narma* and *radys* cotton not bearing a crop till the April and May following their sowing, and thus occupying the ground for at least eleven months. Cotton

fills no place in any special rotation of crops, although it is reported generally to succeed longarsane in Meerut, and to intervene between two cereal crops in Bareilly, the objection being merely that it is grown on good land which had at all events been manured in the preceding year. It is off the ground too late to admit of its being followed by a rain crop in the same year, but an ingenious method of gaining a second crop off cotton fields is to sow the oilseed *Arachis indica* broadcast amidst the crop just before it is usually weeded. The seeds are buried in the operation of weeding, and the *Arachis* plants do not become tall enough to interfere with the cotton until the latter has finished bearing.

The cotton bolls commence to open in October, and picking is in progress from then till the end of January, unless cut short sooner by frost—the great enemy of the cotton plant. Bolls are picked every third or fourth day, but only between sunrise and mid-day, while the cotton remains damp with the night's dew and comes away easily. If force is necessary to separate it from the boll, bits of pest-shell come away with it, which are technically known as 'beats' and greatly damage the commercial value of the produce. Cotton picking is generally done by women, who are remunerated by receiving $\frac{1}{4}$ to $\frac{1}{2}$ of the pickings. For ginning or separating the cotton fibres from the seed a simple but ingenious machine is used (called a *charkhi*), consisting of two small rollers about a foot long (one of iron and the other of wood), each with one end turned into an endless screw, and so geared one into the other that when one—the wooden one—is turned by a handle the other also turns in the opposite direction. When cotton is applied to the rollers the fibres are drawn through, and are in this way parted from the seeds. With this instrument a woman can turn out 45 to 55 lb. of clean cotton more a day. The proportion of fibre and seed varies considerably, being in great measure dependent on the quality of cultivation. Occasionally it rises so high as $\frac{3}{4}$ and falls as low as $\frac{1}{4}$, but $\frac{2}{3}$ is the general average. It is interesting to note that an instrument practically identical with the *charkhi* is used for cotton cleaning by the Negroes of the Southern States of America.

The cost of cultivation is estimated below:—

	R	a	p.
Ploughing (four times)	3	0	0
Cultivating (twice)	0	4	0
Seed (nominal)	0	2	0
Sowing	0	13	0
Weeding (twice)	3	0	0
Picking (1 lb. produce on 200 lb.)	4	0	0
Cleaning (at 1 lb. auna per 10 lb.)	1	14	0
	TOTAL		
Manure 100 manils	13	1	0
Rent	3	0	0
	6	8	0
	GRAND TOTAL		
	22	9	0

3. The external trade of these provinces by rail is exhibited in the following figures for nine years:—

Year.	Imports.	Exports.	Year.	Imports.	Exports.
	Cwt.	Cwt.		Cwt.	Cwt.
1878-79	60,710	395,710	1882-83	61,420	1,000,710
1879-80	21,420	813,570	1883-84	97,140	1,167,850
1880-81	111,420	855,710	1884-85	85,710	850,420
1881-82	90,000	960,710	1885-86	80,710	472,140
			1886-87	91,420	1,190,000

* Deficient outturn owing to heavy rains.

* In addition 16,450 cwt. were exported to Bengal by river.

The exports for 1886-87 are the highest on record during the nine years for which figures are given. Bengal engrossed 70 per cent. and Bombay 30 per cent. of these consignments during the last two years.

4. The average net exports during the last five years mentioned above were 847,000 cwt.

† *Fide* forecast for 1886-87.

The consumption is estimated at 1,300,000 cwt., so that according to these figures the production should be about 1,147,000 cwt. But the average production has previously been stated to be 946,000 cwt. of cleaned cotton; the difference of 201,000 cwt. is due either to the yield, which represents cleaned cotton only, having been under-estimated or to the net exports including both cleaned and uncleaned cotton.

5. The subject of trials with exotic seeds will now be dealt with. Experiments were undertaken at the Cawnpore Experimental Farm in 1881-82 in which trials of Hinganghat cotton and of the varieties of American cotton known as New Orleans and Upland Georgian, on two classes of soil, a light loam and a heavy loam, against two varieties of country cotton that grow in Bundelkhand and known as Kulpahar, and that commonly grown in the Cawnpore District. The results went to show (1) that for light soils the indigenous cotton is by far the most profitable; (2) that on better class soils and with careful cultivation New Orleans cotton can be grown with success and profit. The results of trials with Nankin cotton are thus summarized in the Cawnpore Experimental Farm Report for the kharif season of 1882 (page 6):—

"Of this variety it is necessary, in view of the interest lately taken in it, to make a separate note. To all appearance, in the field before the bolls burst, the plant is the same as that of New Orleans or Upland Georgian, and quite different therefore in growth and leaf to country cotton. It was grown at the farm some few years ago, but discontinued owing to the unfavourable reports on its staple received from Calcutta. This year some seed was received from the Saharanpur Botanical Gardens and from the Rawatpur estate where it had been grown, as well as on other estates in the Cawnpore district, for several years past. On the plant the cotton is of a dirty fawn colour mixed with white; bolls of fawn-coloured lint and of pure white lint being sometimes found on the same plant. After ginning, spinning, and weaving the result is a dark khaki-coloured cloth of uniform tint, admirably adapted for army clothing. The colour can, apparently, be bleached, judging from a coat shown to me at the Elgin Mills, but does not appear to fade with ordinary washing and wear. The mills object to its staple as being difficult to work with machinery, and the English operatives at the Elgin Mills say that on account of this difficulty it is known to the trade in England as 'rotten cotton'—a difficulty, however, which does not seem to be recognised by native weavers.

"This cotton is cultivated in Central India and woven into cloth for the regiments of Central India Horse. Lieutenant-Colonel Martin, C.B., in reply to inquiries, has kindly sent two samples of cloth of first and second quality. The Officer Commanding the 23rd Pioneers has sent samples of cloth and cotton from crops raised near Mian Mir by Subadar-Major Natha Singh, A.D.C., and from the Government of Madras have been received specimens of the cotton, and of cloth manufactured from it at the Coimbatore Jail. From the Cotton Hand-book of Madras it appears that samples of Nankin cotton took prizes at the Madras Exhibition in 1859. The Secretary to the Muir Mills, Cawnpore, writes:—

"This Company has grown for some years crops of this cotton and has manufactured drill from the same. I enclose a pattern of the drill for your examination. We have endeavoured to introduce the cotton among the cultivators, but have not succeeded to any extent. We purchase any quantities of the cotton we may have offered to us, but at present very small quantities have been secured, and we are therefore unable to manufacture cloth for sale of the pattern sent you.

"All the samples of Nankin cotton received appear to be of fairly uniform colour save that from the Muir Mills, which is brighter and lighter than the rest, though but a slight shade different to the first quality of cloth used by the Central India Horse.

"In the report of the Mission to Yarkand, page 479, reference is made to a reddish-coloured cotton sold in the Yarkand bazaar and known as *Kara Kucur*, which maintains the colour after washing. Lieutenant-Colonel Gordon, C.B., to whom I sent specimens of the farm-grown cotton, speaking from recollection, seems to think Nankin identical with *Kara Kucur*, and has kindly promised to try to procure seed from Yarkand.

"To sum up: Nankin cotton has long passed the experimental stage. It has been grown successfully, has been woven successfully, and is approved of by those who have had good opportunities of observing it in use, but of value there are not at present sufficient data, as, owing to absence of demand, the market rate has been purely nominal."

6. In the kharif season of 1884 three varieties of Nankin cotton were tried in the farm, viz.:—

- (1) With seed procured from Yarkand.
- (2) " received from China through the Government of India.
- (3) " acclimatized on the farm.

In reporting the results the Director of Land Records and Agriculture wrote as follows:—

"There is a marked difference in the habits of the three varieties. Nos. 1 and 2 appear to be of the Oriental variety, having few bunches and small deeply indented leaves similar to the ordinary cotton of these Provinces. No. 3 is distinctly occidental or similar in growth and habit to American cotton. Germination in case of the China seed was very irregular. Fields sown at the rate of 18 to 20 seers (36 to 40 lb.) of seed per acre had not as many plants as fields sown with 3 seers of the acclimatized variety. The plants were very stunted; most of them died before October, and those which survived bore scarcely any cotton. The fate of plants raised from the Yarkand seed was not much better. The fields sown with acclimatized seed fared comparatively well."

7. Samples of American and of country cotton cleaned in 1882-83 with the Burgess (Emery) saw-gin and with the ordinary country *charkhi* were submitted to the Manager, Elgin Mills, Cawnpore, for opinion. Here is his report:—

"After carefully examining the samples and comparing the cotton ginned with the native *charkhi* in the ordinary manner with that ginned with the Emery saw-gin, I have arrived at the conclusion that the staple has not been injuriously affected by the latter process, i.e., cut, broken or otherwise appreciably damaged; while the superiority of the saw-gin over the old primitive method is very marked, so far as opening out and cleaning the cotton is concerned, as applying to Upland Georgian and New Orleans. The effect of the saw-gin on the short

stapled country cotton, however, is that the seed is partially broken in the process, and small particles adhering to the fibre are passed through the machine, which materially reduces its value for spinning purposes. I am of opinion, therefore, that the Emery saw-gin, while doing its work admirably on the long-stapled varieties, is not so well adapted for cotton grown in the North-Western Provinces usually known as Bengal."

The Director of Land Records and Agriculture adds that—

"I may note that a sample of the country cotton cleaned by the saw-gin and sent to the Cawnpore market was rejected by the dealers, not on account of any supposed injury to the staple, but on account of its clean appearance, the dealers suspecting that it was old cotton cleaned with a Belua's bow."

8. In the kharif season of 1887, experiments with cotton of two varieties, (1) Louisiana, and (2) Egyptian, were tried on the farm, before and after the rains. The early-sown plots gave more satisfactory results than those sown late. In either case the Egyptian variety is said to have proved more suitable to the climate and soil of the north-west than the other. In two plots country cotton, and in two others New Orleans were sown. In both cases the yield with gypsum and kainite was greater than without them. New Orleans gave an out-turn of 145lb clean cotton per acre, and country cotton 121lb. Nankin cotton was also tried; the points to be determined were (a) for how many years the plants will continue to bear; (b) whether the yield is equal to the annually sown crop or not; (c) whether there is any change of colour in the produce of the annual and perennial plants; and lastly (d) whether rationing makes any difference? With regard to (a), it has been sufficiently proved that the Nankin cotton plant is perennial, and will yield and stand for several years. If kept long, it thrives well, becomes more bushy and produces more pods. But compared with the fresh-sown cotton a greater number of pods do not yield fine cotton. It is also shown that with the age of the plant the seed becomes smaller and smaller, and therefore the percentage of clean cotton on seed increases. With regard to (b), the unfavourable nature of the season interfered much with the experiments. One of the plots sown this year yielded 172lb cleaned cotton per acre, and the other only 40lb, while the produce of the plots sown three years ago was 85lb per acre in each case. With regard to (c) and (d), there was apparently no difference between the colour of the produce of the two kinds of plants, nor was there any difference between the results of rationed and unrationed plants. The foregoing trials have conclusively shown that early sowing of all kharif crops, especially cotton, is advantageous.

PUNJAB.

The districts growing the largest area (i.e., over 40,000 acres each) are Rohtak, Gurgaon, Umballa, Multan, Lahore, Sialkot, Gujrat, Shahpur, Jhelum, Rawalpindi, and Dehra Ghazi Khan. With the exception of the three districts first named, all these lie within the Indus-Sutlej tract.

2. The cotton of the Punjab has a short but strong fibre. Improved varieties exist in some districts. Among them may be mentioned the *khadir* or riverain cotton of the Delhi Division, and the *surma* cotton of the Rawalpindi and neighbouring districts. This cotton according to the report of the Deputy Commissioner of Jhang is believed to be of Egyptian origin. It is stated to have a red flower and a greenish seed, distinguishing it from the common variety, of which the flower is yellow and the seed grey. In the report of the Shahpur District the finer stapled cotton is called *kharai* and the commoner kind *bagir*. The latter name seems to indicate the stock as having come from the Hissar District and as being the same as what is known in Delhi as *kharai* cotton. The ordinary description is hardy, and can be cultivated under circumstances where exotic descriptions would probably not succeed. (Moongraph on Cotton, Punjab, published by the Punjab Government in 1884.)

3. Cotton is sown at different times in different parts of the province, and the time for sowing is also regulated by the rainfall. In the Punjab proper the sowings begin as early as February 15th, and go on till the end of March, and in well-watered lands to April and May. In the Delhi Division the sowings extend into July, and do not begin till the middle of May at the earliest. In Dera Ghazi Khan the sowings are late as the crops are dependent on the rise of the inundation canals. The picking is in October, November, and December, and sometimes begins as early as September, frost and excessive cold being injurious. The cotton should be all picked before January (Vol. I, page 479, Punjab Products, by Baden Powell). It is sent to market from January onwards, and is available for export, according as means of transit are available, from January on to May or June.

4. *Cost of cultivation.*—Details are given in the subjoined extracts from the Provincial Cotton Report for 1882-83, but judging from the remarks thereon, they do not appear to be very reliable. Later particulars are not available.

"The following tables show the cost of the cultivation of cotton in those districts from which detailed estimates have been furnished, distinguished, according as irrigation and manure are, or are not, together or separately applied; also a detail of the cost of each agricultural operation on that class of land in which the cultivation is most complete, that is to say, land which is both manured and irrigated:—

Statement showing the cost of cultivation of cotton in certain districts under the four heads A, B, C and D, i.e., irrigated and manured, irrigated but not manured, unirrigated but manured, unirrigated and unmanured.

District.	A.	B.	C.	D.
	R a. p.	R a. p.	R a. p.	R a. p.
Delhi	31 3 7	24 13 4	19 11 2	14 1 3
Gurgaon	20 13 0	17 11 0	11 15 0	8 12 0
Karnal	23 10 0	19 9 6	15 9 0	8 10 9
Hissar	17 0 0	...	...	8 8 0
Rohtak	14 3 7	11 3 10	8 11 1	6 8 7
Umballa	29 2 9	21 2 10	21 2 1	13 7 2
Ludhiana	23 0 10	17 15 5	...	10 3 5
Jullundur	37 13 4	30 15 6	25 15 6	17 11 11
Amritsar	27 6 4	18 9 6	11 4 4	9 0 2
Gurdaspur	24 10 0	21 7 0	16 13 0	13 10 0
Lahore	20 6 0	12 4 0	9 4 1	5 5 0
Gujrat	17 1 0	15 7 0	10 5 0	8 5 0
Mooltan	16 11 10	10 6 5	...	7 12 10
Jhang	10 0 9	8 5 3	6 10 9	5 1 0
Montgomery	24 0 3	16 7 6	...	7 6 3
Dera Ghazi Khan	22 12 6	12 5 0	...	6 2 6

Estimated cost of cotton cultivation under Class A (irrigated and manured) of each agricultural process in those districts of the Punjab from which detailed estimates have been furnished.

	Delhi.	Gurgaon.	Karnal.	Muzar.	Rohilk.	Umballa.	Amritsar.	Gurdaspur.	Lahore.	Gujrat.	Montgomery.	Dist. Ghazi Khan.
1. Ploughing before sowing	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.
2. Manuring before sowing			6 0 0	3 0 0	2 10 0	4 4 0	2 12 0	4 0 0	2 0 0	2 0 0	1 4 0	1 8 0
3. Watering before sowing			2 8 0	2 8 0	2 3 6	5 3 2	6 1 4	1 0 0	1 0 0	0 14 0	1 3 9	3 2 0
4. Seed and its preparation for sowing			4 0 0	2 0 0	0 12 0	2 6 0	3 8 0	2 0 0	1 0 0	1 12 0	1 4 0	0 10 0
5. Sowing			0 4 0	1 0 0	0 6 9	0 11 9	0 8 8	0 8 0	0 5 0	0 6 0	0 3 3	0 11 3
6. Watering after sowing			...	0 8 0	1 4 3	0 10 0	0 7 0	0 2 0	1 0 0	0 10 0	1 4 0	0 15 0
7. Hoeing and cleaning			...	3 0 0	0 14 0	3 5 2	5 2 8	4 0 0	6 0 0	4 0 0	10 6 0	3 5 3
8. Manuring after sowing			1 12 0	2 0 0	1 8 2	4 0 7	2 0 8	3 0 0	2 1 0	1 0 0	1 2 0	1 9 6
9. Picking			...	1 0 0	1 3 5	0 8 0	...	1 0 0	2 0 0	0 8 0	0 3 0	3 0 0
10. Cleaning			2 11 6	1 0 0	1 12 0	3 13 7	3 6 0	5 4 0	2 0 0	3 0 0	2 13 10	3 0 0
			6 6 6	1 0 0	1 9 6	4 3 9	3 8 0	3 12 0	3 0 0	3 0 0	4 4 5	4 14 0
Total	31 3 7 20 13 0	33 10 0 17 0 0	14 3 7 29 3 9	27 6 4 24 10 0	20 6 0 17 1 0	21 0 3 22 12 6						
Produce per acre	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.	Mda. S. C.
Cost per maund of uncleaned cotton	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.	R a. p.
	5 3 3	6 15 0	5 4 0	4 14 0	7 1 9	4 13 9	6 7 1	4 14 10	5 1 6	8 8 6	5 5 4	5 11 1

"The Deputy Commissioner of Muzaffargarh, Mr. Gladstone, finds that the tahsildars of his district, under the impression, apparently, that some return must be furnished for cost of cultivation under each of the heads A, B, C, and D, which the prescribed form contains, have not paid sufficient regard to the real state of the fact, which is that cotton is never grown upon unirrigated land in that district. It is not impossible that similar remarks might have been made of the returns of other localities. As a rule, cotton is one of the crops to which the zemindar devotes all the resources of labour and fertilizing material at his command, and unless he possesses sufficient of these he will not attempt the cultivation at all. To this rule there are some exceptions, and among them may be instanced the districts of the Rawal Pindi Division where this crop is largely grown in unirrigated land with little care, three crops being often taken off the same plants.

"In details the estimates differ widely from one another and those for the same district in this report, and in the former one do not always agree very closely. To take the Karnal estimate, for example, the operation of ploughing before sowing is now reckoned to cost only Rs 6 an acre instead of Rs 9 as before, and those of picking and of cleaning the cost together only Rs 9-2 as against Rs 12. Again, nothing is put down in the present estimate for either watering or manuring after sowing, for which Rs 2-8 and Rs 1-14 were charged in the former calculation, but the cost of the same operations previous to sowing is increased from Rs 1-4 and Rs 2-8 to Rs 2-8 and Rs 4 respectively. The district report contains no explanation of the differences: as, however, the cost in Karnal, as reported, of the first and last operations, viz., ploughing and cleaning, was, and still is, far above what it is said to be in any other district, it may be inferred that the present year's figures are a nearer approach to accuracy than those given before. The produce per acre of uncleaned cotton in Rohtak and in Gujrat is given as only two maunds. This is evidently an under-estimate, for the resulting cost of production of a maund of uncleaned cotton is thereby raised to a figure which would leave the producer a considerable loser, as a comparison with the prices per cwt. of uncleaned cotton in the same districts will show."

5. The normal area and outturn are returned as 859,000 acres and 743,000 cwt. respectively. The areas for ten years are given below:—

Year.	Acres.	Year.	Acres.
1876-77	669,000	1881-82	918,000
1877-78	655,000	1882-83	899,000
1878-79	785,000	1883-84	802,000
1879-80	777,000	1884-85	793,000
1880-81	786,000	1885-86	1,035,000

The cultivation, which 20 years ago was a little more than 600,000 acres, has apparently a tendency to increase. The area for 1885-86 appears to have been the largest ever sown.

6. The external trade of the Punjab in cotton by rail and river during the seven years ending with 1886-87 was:—

Year.	Imports. Cwt.	Exports. Cwt.	Year.	Imports. Cwt.	Exports. Cwt.
1880-81	31,170	94,654	1884-85	8,443	181,367
1881-82	3,402	86,045	1885-86	3,515	218,404
1882-83	3,888	103,743	1886-87	3,150	327,508
1883-84	26,463	108,983			

These figures also seem to indicate the extension of cotton cultivation in the Punjab. Most of these exports are to Howrah, Bombay and Karachi, the percentage taken by each during the last two years being 24, 29 and 37 respectively.

7. The average yield is 743,000 cwt. and the consumption 598,000 of cleaned cotton. This would leave 145,000 cwt. for export. But the average net exports have been 179,000 cwt. The difference is probably due to the exports including both cleaned and uncleaned cotton.

8. Experiments have for some (at least 25 years) been tried in the Punjab with exotic seeds (vide p. 488-96, Volume I, Punjab Products by Baden Powell). Mexican and New Orleans cotton seem to have promised well, but not so the Sea Island, Egyptian and Nankin varieties. In the Provincial Cotton Report for 1875-76, it is mentioned that the Deputy Commissioner of Rawalpindi reported that the experiments in his district during the year, with Hinganghat seed were a failure, and that the people do not care for this variety as they consider the cultivation to be costly and the yield scanty.

"In Dehra Ghazi Khan there are evidences of former experiments in the large cotton plants now standing, and it is believed that exotic varieties could be grown with success. The district is a favourable one for cotton, both as to climate and means of irrigation, and the quality produced is highly thought of."

Recently experiments with Nankin cotton have been carried on in several districts, but with no very good results. But trials in the Agri-Horticultural Gardens at Lahore have turned out fair. (General Administration Reports from 1883-84 to 1885-86.)

BERAR.

Next to Bombay, the chief cotton producer, Berar has the largest area under cotton cultivation, but in comparison to its cropped area the fibre is grown far more extensively in the latter than in the former tract.

2. It should be stated here that cotton cultivation and trade in Berar, the Central Provinces and Bombay received somewhat prominent attention from the Secretary of State and the Government of India about 20 or 25 years ago. Two Cotton Commissioners were appointed, viz., one for Berar and the Central Provinces in 1866 and the other for Bombay in 1863. These appointments were attended with varied success, but on the whole they appear to have had a beneficial effect upon the cotton culture and trade of India. The former appointment was abolished in 1874 and the latter in 1879.

3. The valley of the "Payanghat,"* where it has been estimated cotton occupies as much as 40 per cent. of the cultivated area, is the locality where the best cotton is grown. Here the deep rich black soil, sometimes extending to 30 or 40 feet in depth, is found mostly in the Akola and Amraoti districts (the former including the town of Khamgaon, the centre of the cotton trade) as also in the northern portion of the Buldana district. Here also are the large trading towns of Amraoti, Khamgaon, Akot, Shegaon, &c., at which places there are presses, but cotton trading is not limited to these large emporiums, as petty dealings take place at every substantial village, weekly markets, and even railway stations during the season throughout the province. In the case of distant towns the ryots find ready sale for their produce, as the country possesses good roads, these being feeders leading either to the nearest railway or to one of the large marts.

4. Cotton seed is sown in the early part of June as soon as possible after the first fall of heavy rain. Cotton picking commences in November and ends in January.

5. The cost of cultivation per acre under ordinary circumstances is stated to be as follows:—

	R
Preparing, sowing and weeding	7
Picking and weeding	3 to 4
Cleaning	2 to 3

Mr. E. A. Hobson, the Survey and Settlement Officer of Berar, states that—

"the total cost is from R13 to R15 an acre (depending greatly upon the district), leaving the cultivator a fair margin of profit: this of course again depends upon the demand: the present rates ruling in the market are from R55 to R70 per bale of 280lb. A local price for cotton cannot however be expected, its value being determined not by the supply in Berar, but by the supply and demand in Bombay and Liverpool. The average yield per acre is about 320lb of cotton in the seed or about 88lb of cleaned cotton. Besides the cotton the cultivator has the cotton seed to feed his bullocks upon, and cotton stalks which are used for numerous purposes such as roofing, grain-stores, &c., but cotton is not the crop the ryot pins his faith on now: it is being driven out of the field by more profitable cereals."

6. There are two varieties of cotton indigenous to Berar grown in the kharif season (autumn) and known as *bani* and *jari*, the former being for the most part cultivated towards the Southern Ghats: it is sown in the beginning of June after the first fall of rain, flowering in September, and yielding an early crop in November. The average yield per acre is estimated at 320lb of seed cotton, which when cleaned gives 26 per cent. or 83lb of cleaned cotton. A good sample of *bani* is considered the best cotton in Berar; but as much of it is cultivated in thin poor soil, *jari* is often preferred by merchants. *Bani* is the same plant as is grown in Hinganghat (Central Provinces), the cotton of which is held in high estimation in the home markets. *Jari* is grown in deep black soil, mostly in the Purna valley: it is sown some 15 days later than *bani* and takes somewhat longer to mature, so that the first picking is seldom commenced before the 15th December. The average yield per acre is much the same as *bani*, but the seed being more thickly covered with fibre, the proportion of cotton to seed is about 36 to 100. *Jari* is also easier to pick clean than the *bani* in which the leaves at the base of the boll are very liable to break and get mixed with the cotton. For these reasons the cultivators prefer *jari*; the staple is cleaner and whiter than that of *bani*, though not so strong and fine and is sought after by purchasers. *Bani* being softer and finer is more easily pressed. The two varieties are mixed at the time of cleaning and pressing, and the whole crop of Berar goes home under the name of Omrawuttee cotton (*vide* pages 72, 73, and 230, Berar Gazetteer, 1870).

* Berar is divided as it were into two sections, the lowland country known as "Payanghat" and the upland country as "Balaghat." The "Payanghat" lies between the "Balaghat" to the south and a portion of the Satpura range of hills known as Gavilghur to the north: from near the centre the valley spreads east and west, the water-shed running in different directions from a spot near the town of Amraoti, that to the east being drained into the Wardha and to the west into the Purna rivers. This valley consists of deep rich black soil called "regur," of inexhaustible fertility and of great depth, with a sufficient undulation to maintain a natural system of drainage. It is in this valley that the fine-famed Berar cotton is produced: the cultivation of the staple is not necessarily confined to the Payanghat but is to be found, though of an inferior quality, on the high lands to the north and south, associated with wheat, kharod, and other cereals." (Notes on Cotton in Berar by the Survey and Settlement Officer, Berar, 1887.)

7. In Berar, as a rule, *lar* (*Cajanus indicus*) in the proportion of one-tenth is sown with cotton. In some instances *bajri* (*Pennisetum typhoides*) as well as *til* (*Sesamum indicum*) are also put down, but this is in villages to the south and above the Ghat.

8. Besides the two varieties referred to above, Dr. Hume, in a note written by him in 1885, mentions three other varieties—viz., a rabi (spring) crop and two imported kharif varieties—(1) the Dharwar or acclimatised American cotton and (2) Vilayati Khandesh, lately introduced. The rabi cotton is said to be a variety of *jari* sown at the same time as wheat. It is picked in March and April. The crop is not so heavy as a kharif crop. Dr. Hume describes the Dharwar cotton—

"as rather shorter than the usual cotton. It is not grown as a separate crop, but plants of it appear at intervals in a cotton field. The Natives call it "Gogli Jari," the large *Jari* or large-seeded *Jari*. As a market cotton it has no separate existence, owing to the small quantity of it grown and the admixture of it with other cotton during the picking of the crops. Since the merchants have made such a determined stand against the Khandesh cotton, this American cotton is becoming more extensively cultivated than it ever was before."

9. As regards Vilayati Khandesh, Dr. Hume remarks that it is a very indifferent cotton and came to Berar principally, he believes, because Mr. Ashburner, Collector of Khandesh, forbade its cultivation in Khandesh. He adds:—

"The subject of cotton in Berar is one that requires immediate supervision. It has been left in the hands of ignorant kunbis, who have no thought for the morrow, but grow whatever pays best at the time. The Khandesh variety is being grown largely to the ousting of the other varieties, to the most certain ruin of the Berar cotton trade. At present they get from Vilayati-Khandesh an early crop, also a large one, getting three or four pickings instead of two or three as they get from the indigenous cotton. They get R3 or R4 a bale less in price than for the indigenous cotton, but the greater bulk compensates, and much more, for this small loss. But this apparent prosperity will be short-lived, for it is only by mixing this Vilayati-Khandesh cotton with the indigenous cottons that merchants can get it accepted in Bombay, and that mixing cannot be carried to a greater extent than a third of the quantity with *Bani* and a much smaller proportion with *Jari*. When this Khandesh cotton has succeeded in ousting the *Bani* and *Jari*, there seems every prospect of extensive distress and ruin. The Khandesh variety is getting better than it was when first introduced, according to some people; but however good the Khandesh may become by hybridisation, it can never be as good as the old *jari* and *bani*; any hybrid of Khandesh must be a deterioration on them."

"The rabi cotton is said to be a variety of *jari*, sown at the same time as wheat is sown. It is picked in March and April. This is sown on marshy and water-logged land, which in the rains is quite uncultivable, but retaining water, is available in the cold weather and supplies the cotton with moisture well into the hot weather. The crop is not so heavy as a kharif crop. The land is rich alluvial soil and deep.

"Vilayati.—This is known more generally as the Vilayati-Khandesh cotton. It is a coarse hardy plant, that will grow almost anywhere that cotton will grow, and produces a large crop; but the staple is short and hard and is objected to as cotton in the home markets, and consequently in Bombay. It is a bad variety, and is doing a lot of injury by its cultivation in Berar to the Berar cotton reputation. The plant looks 'jungly'; the high split leaves show want of breeding and cultivation, which is borne out by the short-stapled fibre."

10. This inferior cotton formed the subject of correspondence between the Resident, Hyderabad, and the Government of India in 1883-84. The Resident, Mr. J. G. Cordery, reported in August 1883 that vigorous measures were adopted in 1875-76 for the extirpation of this variety (Vilayati), which possesses no staple but which is a very prolific crop, costs less to produce, and is clean and good to look at, and that it is therefore largely used for purposes of adulteration. It was added that the admixture had of late years been in some markets carried too far, and that it was apprehended that unless its growth could be discouraged, the reputation of Berar cotton would be much injured. The measures taken in 1875-76 were successful for the time, and proved, it was said, permanently successful in Khandesh. The cultivators who possessed adulterated or inferior seed were induced to receive in exchange for it seed of the same indigenous variety. Advances were made in Berar for this purpose amounting to R18,000. It does not appear that the agriculturists were compelled to accept the proposed exchange, but a special officer was deputed to the work and much attention and enquiry was needed for its successful execution. It was stated that the reason why that success was not permanent in Berar was probably the fact that in January 1878 instructions were issued by the then Resident, Sir R. Meade, to Deputy Commissioners that no future attempts should be made to control cotton cultivation, and hence it was supposed by the growers that Government had become indifferent about the matter. The evil was said to have spread to the Amraoti District. Mr. Cordery was inclined to return to the policy formerly adopted, and he therefore asked for sanction to another advance (R15,000) for the purchase of the seed required for the elimination of the Vilayati seed from Berar.

11. To this application the Government of India replied as follows in its letter No. 231 F. S., dated 28th September 1883.

"I am directed to acknowledge the receipt of your letter No. 368, dated 17th August 1883, on the present prospects of cotton in Berar and the increasing extent to which an inferior staple known as "Vilayati," and

originally introduced from Khandesh, is being grown by cultivators. You refer to the measures adopted in 1875-76 in Berar, and previously in Khandesh, for the extirpation of this variety of cotton by the distribution of superior seed, by money advances, and by executive orders. And you consider that, though these measures produced no permanent results in Berar, and were abandoned in 1878, yet the large interests at stake, and the success which attended similar measures in Khandesh, justify further efforts in Berar. You accordingly solicit the sanction of the Government of India to the expenditure of Rs15,000 in advances for seed, of which sum you are disposed to think that not more than one-half might be recovered by Government.

"2. In reply, I am directed to say that, after giving the subject of your letter its careful attention, the Government of India has come to the conclusion that any attempt on the part of the State to make the Berar cultivator grow one class of cotton when his immediate interests prompt him to grow another is almost certain to end in failure. The measures taken in Khandesh have not been permanently successful any more than in Berar. The steps taken by Mr. Ashburner in 1876 succeeded at the time, but as soon as the vigorous measures to which he had to resort ceased with his departure from the district, the cultivators of Khandesh returned to the indigenous and inferior variety of cotton. Writing in 1882, Mr. Probert, the Collector of Khandesh, was obliged to confess that all his endeavours during six years of office to discourage the cultivation of the inferior cotton had been practically fruitless.

"3. Under these circumstances, the Government of India, before sanctioning any expenditure on the purchase and distribution of seed in the Berars, would like to be assured that there is some probability of the experiment being productive of more lasting results than have been achieved hitherto. If there is any difficulty in procuring good seed, the Government of India will not object to the institution of an agency for obtaining and distributing it. But the Government of India is unwilling in the face of past experience to countenance a system of advances year after year on the mere chance of the cultivators of Berar being thereby induced to abandon the cultivation of a description of cotton for which they have shown a decided preference. Indeed, it appears to the Government of India that it has yet to be shown that the cultivators are wrong and do not know their own interests best. The short-stapled cotton appears to possess certain advantages in regard to soil and climate over the long-stapled variety; it is said to require less rain, and the facts seem to indicate the possibility of greater economy and profit in growing it. These are points which appear to the Government of India to deserve investigation, and I am to suggest that they might profitably form the subject of a series of experimental trials (which should from year to year be carefully watched and the results recorded) in a limited area or in a small number of villages. Proof cannot but eventually be forthcoming as to which cotton returns most profit, and it is by the test of the profits to be derived, rather than by any action on the part of Government that the cultivator will be influenced in his selection of staples."

12. Mr. Cordery in October 1884 again wrote as follows:—

"I have the honour to forward what appears to me to be a careful and able report from the Officiating Commissioner upon the manner in which the Province of Berar is affected by the large and increasing admixture of an inferior variety of seed with that which produces a longer staple of cotton."

"2. If, as Mr. Riddale asserts, the new crop has created a market of its own with a designation known in Liverpool and commanding a sufficient profit, there can be no need for any action whatever. The question has, of course, been represented in a very different light by other officers; but the conclusions drawn by the Officiating Commissioner would appear to be more in accordance with the probabilities deducible from the recent extension in the growth of this variety than those based on the statements of traders disappointed in not finding the better variety which they desire to purchase. In such cases the term adulteration is not truly applicable. There is no concealment on the part of the cultivator, and the buyer is not deceived. The substitution of an inferior staple for one which formerly enjoyed a better reputation and a larger price must, under these circumstances, be held to be due to natural causes, against which it is useless to contest."

"3. The suggestions, therefore, made in my letter No. 363, dated 17th August 1883, were based on the mistaken belief that the complaint lay against an adulterated article being brought to a market, which (if this course were persisted in) would ultimately be closed to Berar. And on the fuller information before me, I have no desire to press them further."

The Government of India replied that it agreed with the Resident that a case had not been made out for State interference.

13. In the Land Revenue Administration Report on Berar during 1886-87 it is mentioned that *vilayati* cotton is fast driving the old *bani* cotton out of the fields to the great grief of all cotton merchants who like *bani* because of its long staple, which fetches a higher price than the shorter staple produced by the hardier plant. The large introduction of the latter around Amraoti is stated to have caused the present cotton known as "umraa" to be looked on as very inferior to what it was a few years ago. It is asserted that the reasons for its superior popularity are, besides its extra productiveness, the fact that the plant is not so easily injured by either excessive wet or drought: it is an earlier crop, and does not come into bearing all at once. These facts have been proved from experiments carried out on the Amraoti (Experimental) Farm for some time now. The Deputy Commissioner of Amraoti considers it necessary to endeavour to substitute, if possible, a variety combining the hardihood of the *vilayati* with the long staple of the *bani*, and he suggested that Government should obtain the services of a scientific agriculturist to see if anything could be done towards this end. The Commissioner in remarking that the suggestion was a good one added that the value of the product is sufficient to warrant the expenditure of a large sum in making such experiments, and he proposed that Mr. Duthie, Director, Botanical Department of Northern India, should be deputed to Berar to advise on the

possibility of any such steps securing the advantages suggested. The Government of India replied as follows in its No. 2318, dated 12th June 1888 (Foreign Department):—

"The Governor General in Council fully appreciates the advantage of developing to the utmost the cotton production of the Berar districts. The improvement of the cotton staple in India is a question about which English importers are known to be especially anxious, and the Government of India is willing to support every reasonable effort made in this direction. Mr. Saunders' suggestion for the deputation of Mr. Duthie would be accepted but for the circumstance that Mr. Duthie's experience has not hitherto brought him into contact with cotton culture, and it is believed that it would be of more immediate advantage for the Commissioner to place himself, with the permission of the Bombay Government, in personal communication with Mr. Ozanne, the Director of the Bombay Agricultural Department, on his return to India. Mr. Ozanne is known to have made a special study of improved cottons during the last two or three years, and to have achieved considerable success in the introduction of one or two kinds into districts adjacent to Berar. On the 26th April last a telegram was issued to you advising that seed for the present season should be procured from the Bombay Agricultural Department, and the Government of Bombay has now been requested to allow Mr. Ozanne to meet the Commissioner during the ensuing cold season for the purpose of further discussing the question."

14. The normal area and outturn are respectively 2,033,000 acres and 658,000 cwt. According to the "Statistical" Tables published by the Department of Finance and Commerce, the yield per acre ranged from 22lb to 51lb of cleaned cotton, but Mr. Hobson and other local officers put it at between 80lb and 85lb. The area under cotton for nine years is given below:—

Year.	Acres.	Year.	Acres.
1877-78	2,078,000	1882-83	2,142,000
1878-79	2,204,000	1883-84	2,027,000
1879-80	2,101,000	1884-85	1,959,000
1880-81	1,756,000	1885-86	1,046,000
1881-82	2,189,000		

It will be seen that there was a diminution in the area during the four years ending with 1885-86. The following extracts have been taken from Mr. Hobson's report with reference to this decrease:—

"With the exception of the Buldana and Ellichpore Districts, the outturn of cotton and jowari (*Sorghum vulgare*) has decreased and been replaced by wheat and linseed. The exports of the latter from Berar are very great, the supply not being equal to the demand. The prices of the two latter cereals have become so enhanced that the ryot finds it more profitable in every way to utilize his ground for these crops. However, the cultivation of both wheat and linseed require considerable manuring, and the ground is given rest by constant rotation of crops, these being generally, 1st wheat; 2nd lac (*Lathyrus sativus*); 3rd, cotton; 4th, linseed (where practicable); 5th, jowari, and 6th, wheat again."

"It is strange that linseed and wheat should have increased at the expense of jowari and cotton, for though the price of the former is high, that of the latter is comparatively higher; and it looks as if the rotation system produces fluctuations instead of leaving the aggregate at the same level as it might at first sight be expected to do."

"Cotton, until pressed and carried as "Dokra" is very bulky, and it is now known that the ryot considers wheat and linseed, although heavier dead-weight, more remunerative to cart to any distant market than cotton."

15. The rail-borne trade in cotton for ten years is illustrated in the subjoined figures:—

Year.	Imports, Cwt.	Exports, Cwt.	Year.	Imports, Cwt.	Exports, Cwt.
1877-78	144	1,163,214	1882-83	392	1,019,642
1878-79	2,693	817,285	1883-84	5,032	730,785
1879-80	529	710,357	1884-85	3,098	574,428
1880-81	5,091	725,214	1885-86	3,988	912,934
1881-82	142	1,119,642	1886-87	20,008	1,233,117

Mr. Hobson says "that in former years large quantities of cotton used to come across from that part of His Highness the Nizam's Dominions bordering on Berar; but this of late years, possibly owing to bad seasons, has much fallen off. However, should the proposed Akola-Hingoli line of railway be completed, it will tap that portion of His Highness' Dominions, and doubtless the cotton export return to its former average." The average imports from the Nizam's Territory for the five years ending 1886-87 were 28,000 cwt. In 1877-78 and 1878-79 they were 134,000 and 59,000 cwt. respectively.

16. The exports from Berar during 1886-87 were the highest on record for the last ten years mentioned. Of these exports 98 per cent. proceeded to the Bombay Port and most of the remainder to the North-Western Provinces and Oudh, apparently for the Cawnpore Cotton Milla. The average net exports for the five years ending with 1886-87 were 928,000 cwt. The yield is only 658,000 cwt. of cleaned cotton, out of which 55,000 cwt. must be deducted for local consumption. Apparently the yield has been under-estimated. The normal outturn of cleaned cotton per acre is returned as 36lb., whereas, as stated before, Mr. Hobson and other local officers estimate it at between 80lb and 85lb per acre.

17. The following extracts taken from the Berar Gazetteer (1870) indicate the improvements made by the then Cotton Commissioner Mr. Rivett-Carnac, in the packing of cotton and in facilitating and expediting the exports from Berar:—

"In 1865-66 the Great Indian Peninsula Railway line was for the time an obstruction to commerce. The Company's rolling-stock was quite inadequate, but the enormous advantages of carriage by rail over carriage by ruts if the cotton could once get on board the goods wagons attracted all cotton to the new channel. The whole of the crop was sent forward in loosely-packed 'dokras' or rough sacks; their bulk was so enormous that the Railway Company were utterly unable to carry it off as it was consigned to them, and thousands of bags accumulated at each of the stations, where at one time the slit-up, or block, amounted to 115,000 dokras.

"The consequence was natural, but deplorable. The cotton was worthless in the station-yard and priceless in Bombay; delay and dirt diminished its value daily; the station-master was master also of the situation, for the few available empty wagons were at his disposal; and the exigencies of this crisis utterly demoralized all parties. So recently as in 1867 the Bombay merchants told Mr. Rivett-Carnac that 'it would be about as safe to make a contract for future delivery with King Theodore' (who was then prominently before the public) 'as to buy cotton up-country, which might be detained for months at the railway station.' However, the Government at last interposed seriously; much pressure was brought to bear on the chief railway authorities; the district officers worked strenuously; the cotton-yards were regulated; the despatches were arranged by a mechanism which barred partiality, and the choked-up channel of goods traffic was at last cleared. Nevertheless the stream of cotton export by railway did not acquire its present full, even, and rapid flow until all the barriers and obstacles raised or left standing by official imperfection were finally levelled by the sustained assaults and exertions of a special Cotton Commissioner.

"But it was the introduction of pressing that promoted as much as, or more than, any other reform the safe and expeditious consignment of our inland cotton to the seaport. In 1866 there was not a single cotton-press at work in Berar, though it seems that as early as 1836 Messrs. Kikaji and Pestanji, merchants of Bombay and Hyderabad, had set up one screw at Khamgaon. During the year 1867 thirty-two half-presses and two full-presses were set up, and the subjoined statement details subsequent progress:—

Years.	Full-Presses.	Half-Presses.
1868	14	81
1869	19	125
1870	19	74

"During the season of 1869-70 the number of half presses has very sensibly diminished, because the railway rates of carriage have been raised on half-pressed bales to an amount that renders full pressing very much more advantageous. The effect of this change has been to throw most of the cotton into the hands of the merchants who buy for direct export to England, since the Bombay market does not like to invest in bales that cannot be opened out for examination of the cotton. Therefore most of the cotton sent down in 1870 by railway from Berar has been full-pressed, as the following figures show:—

Full-pressed	122,933
Half-pressed	69,585
Dokras ($\frac{20,790}{3}$)	16,930

or equal to 104,723 Bombay handis.

200,447* bales of 3½ cwt.

"In the market of Berar all the cotton is sold, between producer and dealer, by the boja of 290lb, or 266lb nett; about three of them go to the Bombay handi. The word means generally a load, and in the Berar cotton trade it meant particularly the load of a pack-bullock.

"In the half-pressed bale the cotton is condensed to about 12½ to the cubic foot, and in the full-pressed bale the density varies from 20½ to 32½ the cubic foot. A full-pressed bale contains generally 3½ cwt., but Khamgaon presses now usually succeed in getting 3½ cwt. within the bale. The half-pressed bale sometimes contains as much as 5 cwt., but then it is nearly three times the bulk of the full-pressed. In these inland districts the dry weather makes cotton so elastic that the best presses find much difficulty in obtaining the density of a bale pressed on the sea-board.

"The full-pressed bale and half-pressed bale are equal to about half a Bombay handi, and the dokra to one-third of a bale."

CENTRAL PROVINCES.

The cotton country of the Central Provinces lies on the left bank of the Wardha river. In the north, where the river debouches from the Satpura Hills, the cotton cultivation covers a rich but narrow strip along the bank. This strip widens as it proceeds southwards until it

* The full-pressed bale does not average much above 3 cwt., nor the half-pressed bale above 4 cwt., so a rough estimate of 3½ cwt. for bales of both kinds has been taken.

† "The black soil or regar, or as it is not uncommonly called the 'cotton soil,' forms one of the most marked varieties in these Provinces. It is the common soil of the Deccan, Malwa, Nerbada valley, &c. It varies greatly in colour, in consistence, and, with these, in fertility, but throughout is marked by the constant character of being a highly argillaceous, somewhat calcareous clay, being very adhesive when wetted, and from its very absorbent nature expanding and contracting to a very remarkable extent, under the successive influence of moisture and dryness. It therefore becomes fissured in every direction by huge cracks in the hot weather. It also retains a good deal of moisture and requires therefore less irrigation than more sandy ground. The colour of this soil, often a deep and well marked

ultimately attains a width of some 50 miles. The well-known cotton mart of Hinganghat may be said to be situated where the cotton field is the widest; but the whole plain, though capable of producing cotton, is not entirely occupied by it, for wheat and jowari (*Sorghum vulgare*) alternate with cotton fields. After reaching its greatest width the cotton country again narrows itself, until at last, in the south of the Chanda district, it is lost in the encircling brushwood and jungle (page 7, General Administration Report, 1882-83).

2. The districts in which the cotton crop is of most commercial importance are Nimar, Wardha, Chhindwara, and Nagpur. The rainfall in these provinces is very much lighter on their western border than elsewhere, and it is in the western districts that cotton is most profitably grown. Cotton is sown in June, plucked in November and comes into the market from December to March. In Chanda, which supplies the mart of Hinganghat with what is reported to be its finest quality of cotton, cotton known as *Jari* is also produced in the cold weather, but it is stated that its cultivation appears to be decreasing owing to the smallness of its outturn, for which its excellent quality does not altogether compensate.

3. The normal area under the plant is 627,000 acres and the total outturn 237,000 cwt. The cultivation, which according to the Statistical Tables published by the Department of Finance and Commerce has decreased from 680,000 acres in 1883-84 to 596,000 acres in 1886-86, is stated to be practically giving way to that of cold weather crops, especially of linseed which grows well on the soils ordinarily appropriated to cotton. It is said that cotton can now be imported at a lower price than formerly ruled for it.

4. The following figures represent the areas under cotton in 1885-86 in the chief cotton-producing districts:—

	Acres.
Wardha	231,000
Nagpur	125,000
Chhindwara	53,000
Nimar	37,000

5. The external trade by rail during the last five years is illustrated below:—

Year.	Imports. Cwt.	Exports. Cwt.
1882-83	11,475	109,461
1883-84	1,892	80,618
1884-85	1,823	61,945
1885-86	16,061	88,344
1886-87	3,828	156,068
Average	7,016	97,287

Of the exports in 1886-87, which are the highest on record during the five years for which figures are given, 70 per cent. were taken by Bombay, 13 per cent. by the North-Western Provinces and Oudh and 12 per cent. by Berar.

6. The subjoined extract, which was written in 1870 in connection with the future prospects of the cotton trade of the Central Provinces, will be found interesting:—

"Cotton is the most valuable item of export, while salt is the chief import. Since the extension of the Great Indian Peninsula Railway to Nagpur in 1867 the cotton trade has almost deserted its old routes,—north-

black, with every variation from this to a brownish black, would appear to be solely due to an admixture of vegetable (organic) matter in a soil originally very clayey. Thus deposits of precisely the same character as this regar are being formed now at the bottom of every jhil in the country, and throughout the very area where the regar is best marked. It is not by any means an uncommon thing to find the slopes of the small hills or undulations formed of more sandy reddish soil, while the hollows below consist solely of the finest regar. This appears to be due to the more argillaceous and finer portions of the decomposed rocks below being washed away by ordinary glacial action from the slopes and accumulated in the hollows, where this finer mud forms a soil much more retentive of moisture, and which therefore rapidly becomes more impregnated with organic matter, and is often marshy. Regar can thus be formed, wherever a truly argillaceous soil is formed and its general, but by no means universal, absence over the metamorphic and other rocks is easily accounted for by the fact that these rocks for the most part yield sandy, not clayey soils. It is never of any very great depth, and excepting when re-arranged by rivers in their recent deposits, it is therefore never met with at any great distance below the surface.

"Obviously formed from the re-arranged wash of the older and more widely-extended soils we find large areas of very fertile soil, consisting of clays rather more sandy than the older alluvium, and not therefore so black or adhesive. Though rarely formed altogether of the true regar soil, it frequently contains a large proportion of this mixed with other clays and sands. Every intermediate form of soil occurs, and it would by no means be an easy task to distinguish them all. In an agricultural point of view, it is interesting to see how exactly the limits of certain kinds of cultivation coincide with the limits of these marked varieties of the alluvial deposits of the country." (Pages XLVI and XLVII, Central Provinces Gazetteer, 1870.)

ward to Mirzapur, and eastward to Cuttack and the Mahanadi,—and has turned almost entirely in the direction of the western coast, where the bales are delivered 'pressed' in the shape best fitted for marine transport.

"The excellent quality of the Wardha valley staple, which under its brand of 'Hinganghat' commands a price equal to that quoted for any other Indian cotton, will always give it a good place in the English market but for some time to come it does not seem likely that the export will exceed 60,000 or 70,000 bales (of 400 lb) per annum. Not only is cotton a very sensitive crop and therefore one on which cultivators hesitate to stake their whole harvest return, but the prices of food-grains have risen so rapidly of late years that it would not pay to bring more land under cotton at present. The best chance for the extension of the cotton culture is in the improvement of communication with Chhattisgarh, now divided from Nagpur by 174 miles of unfinished road.

* The railway now runs to Nandgaon which is 145 miles from Nagpur. P. M. W. S. The Chhattisgarh plain is a great granary; the Wardha valley is the best cotton field in these parts of India, and when perfect connection is established between the two, it is only reasonable to suppose that each will be enabled, by the division of labour, to fulfil its natural function, and that the Wardha country, having no concern about its food-supplies, will send to England enlarged consignments of cotton, which returning in their manufactured shape to Chhattisgarh, will set free for grain-production men and land now less profitably employed in providing clothing from an inferior local staple." (page CLII, Central Provinces Gazetteer, 1870.)

7. The following experiments were tried on the Government Farm at Nagpur:—

1882-83.

Black Cotton—Planted in order to ascertain its suitability for the black cotton soil of Nagpur. This cotton seemed to suffer more from the drought, which prevailed in that year, than the indigenous varieties. The Deputy Commissioner was of opinion that this variety is not suited to the soil and climate of the district unless there is abundance of water for irrigation.

1883-84.

Trial was made of two American varieties (New Orleans and Upland Georgian), the *khaki* coloured variety and two varieties (*bani* and *jari*), which are in common cultivation in the Nagpur district. The American cotton seed had been acclimatized and was procured from the Cawnpore Farm. The *khaki* cotton seed was obtained from the Nagpur Central Jail, where a small field of it was grown with success the previous year. The outturns were pronounced very poor. In reporting this result the Director of Land Records and Agriculture added:—

"The quality of these cottons is, however, as important a matter as the quantity of their outturn. Samples of each variety ginned (1) in the Dharwar saw-gin and (2) in the ordinary hand-roller gin of the country were submitted to the Managers of the cotton-mills at Nagpur and Hinganghat, who have most courteously favoured me with reports upon them, quoting for each sample a price which is shown below. The prices are for the *boja* of 340 lb, and I may note for comparison that at the time of the sampling, good *bani* and *jari* were selling in the Nagpur market at R73 and R55 respectively.

	NEW ORLEANS.		UPLAND GEORGIAN.		BANI.		JARI.	
	Hand-ginned.	Saw-ginned.	Hand-ginned.	Saw-ginned.	Hand-ginned.	Saw-ginned.	Hand-ginned.	Saw-ginned.
	R	R	R	R	R	R	R	R
Nagpur mills	75	55	75	78	73	70	55	54
Hinganghat mills	70	68	78	78	78	75	61	60

"It is noticeable how very greatly saw-ginning decreased the value of New Orleans cotton. It also decreased the value of *bani*, but to a much less extent. Upland Georgian cotton was on the other hand if anything improved by it, as was also the case with the *jari* (also called 'Vilayati') cotton. I am at a loss to account for the great difference between the New Orleans and Upland Georgian varieties in this respect, and I am inclined to attribute it to carelessness in the ginning of the former kind.

"Compared with the ordinary *bani* cotton of the country it will be seen that the Upland Georgian shows well, but it would not, as the Manager of the Hinganghat Mills informs me, be worth more than really good *Hinganghat Bani*, a variety which has been almost lost sight of from carelessness in permitting mixture of seed. New Orleans is returned as being very little, if any, better than the *bani* variety. But it may be noted that the excellence of both kinds of American cotton lies chiefly in the *fineness* of the fibre which can be used to spin high counts of thread. The thread spun in mills in this country is almost wholly of low counts, for which length and strength of staple are chiefly desirable, and fineness is a secondary consideration. American cotton if grown at all would be grown entirely for export, and a decision regarding them would be incomplete unless it took into account the opinions of exporters as well as of Indian manufacturers. I am taking steps to have this omission made good.

"The discrepancies between certain of the prices quoted by the Nagpur and those quoted by the Hinganghat Mills may be explained partly by the smallness of the samples, partly by differences between the samples which were made up during my absence from Nagpur, and partly to the difficulty in valuing cottons which are not as a matter of fact in the market. The *khaki* cotton could hardly be valued as it is not in the market, and there is at present no consumption of it. Its sole chance of coming into common cultivation seems to lie in

its adoption as a material for soldiers' uniforms. The Manager of the Nagpore Mills has kindly undertaken to distribute the Farm crop of seed to cultivators, and to give it in this way a practical trial."

1884-85.

The Director reported as follows regarding Upland Georgian cotton:—

"The only field which yielded an outturn worth picking and ginning was one of those under Upland Georgian, and this was due to the fact that it continued to bear cotton till late in the hot weather and profited therefore by the cold weather rain. I think that this variety promises well enough to deserve an extended trial. A reference to last year's report will show that it was valued higher last season than either of the kinds ordinarily grown, and a valuation which I have been enabled to have made in the Bombay market through the courtesy of the Bombay Chamber of Commerce repeats this, though the difference in favour of the Upland Georgian cotton is not so considerable. One of its most marked characteristics is that it actually gains in value by being saw-ginned, whereas local cotton is greatly injured by this process, and must be cleaned by rollers. This practically involves the rejection of all improved ginning machines in favour of the slow and clumsy hand-roller gin in common use."

1885-86.

A sample of this cotton was again sent to the Manager, Hinganghat Mills, for opinion. He considered that the lint was good, strong-stapled and superior to the Hinganghat cotton which is stated to be the best in the Wardha markets.

1886-87.

Trials were again made with Upland Georgian. The cotton gave a fair crop. The yield of clean cotton per acre was 173 lb on manured and from 71 to 111 lb on unmanured land. Attempts are being made to introduce its seed into general use, as will be seen from the subjoined extract from the report of the Director of Land Records and Agriculture:—

"Complaints have been commonly made of the deterioration which is taking place in the quality of the cotton exported from the northern portion of the Wardha district owing to the extension of the cultivation of the variety of cotton known locally as 'vilayati' which resembles that grown in the North-Western Provinces, in the shortness and coarseness of its staple. This locality seemed a suitable one for the introduction of the Upland Georgian variety, and last year over 1,000 lb of seed were distributed to ryots in the Wardha district, mostly in its northern part. Reports vary somewhat as to the amount and quality of the outturn, but on the whole the seed seems to have been appreciated. The Deputy Commissioner thinks that the Upland Georgian cotton may be taken to have established itself in the good graces both of the cultivators and the dealers, and he looks forward with some confidence to its gradually taking the place of the 'vilayati' cotton against which so much has been said.

"What seed could be spared from the Farm has been sent to Wardha for sowing in the current season. It is too soon as yet to speak with any confidence of the results of this attempt at introducing new seed to the people."

ASSAM.

The average area under cotton during the three years ending with 1885-86 is estimated at 39,800 acres and the total outturn of cleaned cotton 53,400 cwt.: the average outturn per acre is stated to be 150 lb of cleaned cotton.

2. The extent of cultivation will be gathered from the subjoined extract from the monograph on cotton in Assam written in 1885 by the Director of Land Records and Agriculture of that province (Mr. Darrah):—

Assam Valley.—"In the plains patches of cotton are met with here and there. The Miris of Lakhimpur and Sibsagar grow a little for their own domestic consumption. In some mouzas of the northern frontier the cultivation of cotton on the lower slopes of the Bhutan Hills, and in the light soil at their foot, used once to be carried on extensively. It was known as *gari* cultivation, and the Chapaguri mouza in Kamrup was once famous for it. In the Goalpara district some cotton is grown in the hilly portions of the Sidli and Bijui parganas. In Kamrup *jhuning** is carried on for cotton to a limited extent on that portion of the Khasi Hills which is included within the district. The only district in the Assam Valley which grows cotton largely is Nowgong. The exception is due to the fact that the range of the Mikir Hills is included within its boundary. The Mikirs grow cotton not only for domestic consumption, but also for export, and boat-loads of it may be seen going down the Kopili and Kollong towards the close of the cold weather.

Surma Valley.—"Similarly in the Surma Valley, cotton is only occasionally cultivated in the plains districts. The Mikirs and Tipperas grow some by *jhuning* in pargana Mulagul in Sylhet. About 50 acres are supposed to be under cotton in Sunamganj. The area under cotton in Cachar is high, but that is because the district includes the sub-division known as the North Cachar Hills, which are really a portion of the Central Assam range. Here cotton is largely grown for export as well as for local consumption, by hill Cacharies, Nagas, and Kukis. The Sadr sub-division grows but little cotton.

Cultivation in the plains.—"Altogether, however, the cultivation of cotton in the plains districts of Assam is, with the exception of that in Nowgong and the North Cachar Hills, totally insignificant. In the regular plains it may be said never to be cultivated at all; but where the slopes of the adjacent hills are included within the borders of these districts cotton is grown to a limited extent.

Cultivation in the hills.—"In the three hill districts of the Province and the sub-division of North Cachar, however, the case is quite different. In the range of mountains which extends from the head of the Brahmaputra valley to the confines of Mymensingh cotton is nearly everywhere a staple crop. The one exception is the high

* *i.e.*, removing jungle for purposes of cultivation.

plateau of the Khasi Hills where the climate is too cold. The Garos grow it in very large quantities. The inhabitants of the Khasi and Jaintia Hills carry down hundreds of maunds every year to Kamrup and Nowgong. The Nagas (Lhotas and Rengmas) export partly to Nowgong, but principally to Sibsagar."

3. The time for sowing and picking the cotton will be seen from the following extracts taken from Mr. Darrah's monograph:—

"The jungle is usually cut in the cold weather and allowed to dry on the ground. It is burnt in March or April, and then, as a rule, hoed. As soon as possible afterwards the cotton is sown Plucking generally begins about November. It is usually over in January As a general rule, plucking lasts for about a month and a half and usually an interval of three to six days is allowed to elapse between each picking."

Generally speaking the cotton season lasts from November to March.

4. The river-borne trade between Assam and Bengal during the five years ending with 1886-87 is detailed below:—

	Imports.	Exports.
	Cwt.	Cwt.
1882-83	37	10,143
1883-84	198	12,193
1884-85	373	18,769
1885-86	143	23,514
1886-87	90	21,340

The exports increased rapidly up to 1885-86. The decline in 1886-87 is attributed to excessive rainfall when the cotton was plucked. It is believed that a large portion of these exports passed ultimately by rail to Calcutta for shipment: these re-exports are of course shown in the Bengal returns as imports from Bengal into Calcutta.

5. The average exports according to the figures given above are about 18,000 cwt. This quantity, it is believed, consists mostly of *uncleaned* cotton, and would represent about 7,000 cwt. of *cleaned* cotton. The Director of Land Records and Agriculture estimates that the proportion of *uncleaned* to *cleaned* cotton is 5 : 2. The normal yield of *cleaned* cotton is estimated at 53,000 cwt., and the consumption at 33,000 cwt., leaving 20,000 cwt. available for export. As the average exports are put at 7,000 cwt. only, there is apparently some mistake about these figures which the Director might clear up.

6. Mr. Darrah writes as follows regarding the prospects of the cotton trade and industry of Assam:—

"Though as yet only an inconsiderable portion of the cotton produced in Assam is exported, there is every probability of a future before the cotton trade of the Province. Up to date there would seem to have been little or no capital expended. The export has been managed entirely by Marwari traders, who are satisfied with small transactions and comparatively small profits. The cotton marts are insignificant villages at the foot of the hills or at suitable points at the junctions of rivers. Ginning machinery was until lately unknown, and by far the larger proportion of the fibre of the Province goes down to Calcutta retaining the seed.

"This is, perhaps, the most curious anomaly in connection with the trade. It evidently does not pay to gin cotton in Assam. Two reasons are usually alleged. One is that labour is here far too dear. The other is that the seed, though of no value, or nearly no value here, is saleable in Calcutta. No doubt these are the main reasons affecting the result, but the fact cannot for a moment be doubted that if the ordinary gin is used, it does not pay to clean cotton before exporting it.

"The reverse has, however, been shown to be the case when machinery is employed. At the present moment there are two English gins at work in the Province. One is at Tura in the Garo Hills, the centre of the trade in Garo Hills cotton. The other is at Doboka in Nowgong, where the Jamuna is turned south-west by the western spurs of the Mikir Hills. This gin is therefore admirably placed for intercepting Mikir Hills cotton. At Tura *uncleaned* cotton was selling last year at Rs. 4-8 per maund, and *cleaned* cotton at Rs. 14 per maund. The machine (one of Burgess & Company's Emery's Patent 12-saw hand cotton gins) was found capable, in a working day of eight hours, of turning out one maund of *cleaned* cotton. The daily profit is shown in the following statement:—

Expenditure.		R s. p.
Two maunds <i>uncleaned</i> cotton, at Rs. 4-8		9 0 0
Wages of three men at 3 annas each		0 9 0
Oil, &c.		0 1 0
Total		9 10 0
Receipts.		R s. p.
Value of one maund <i>cleaned</i> cotton, at Rs. 14		14 0 0
Ditto seed at annas 10		0 10 0
Total		14 10 0
Daily profit		5 0 0

The above figures are not an estimate. They represent what actually occurred. Some of the *machine-ginned* cotton realized Rs. 18 a maund in Calcutta. The cost of carriage from Tura (plus broker's charges) amounts to

Rs. 4-0 per maund. Consequently, the value at Tura should have been Rs. 18-12-0. If this price had been realized the profits would have amounted to Rs. 12-0 per diem. The machine landed at Tura cost Rs. 420. Taking the profits at the lower figure given above, it is clear that the initial cost would be recovered in a little over three months.

"It would seem, however, that the action of the saws is injurious to the fibre. Two bundles of Garo Hills cotton were forwarded to an expert for report. Each bundle consisted of two seers of *cleaned* cotton. One (marked A) contained fibre *cleaned* by the ordinary hand gin, the other (marked B) was the produce of the patent gin, but these facts were not stated on the bundles or in the letter which accompanied them. The following is the report received, dated Calcutta, 18th July 1885:—

"The two samples marked A and B represent a class of cotton known here as 'Assam cotton.' The difference between the two is very distinct. A is 'hand ginned.' B is decidedly 'machine-ginned.' With respect to A, the class is fully up to a good delivery, being entirely free from seed and stain, though containing, perhaps, a little too much 'discolour,' valued to-day at about Rs. 21 per maund. B is of a class not desirable. The cleaning process having done away, to a considerable extent, the particular feature of the 'Rough Fine' cotton, valued to-day at about Rs. 16 per maund. A and B are description of 'Rough Fine.' This class of cotton is principally consumed in Saxony by the wool manufacturers in the form of mixing, the 'rougher' the better. A quoted at Rs. 21 is about five to six per cent above its average value."

"This report is distinctly unfavourable to the English machine, but it does not prove that it is unprofitable. It must be remembered that the outturn could probably be increased, were the machine worked with greater speed. So far it has not been utilized to its full extent, as the workmen were new to it, and it was feared that, if pressed, they would injure the apparatus. Taking, however, the estimate of Calcutta value given in the above report, cotton *cleaned* by the Emery gin would be worth Rs. 13-12-0 at Tura. This would give a daily profit of Rs. 4-12-0, and would enable a purchaser to recoup himself for the original cost in less than four months, i.e., in his first season's operations."

"At Doboka the price of cotton (*cleaned* and *uncleaned*) is lower than at Tura, and wages would be higher. Seed, again, would not sell at all at the former place, so that it may be taken as proved that an English machine would probably not make as much profit there as at Tura. But it has been shown that taking the most unfavourable view of the facts, a profit of 100 per cent. can be made in four months at Tura. This being so, there is room for the profit to decrease considerably before the stage is reached at which the purchase of a machine would become unremunerative."

"It is of course essential if ginning is to be worked profitably that the machine should be placed at a spot where cotton can be obtained in abundance, and where means for readily exporting the *cleaned* fibre are available. Where the first condition exists, the second is almost certain to be found. It would seem, then, that where cotton is to be had in sufficient quantity, an English machine must pay well. There is no part of the province fairly well inhabited where the small amount of labour required could not be obtained for at least 8 annas per man per day. There is no cotton mart in Assam where the *cleaned* fibre costs less than Rs. 14, or the *uncleaned* commodity more than Rs. 5 (as a matter of fact, if *uncleaned* cotton cost Rs. 5 a maund, *cleaned* could not be sold at Rs. 14. It would be certain to fetch Rs. 19 or Rs. 20). However, let us omit the seed and take these figures (the most unfavourable possible), and work out the profit on a machine such as Emery's Saw-gin:—

Expenditure		R s. p.
Two maunds <i>uncleaned</i> cotton, at Rs. 5		10 0 0
Three coolies, at 8 annas		1 8 0
Oil, &c.		0 1 0
		11 9 0
Receipts.		R s. p.
One maund <i>cleaned</i> cotton, at Rs. 14		14 0 0
Profit		2 7 0

"Therefore, to recover his original expenditure, the owner would have to work his machine 151 days, or, in other words, to make sure of at least 302 maunds of *uncleaned* cotton. Therefore, under the most unfavourable circumstances possible, it may be laid down that an English ginning machine such as has been described would repay its cost in less than six months in any town in Assam, provided the owner could obtain 302 maunds of *uncleaned* cotton within that time."

LOWER BURMA.

The average area under cotton during the five years ending with 1885-86 was 11,500 acres and the total outturn 9,500 cwt. of *cleaned* cotton. In Lower Burma cotton is not grown to any extent as a field crop except in parts of the Sandoway and Amherst districts: elsewhere, as in the hilly tracts of Thayetmyo and Northern Arakan, it is almost invariably grown mixed with other crops. The climate and soil of the greater part of Burma are unfavourable to profitable cotton cultivation. Such cotton as is grown is grown almost exclusively for home consumption (Cotton Report, Burma, 1882-83). Judging from the areas given in the Statistical Tables published by the Department of Finance and Commerce, the area under cotton in Lower Burma appears to have fallen off, the area in 1885-86 being 9,000 acres only as

compared with 15,000 in 1881-82, or five years ago. In referring to the diminution in the area noticeable in 1882-83 the Chief Commissioner wrote as follows:—

"The shrinkage of the area is most conspicuous in the Thayetmyo district and appears to be due, in some measure at least, to the preference which the Burmese cultivator has for other crops requiring less labour and trouble to produce and to the cheapness of imported twist, which in some parts of the country is finding the home produce out of the market altogether. In Kyaukpau, for instance, no cotton whatever is now grown, and in Arakan generally the home product is rarely brought to market or even disposed of locally in a cleaned state."

2. Further particulars regarding cotton in Burma are given in the subjoined extract from the Lower Burma Gazetteer published in 1880 (Volume I, page 427):—

"Cotton is grown principally in hill-gardens, and in Thayet. In former years the Thayet produce was carried up-country and exported to Yunnan, but the outbreak of the Panthay rebellion checked, if it did not altogether stop, trade by this route, and the price of rice in the huck rose so rapidly and has continued so high and the importation of cotton goods and of twist has been so large that there was little or no demand for the home-grown article and the cultivation of rice has become far more profitable. For many years persevering efforts have been made to introduce foreign cotton, especially Egyptian, Upland, Brazilian and Carolina, which would give a longer staple, but these have been unsuccessful not only for the reasons given above, of which undoubtedly the greater returns from rice together with the large areas of rice land available on the easy terms on which land is granted are the most important, but also because the native plant is hardier and requires little care."

"The cotton grown in Upper Burma is still shorter-stapled than that grown here, and much of that imported uncleaned is taken to Prome, Allanmye and Rwa-toung, where are the principal cotton-ginning mills, cleaned and mixed with Thayet and Prome cotton for export. The plants in British Burma are of two kinds known to Burmans as the 'large' and the 'early' respectively. The early kind is a plant which does not grow more than three or four feet high and its bolls are ripe in December and January. The large kind reaches a height of from six to ten feet and its seed does not ripen till a month or two later. The produce of the two kinds is hardly distinguishable."

3. It is stated in the Provincial Cotton Report for 1882-83 that none of the cotton grown in Lower Burma is exported from the province. The land trade in cotton is wholly confined to imports by river and overland from Upper Burma. The imports during the five years ending with 1886-87 are returned as follows:—

	Cwt.
1882-83	42,000
1883-84	97,000
1884-85	91,000
1885-86	84,000
1886-87	88,000
Average	84,000

4. The exports by sea and coast which, it is stated, consist entirely of the imported article, have averaged 69,000 cwt. during the last five years. Judging from these figures it would seem that some of the local produce is exported, but it is more likely that the imports are understated. Most of the exports by sea is shipped to China either direct or through the Straits Settlements where cotton is used for quilting, that is, lining garments.

5. Experiments were made in 1882-83 in the Arakan Hill Tracts and Sandoway with seed of the Bhamia and Egyptian varieties of cotton. They were not successful. In the report for 1868-69 (page 189) published by the Cotton Commissioner for the Central Provinces and the Berars, it is stated that a variety of the Persian cotton closely allied to the Egyptian grows exceedingly well about Rangoon at all seasons and yields a fine white cotton of strong staple.

NATIVE STATES.

Nizam's Dominions (Hyderabad).

The normal area and outturn of cleaned cotton are returned as 1,016,000 acres and 307,000 cwt. respectively. The exports by rail were in 1885-86, 30,714 cwt. and in 1886-87, 19,253 cwt. Of the latter quantity Bombay received 50,000 and Madras 29,253 cwt. These two Presidencies as well as Berar import large quantities of cotton by road from the Nizam's Territories: the total imports for three years are given below:—

	Bombay.	Berar.	Madras.	Total.
	Cwt.	Cwt.	Cwt.	Cwt.
1884-85	199,243	30,000	9,298	238,541
1885-86	212,837	30,425	2,143	245,405
1886-87	253,671	32,143	9,298	295,112

The estimated local consumption is stated to be on an average 131,000 cwt.: if this quantity be deducted from the normal yield of cleaned cotton, 307,000 cwt., 176,000 cwt. remain for export. But the total exports appear to be more than 300,000 cwt. yearly: probably this excess is due to the latter figures comprising both cleaned and uncleaned cotton, or the total outturn may have been put too low: the normal yield per acre of cleaned cotton is shown as 34lb only.

MYSORE.

The normal area is 25,000 acres and the yield of cleaned cotton about 10,000 cwt. The total outturn is reported to be insufficient for local consumption and cotton has therefore to be imported.

RAJPUTANA AND CENTRAL INDIA.

These two States will be dealt with together as they are treated as a single block in the rail-horse Trade Returns. The area and outturn of cleaned cotton in 1885-86 were:—

	Area.	Outturn.
	Acres.	Cwt.
Rajputana	536,000	633,000
Central India	295,000	134,000
Total	831,000	767,000

Earlier statistics are not available. In Rajputana cotton is grown in the midland and eastern districts. (Rajputana Gazetteer, page 91.)

The net exports by rail were in 1885-86, 359,285 cwt. and in 1886-87, 670,000 cwt. Bombay usually receives over 95 per cent. of these exports. The imports from these States into Bombay by rail during the five years ending with 1886-87 were as follows:—

1882-83.	1883-84.	1884-85.	1885-86.	1886-87.
Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
303,571	333,371	323,571	357,142	618,571

The exports are increasing yearly. The Bombay Chamber of Commerce has recently reported in regard to the arrivals of "Bengal" cotton in Bombay that Rajputana now supplies the Presidency with more cotton of that growth than the North-Western Provinces and the Punjab put together. According to the above figures the average exports during the five years were 587,000 cwt.

In 1885-86 the yield of cotton (apparently mostly uncleaned) was 767,000 cwt.: the estimated local consumption was 310,000 cwt., so that 457,000 cwt. were available for export in 1886-87, but the total quantity really despatched was as much as 620,000 cwt. This excess is probably due to the consumption for Rajputana having been put at too high a figure (vide paragraph 12 of the summary).

DEPT. OF REVE. AND AGRICULTURE, GOVT. OF INDIA, } F. M. W. SCHÖFIELD.
Dated Simla, the 15th September 1888.

Statement showing the Area and Outturn of Cotton, also the Yield per Acre, during the five years ending with 1885-86.

(*) No information available.

(†) Estimated by multiplying the number of acres planted or cultivated by the number of bushels per acre.

(‡) Not accurate.

(§) Figures for the agricultural year ending August.

Statement showing the Imports during three years (1891-93 to 1895-97) into Calcutta, Bombay Port, Madras Ports and Lower Burma by all routes (i.e., rail, road, river and coast).

Imports into Calcutta taken from the River and Rail-borne Trade Report of Calcutta, 1886-87.

" Bombay, Karachi and Madras taken from the River and Rail-borne Trade Reports, the imports by Coast and Sea being added.

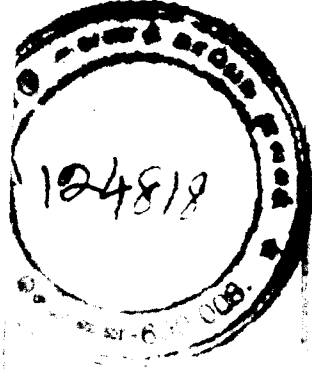
The imports in the case of all the ports mentioned include those by coast.

The imports into Lower Burma are those by land from Upper Burma.

" i.e., Madras, Pondicherry, Negapatnam and Tuticorin.

	† By rail .	.	.	.	.	.	. 1,993,553
	By coast from Bombay ports :	.	.	.	.	.	1,615,785
	TOTAL	.	.	.	.	.	3,519,438

‡ Excluding imports by river into Sindh from the Punjab as these are mostly included in (d) being re-exported from Sindh by rail to Karachi.
§ Exclusive of the exports during 1984-85, from Madras to its nearest complete figures for which year are not available.



APPENDIX D.

Statement showing the Foreign Countries to which Raw Cotton was exported from India from 1899-03 to 1956-57.

Countries to which Exported.	QUANTITY.					VALUE.				
	1899-03.	1903-04.	1904-05.	1906-07.	Average.	1899-03.	1903-04.	1904-05.	1906-07.	Average.
United Kingdom	2,806,085	2,604,921	2,154,703	1,431,392	2,223,210	7,404,390	6,452,000	5,509,309	4,046,709	5,651,452
Austria	704,550	690,163	573,643	541,350	617,776	1,542,374	1,308,300	1,353,344	1,022,217	1,306,044
Belgium	828,704	654,473	533,903	630,451	640,778	1,847,134	1,308,300	1,353,344	1,022,217	1,306,044
France	848,706	608,151	577,169	472,030	540,045	1,847,134	1,308,300	1,353,344	1,022,217	1,306,044
Germany	114,413	132,535	65,353	19,507	106,502	1,847,134	1,308,300	1,353,344	1,022,217	1,306,044
Italy	937,404	841,860	740,447	842,140	840,503	2,418,436	2,100,700	1,847,134	1,308,300	1,353,344
China	308,556	313,236	236,860	296,496	313,746	95,16,692	7,404,390	6,452,000	5,509,309	4,046,709
Other Countries	196,387	236,166	181,898	132,707	187,541	51,04,496	45,13,787	47,05,310	33,45,068	46,41,809
TOTAL	4,168,379	3,979,494	3,008,037	4,149,718	3,307,239	16,04,90,174	14,38,37,378	13,38,63,673	10,77,72,041	13,59,24,492

Statement showing the Presidency or Province in India whence Raw Cotton was exported to Foreign Countries from 1899-03 to 1956-57.

Presidency or Province in India whence Exported.	QUANTITY.					VALUE.				
	1899-03.	1903-04.	1904-05.	1906-07.	Average.	1899-03.	1903-04.	1904-05.	1906-07.	Average.
Bombay	111,205	638,638	284,976	416,760	325,124	1,36,44,390	1,51,34,734	68,82,061	1,09,34,390	1,32,56,674
Madras	1,114,205	4,341,634	4,664,930	3,200,021	3,330,196	12,89,33,381	11,10,11,409	16,89,32,143	9,95,31,448	10,68,57,407
Central Provinces	1,114,205	60,723	71,660	124,578	103,131	24,13,534	15,14,348	17,43,968	30,40,175	20,81,448
Other Provinces	1,114,205	60,723	527,877	311,392	503,554	1,52,21,193	1,43,00,087	1,34,72,846	63,75,246	94,75,745
TOTAL	3,440,620	11,642,724	7,648,596	7,752,758	9,307,239	38,80,32,116	38,79,80,579	36,38,13,915	50,85,808	43,81,60,674

Statement of Raw Cotton Exports from India to Foreign Countries from 1899-03 to 1956-57.