

**TWENTY-THIRD  
ANNUAL REPORT**

of the

**INDIAN  
CENTRAL COTTON COMMITTEE**

for the year ended,

**31st AUGUST,**

**1944**

**Price, Rs. 2.**

# CONTENTS.

PAGE

## CHAPTER I.

<i>Introductory</i> .. .. .	1
-----------------------------	---

## CHAPTER II.

<i>Cotton Statistics</i> .. .. .	6—14
Indian cotton situation—1943-44. .. .. .	6
Report on the staple length of Indian cotton crop .. .. .	9
Demand for various types of Indian cotton .. .. .	9
Stocks .. .. .	10
Indian mill consumption .. .. .	10
Exports .. .. .	11
Statistics of cotton pressed .. .. .	11
Unpressed (loose) cotton statistics .. .. .	11
Statistics of cotton ginned .. .. .	11
Improvement of cotton forecasts .. .. .	12
Scheme for crop estimating survey on cotton in the Central Provinces and Berar. .. .. .	13
Revision of classification of Indian cotton adopted in the all-India Cotton Forecasts .. .. .	13
Report on the accuracy of the all-India cotton forecasts .. .. .	14
Publications .. .. .	14

## CHAPTER III.

<i>Progress in the Introduction of Improved Varieties of Cotton</i> .. .. .	15—38
(i) Bombay .. .. .	18
(ii) Sind .. .. .	23
(iii) Punjab .. .. .	26
(iv) Central Provinces and Berar .. .. .	27
(v) Madras .. .. .	28
(vi) United Provinces .. .. .	34
(vii) Hyderabad State .. .. .	35
(viii) Baroda State .. .. .	36
(ix) Rajpipla State .. .. .	38

## CHAPTER IV.

<i>Research</i> .. .. .	39—78
Research on Cotton Technology .. .. .	39
Fundamental Research .. .. .	41
Cotton Research in Provinces and States .. .. .	46

	PAGE
(i) <i>Bombay.</i> —	
(a) Broach Cotton Breeding Scheme .. .. .	46
(b) Jalgaon Cotton Breeding Scheme .. .. .	47
(c) Scheme for breeding wilt-resistant cottons in Surat area ..	48
(d) Scheme for improvement of Wagad cotton at Viramgam and Jagudan .. .. .	49
(e) Scheme for improvement of cotton crop in Kaira district ..	50
(f) Scheme for interspecific hybridisation in cottons at Surat ..	51
(g) Scheme for improvement of Dharwar-American cotton ..	52
(ii) <i>Sind.</i> —	
(a) Scheme for production of long staple cottons in Sind .. .. .	53
(b) Scheme for Cotton Jassid Investigation .. .. .	54
(c) Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan .. .. .	55
(d) Scheme for bollworm investigation and clean-up campaign in Sind .. .. .	56
(iii) <i>Punjab.</i> —	
(a) Punjab Botanical Scheme .. .. .	57
(b) Scheme for improvement of Punjab-American 280 F/K. 25 cotton ..	59
(c) Physiological Scheme .. .. .	60
(d) Cotton Jassid Investigation in the Punjab .. .. .	64
(iv) <i>Central Provinces and Berar.</i> —	
Central Provinces and Berar Cotton Breeding Scheme .. .. .	65
(v) <i>Madras.</i> —	
(a) Pempheris Scheme .. .. .	66
(b) Scheme for improvement of Mungari cotton in Madras Province ..	68
(c) Scheme for Improvement of Cocanadas cotton in Madras Province .. .. .	68
(vi) <i>United Provinces.</i> —	
United Provinces Botanical Scheme .. .. .	69
(vii) <i>Bengal.</i> —	
Scheme for cultivation of long staple cotton in Bengal ..	70
(viii) <i>Baluchistan.</i> —	
Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan .. .. .	71
(ix) <i>Hyderabad.</i> —	
(a) Botanical Research Scheme .. .. .	72
(b) Scheme for improvement of cotton of Oomras tract in Hyderabad State .. .. .	73
(c) Scheme for improvement of Kumpta cotton .. .. .	74
(x) <i>Baroda.</i> —	
(a) Root Rot Scheme .. .. .	75
(b) Scheme for improvement of Mathio cotton at Amreli .. .. .	75

(xi) *Bikaner.*—

Bengals cotton Improvement Scheme . . . . . 76

(xii) *Mysore.*—

Mysore (*Doddahathi*) Cotton Scheme . . . . . 77

## CHAPTER V.

*Seed Distribution and Extension Schemes* . . . . . 79—97

*Bombay.*—

(a) Surat Seed Distribution Scheme . . . . . 79

(b) Scheme for Selection 1A cotton . . . . . 80

(c) Jarila Seed Distribution and Extension Scheme . . . . . 81

(d) Deccan Canals (Jarila) Seed Distribution Scheme . . . . . 82

(e) B. D. 8 Seed Distribution Scheme . . . . . 82

(f) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme . . . . . 83

(g) Scheme for cultivation of 1027 A. L. F. cotton in Nawapur Taluka . . . . . 85

(h) Scheme for Multiplication and Distribution of 'Vijaya' cotton in Middle Gujerat . . . . . 85

(i) Scheme for Multiplication and Distribution of 'Wagotar' cotton in Ahmedabad District . . . . . 86

*Sind.*—

(a) Seed Distribution and Extension Scheme . . . . . 86

(b) Financing of Seed Distribution . . . . . 88

*Central Provinces and Berar.*—

(a) Verum Seed Distribution and Marketing Scheme . . . . . 89

(b) Scheme for Distribution and Marketing of *Buri* 107 cotton . . . . . 90

(c) Scheme for Distribution and Marketing of *Jarila* cotton in Central Provinces and Berar . . . . . 91

*Madras.*—

(a) Co. 3 Seed Distribution Scheme . . . . . 91

(b) Scheme for Distribution of H. 1 strain in the Westerns area . . . . . 92

(c) Maintenance of nucleus of pure seed of improved varieties of cotton . . . . . 93

*United Provinces.*—

Scheme for Distribution and Extension and Marketing of Perso-American cotton in Western United Provinces . . . . . 93

*Baroda State.*—

(a) Baroda (Navsari) Seed Storage Scheme . . . . . 94

(b) Baroda B. D. 8 Seed Distribution Scheme . . . . . 95

(c) B. 9 Seed Storage Scheme . . . . . 96

(d) Scheme for creation of a pure Wagad Zone in Mehsana District in Baroda State . . . . . 97

## CHAPTER VI.

<i>Cotton Marketing, Legislation and other Protective Measures</i> .. .. .	98—107
(i) Planned production of cotton .. .. .	98
(ii) Deterioration in quality of Indian cotton crop .. .. .	98
(iii) Cotton baling hoops .. .. .	100
(iv) Fuel requirements of ginning and pressing factories .. .. .	100
(v) Dismantling of cotton ginning and pressing factories .. .. .	100
(vi) Supply of iron for agricultural purposes .. .. .	101
(vii) Provision of improved implements, machinery and fertilisers .. .. .	101
(viii) Regulated cotton markets .. .. .	101
(ix) Agmarking .. .. .	102
(x) Universal standards .. .. .	102
(xi) (a) Cotton Transport Act .. .. .	102
(b) Cotton Ginning and Pressing Factories Act .. .. .	102
(c) Prohibition of mixing of different varieties of cotton .. .. .	105
(d) Prevention of introduction of foreign cotton pests .. .. .	107
(e) The Red (Sudan) Bollworm ( <i>Diperopsis castanea</i> ) and other pests .. .. .	107
(f) Cotton Control Acts .. .. .	107

## APPENDICES.

I. Balance Sheet as at 31st March, 1944 ; statement of receipts and payments for the year ended 31st March, 1944 .. .. .	108
II. Members of the Indian Central Cotton Committee .. .. .	122
III. Sub-Committees .. .. .	124
IV. Stock of Indian cotton on 31st January, 1944, held by the mills and the trade in Madras Province .. .. .	126
V. Indian raw cotton consumed in Indian mills .. .. .	127

# INDIAN CENTRAL COTTON COMMITTEE. ANNUAL REPORT.

---

## CHAPTER I:

### INTRODUCTORY.

THIS is the twenty-third Annual Report of the Indian Central Cotton Committee, covering the period 1st September, 1943, to 31st August, 1944. While maintaining the general form of previous reports, it has been decided this year to limit to essential facts, the usual survey both of research and other activities of the Committee. It is hoped, however, that, in spite of condensation, the report will serve to give an adequate outline of the past year's activities. It may be mentioned that throughout the year the work of the Committee has been maintained and in some directions expanded despite increasing difficulties arising from war conditions.

There was no change in the administration. Mr. D. N. Mahta continued as the Secretary of the Committee and Dr. Nazir Ahmad as Director of the Committee's Technological Laboratory. The receipts during the year amounted to Rs. 6,33,815 and the total expenditure to Rs. 9,37,726. The receipts and expenditure of the Committee, as well as the Balance Sheet for the year as at 31st March, 1944, are given in Appendix I.

Under the Indian Cotton Cess Rules, members, who are not *ex-officio* members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor-General under Section 4 (xi) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification. A list of the members constituting the Committee and the various interests they represent as on 31st August, 1944, is given in Appendix II. The composition of the Sub-Committees as on 31st August, 1944, is given in Appendix III. The functions of the various Sub-Committees have been detailed in previous Annual Reports, and it is not proposed to repeat them here.

Sir Pheroze Kharegat (President), Sir Chunilal B. Mehta (Vice-President), Mr. W. J. Jenkins, Sir Chunilal V. Mehta and Mr. D. N. Mahta, Secretary, represented the Committee on the Board of Governors of the Institute of

Plant Industry, Indore, during the financial year ending 31st March, 1944. Mr. Roger Thomas represented the Committee on the Imperial Council of Agricultural Research. Under Article 51, as amended, of the Articles of Association of the East India Cotton Association, the Committee is entitled to nominate, from amongst its growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Rao Bahadur Sir Madhaorao Deshpande, Mr. L. Madhava Reddi and Mr. S. T. More were elected by the Committee as its representatives for the cotton year 1943-44.

To ensure that the requirements of the cotton textile industry are (a) given due weight in the allocation of transport facilities, but (b) not so handled as to embarrass Provincial Governments, Regional Transport Authorities and Railway Administrations in dealing with the general transport problem, the Government of India established a Cotton Movements Panel (afterwards changed to the Cotton Movements Committee) in Bombay with effect from September, 1942. Sir Chunilal B. Mehta, Vice-President, was appointed as the Committee's representative on the Panel. The Government of India also appointed Mr. D. N. Mahta, Secretary, as a member of the Panel. In November, 1942, the Cotton Movements Control Order was notified.

Two meetings of the Central Cotton Committee were held in the year that has lapsed since the last report was issued. At the first meeting, which was held at Bombay on the 28th and 29th January, 1944, His Excellency Sir John Colville, Governor of Bombay, was present. Sir Pheroze Kharegat presided. The Committee was mainly concerned with the important questions of the floor and ceiling prices of cotton fixed by the Government of India and the urgency of prohibiting the mixing of cottons in India. After a lengthy discussion it was decided that the Government of India should be informed that whilst the Indian Central Cotton Committee was thankful to them for the action taken by them in fixing a minimum price for cotton, it was of the opinion that the floors fixed should be definite and not hampered by conditions and limitations which had so far prevented them from acting as proper floors; further, that the conditions laid down by Government in their press communiqué to the effect that they would not buy any cotton unless the Indian Cotton Contract in the market of the East India Cotton Association in Bombay was quoted at the floor price of Rs. 400 and that then Government would buy basic *Jarila* Khandesh  $\frac{3}{4}$ " staple at the floor price

of Rs. 400 per *candy* and other styles at the floor prices announced or at the market rates for these styles, whichever was lower virtually, rendered the floor prices fixed for varieties other than *Jarila* ineffective in practice. It was suggested that it might be mentioned as an instance that, in accordance with the communiqué referred to, it would seem that even if Sind N. T. (for which the floor price fixed is Rs. 575) were selling at Rs. 500 or less Government would not buy such cotton so long as *Jarila* was quoted at or above Rs. 400 and that the feeling of the Committee was that, to ensure greater degree of price stabilisation, there should be effective floors for different varieties unhampered by any conditions and that Government should declare their readiness to enter the market to buy at the floor levels notified when the rates were, say, within 5% above the floor prices fixed. It was decided further that Government should be requested to make it clear that the floor and ceiling prices fixed referred to the average quality roller-ginned cotton of the respective styles for the season concerned, that the lower qualities offered shall be bought at fair discounts and that saw-ginned styles shall be bought at fair premiums *pro rata* with the respective floors announced for roller-ginned styles. The view was also expressed that it should be suggested to Government that suitable provision should be made for arbitration in case of disputes arising from fixation of prices. As regards the floor price of Rs. 400 per *candy* fixed for *Jarila*  $\frac{3}{4}$ " staple, it was decided that Government should be informed that in the opinion of the Committee this was too low, having regard to the fact that, owing to the war, the cost of all articles required by the cotton growers had recently greatly increased with consequent rise in the cost of production of cotton, and that the general opinion of the Committee was in favour of the minimum being raised to Rs. 500 per *candy*. It was decided further that it should be pointed out to Government that at the current price of cloth a floor price of Rs. 500 for *Jarila*  $\frac{3}{4}$ " staple was not in any way unreasonable, but that, if the suggestion for putting up the floor prices was considered contrary to the general anti-inflationary policy of Government, steps should be taken to reduce the price of cloth to a suitable level so as to remove the present disparity between the price of cotton and that of cloth.

As regards the second point, *viz.*, urgency of prohibiting mixing of cottons in India, the following resolution was unanimously passed:—

"In the opinion of this Committee resolute and determined steps should be taken at once effectively to stop the malpractice of mixing of cottons. The Committee accordingly authorises the local Sub-Committee to go into the matter, take such action as it can and put up its final proposals for confirmation at the next monsoon meeting of the full Committee."

The second meeting of the year was held in July, 1944, at Bombay ; Mr. H. R. Stewart, C.I.E., Officiating Vice-Chairman of the Imperial Council of Agricultural Research, presided. The principal subjects considered at this meeting were the ceiling prices of cotton, the necessity of eradicating the malpractice of mixing different varieties of cotton and the urgency of growing more food crops. On these subjects the following resolutions were passed :—

1. "The Indian Central Cotton Committee, while taking full cognizance of the gravity of the food situation in the country and of the urgent necessity of increasing the supply of food grains, is unanimously of the opinion that the lowering of floor and ceiling prices for cotton will not achieve the object in view but will only result in severe hardship to the cotton cultivators and seriously interfere with the economic conditions of the rural population as a whole.

The Committee considers that the solution of the food shortage problem lies along the avenue of planned production and not in reducing the income of growers of non-food crops to a bare subsistence. To aim at price levels for cotton, which will leave the growers only a bare subsistence, is a retrograde step which will greatly add to the difficulties of post-war nation building.

It is the considered view of the Committee that the shortage of foodstuffs can best be met by the enforcement of legislation restricting the area under cotton in accordance with a co-ordinated policy of planned production on an all-India basis, without unnecessarily reducing the purchasing power and the already low standard of living of cotton growers.

The Committee is of the opinion that the floor and ceiling prices for the 1944-45 season, announced by Government in their press note dated the 15th July, 1944, are very low. It, therefore, strongly recommends that the fixed floor prices for *Jarila* and all other styles should be raised by at least Rs. 50. In making this recommendation, the Committee has given due regard to the present increased cost of producing cotton, arising more especially out of the heavy increased cost of consumers' goods, labour, agricultural implements, plough-cattle, etc."

2. "The Indian Central Cotton Committee is convinced that the malpractice of mixing of different varieties of cotton is seriously hampering the work of cotton improvement in the country. It is the considered view of the Committee that until this malpractice is made a penal offence, it will be impossible to provide seed of improved varieties of cotton in quantities adequate to meet requirements. In the interests of Indian cotton as a whole, therefore, the Committee is unanimously of the opinion that, as a first step, the mixing of short staple with medium and long staple cotton and of medium with long staple cotton at the factories should be forthwith prohibited by the Government of India, by legislation. The Committee further recommends that steps be taken by the Government of India to ensure that the legislation is put into effect by the Provincial and State Governments as soon as possible and, in any case, well in advance of the cotton season commencing 1st

September, 1945. The Committee has no doubt that the adoption of the measure suggested by it will have a beneficial effect on the food position of the country for, if the utilisation of short staple cotton for mixing purposes is stopped, the production of such cotton would be automatically reduced to the minimum commensurate with requirements."

3. "In view of the paramount importance and urgency of growing more food during the present emergency and in the interests of improvement of Indian cotton in future so as to make its production remunerative to the grower, the Committee is strongly of the opinion that concerted efforts should be made to develop the agricultural resources of the country to the fullest extent possible. The Committee is convinced that the object in view can be achieved by improved methods of farming, suitable rotation of crops, and, above all, where conditions are favourable, by the introduction of mechanical devices for cultural and harvesting operations. It accordingly requests the Government of India to give immediate facilities for manufacture in the country and import from abroad (to meet immediate requirements) of improved implements and machinery and fertilisers."

Despite war conditions, research and other activities of the Committee continued unhampered and good progress was recorded in each branch. A brief account of the work done and the results achieved during the period under review is given in the following chapters.

---

## CHAPTER II. COTTON STATISTICS.

The total area under cotton in India during the year under review was 20,398,000 acres, showing an increase of 1,195,000 acres as compared with the previous year. The increase was mainly in the Punjab, Sind and the United Provinces and the States of Hyderabad, Gwalior and Rajputana. The acreage in the Provinces of Bombay, Madras and Central Provinces and Berar recorded a decrease. The total estimated outturn for 1943-44 was 50,94,000 bales, against 47,02,000 bales in 1942-43.

### INDIAN COTTON SITUATION—1943-44.

The firm undertone with which the market closed during the end of the previous season continued through the opening month of the season under review which witnessed a further improvement in prices. The first All-India Cotton Forecast, 1943-44, showed a reduction of 4 per cent in the acreage as compared with the corresponding forecast for the previous year; there was, however, an increase in the acreage under long staple cotton. In October 1943, the Government of India permitted, subject to certain safeguards, the re-opening of the cotton futures market as an experimental measure; the chief restriction related to the limits within which trading could be carried out, the maximum and minimum limits being fixed at Rs. 550 and Rs. 400 per candy, Bombay delivery, respectively, in terms of the Indian Cotton Contract. Government, however, retained the right to requisition cotton for the use of mills at prices from about 3 to 5 per cent below the ceiling prices, if cotton prices touched the ceilings. Forward trading was to be confined to the official market which existed in Bombay only. Members of the East India Cotton Association, Bombay, who intended to enter into forward contracts were required on each clearing day commencing from the 12th November, 1943, to deposit with the said Association, which should in turn deposit with the Imperial Bank of India a sum, not carrying interest, which should be not less than Rs. 25 per bale on the net open futures position of each such member, regardless of the price of such contract. Trading in options continued to be prohibited. The second All-India Cotton Forecast, 1943-44, showed a decrease of 8 per cent in the acreage as compared with the corresponding figures for last year. There was better buying support for spot cotton in the Bombay market throughout the month of October, mills evincing keen interest in

staple styles. At the end of October, *Jarila* ( $\frac{3}{4}$ " staple) was quoted at Rs. 440 per candy. After an initial rise, cotton prices tended to be marked down for the greater part of November, due to absence of buying support and increased arrivals in up-country markets. On the 18th November, 1943, the Government of India issued a press communiqué announcing the fixation of 'floor and ceiling' prices for certain descriptions of cotton and the means by which it was intended to maintain the price of Indian cotton between the floor of Rs. 400 per candy and the ceiling of Rs. 550 per candy in terms of the Indian Cotton Contract. Following this announcement the market firmed up and the quotation for Indian Cotton Contract, January delivery, gradually advanced to Rs. 458/4 on November 30 from Rs. 435/8 on November 18. The upward trend of prices was well maintained during the following month due to good enquiries for staple styles. The Indian Cotton Contract, January delivery, opened at Rs. 456 on the 1st December and closed at Rs. 480 on the 31st December. The Third All-India Cotton Forecast for 1943-44 recorded a decrease of 2 per cent in the acreage but an increase of 6 per cent in the yield as compared with the corresponding revised figures for last year. The Bombay cotton market displayed on the whole a quiet tendency during January and February 1944. The Indian Cotton Contract, which opened at Rs. 478 on the 3rd January, gradually declined to Rs. 467 on the 27th January but later rose by about 10 points on improved mill demand and the resumption of hedge business in the Karachi market. Thereafter, factors such as heavy crop movement, indifferent demand in the ready market, bearish sentiment of the cloth and yarn markets and fear of heavy tenders against March delivery had a bearish effect on the trend of prices. The rate stood at Rs. 455 on the 29th February. The market continued to be weak during March. *Jarila* May which opened at Rs. 455/8 on 1st March declined to Rs. 434/8 at the close of business on 31st March. Raw cotton prices continued their downward course, due to poor demand and the accumulation of heavy stocks in upcountry markets. Occasional Government purchases were the only steadying influence but that too proved inadequate in view of the continued absence of mill buying. The quotation for *Jarila* May delivery declined from Rs. 438 in the first week of April to Rs. 414 by the middle of May but slightly improved before the settlement date. The All-India Final Cotton Forecast, 1943-44, revealed an increase of 6 per cent in area and 8 per cent in yield as compared with the previous year. The position of cotton deteriorated further in June and July 1944, the chief factors which influenced prices being the lack of confidence on account of the complete absence of demand and the over-abundance of supplies of unwanted cotton. Government purchases, when the price tended to touch the floor had, however,

a steadying effect. *Jarila* July lost ground rapidly from Rs. 426 at the beginning of June to Rs. 409 by the middle of that month. After declining further, it gradually improved to Rs. 410-8-0 on the 5th July but again went down. Towards the end of July, prices recovered temporarily on developments in the war situation, with *Jarila* September quoting at Rs. 413-12-0 against Rs. 424 on the 22nd July and Rs. 440 at the beginning of June. Except for occasional minor recoveries, the trend of prices during the month of August was downward. General support was lacking in the absence of new crop trading facilities. September *Jarila* which was quoted around Rs. 415 at the beginning of August reached the floor by the end of the month.

As regards the statistical position of Indian cotton, the season started with an estimated carry-over of 26.0 lakhs bales (400 lbs. net each) with the trade (excluding spinning mills). On the basis of the figures of cotton pressed and unpressed cotton consumed in mills, the actual crop in 1943-44 is estimated to be about 53.0 lakhs bales (excluding extra-factory consumption of 4.5 lakhs bales), of which 35.5 lakhs bales are estimated to have been of staple length  $\frac{7}{8}$ " and above. The receipts at mills of Indian cotton on the basis of voluntary returns amounted to 41.0 lakhs bales (400 lbs. net each), of which 29.3 lakhs bales were of staple length  $\frac{7}{8}$ " and above. The total exports during the season amounted to 3.6 lakhs bales, of which 2.1 lakhs bales were of staple length  $\frac{7}{8}$ " and above.

On the basis of the figures of actual production, mill receipts and exports, the carry-over of Indian cotton with the trade, excluding spinning mills, at the end of the season, is estimated at 34.4 lakhs bales as shown below :—

	In lakhs of bales of 400 lbs. net (excludes extra-factory consumption).		
	Total.	$\frac{7}{8}$ " and above.	Below $\frac{7}{8}$ ".
Estimated stocks held by the trade (excluding spinning mills) on 31st August, 1943 .. .. .	26.0	7.0	19.0
Probable production in 1943-44 .. .. .	53.0	35.5	17.5
Total supply ..	79.0	42.5	36.5
Estimated receipts at mills in 1943-44 .. .. .	41.0	29.3	11.7
Exports during 1943-44 .. .. .	3.6	2.1	1.5
Total distribution ..	44.6	31.4	13.2
Estimated stocks held by the trade on 31st August, 1944 .. .. .	34.4	11.1	23.3

## REPORT ON THE STAPLE LENGTH OF INDIAN COTTON CROP.

A report on the estimated production of cotton according to staple length for the 1943-44 season was issued in August 1944, the trade estimates of the crop were also presented in this report. Of the official revised estimate of 5,094,000 bales (compared with the trade estimate of 5,530,000 bales), 12% was of staple length 1" and above and 49% of staple  $\frac{7}{8}$ " to 31/32". It was reported last year that the Committee decided that a Special Sub-Committee consisting of representatives of the East India and the Karachi Cotton Associations, the Southern India Millowners' Association and the Indian Central Cotton Committee should be appointed to go into the question of the existing staple length groups adopted in Statistical Leaflet No. 1 issued by this office and the classification of Indian cotton under these groups, in the light of the experience gained during the last six or seven years and the changes that have taken place in the character of the Indian cotton crop. After consulting the Associations referred to above, the Committee at its meeting in July 1944 appointed the following to constitute the Special Sub-Committee:—

- |                                         |                                                                                                                                     |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Indian Central Cotton Committee ..      | 6 representatives (the Vice-President, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Mr. A. P. Darlow, Dr. Nazir Ahmad and the Secretary. |
| East India Cotton Association ..        | 4 representatives (Mr. Haridas Madhavdas, Mr. Hansraj Jivandas, Mr. Ramdas Kilachand and Mr. Jehangir P. Patel).                    |
| Karachi Cotton Association ..           | 1 representative.                                                                                                                   |
| Southern India Millowners' Association. | 1 representative (Mr. K. Devarajulu Naidu).                                                                                         |

### DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

As usual, statistics relating to internal and export demand for various types of Indian cotton were compiled from information furnished on a voluntary basis and published in Statistical Leaflets Nos. 3 and 4 (1943-44). It is hardly necessary to emphasise the importance of these statistics to the trade and industry as well as to those entrusted with the responsibility of shaping and directing the cotton policy of the country. Receipts at mills of Indian cotton, during the season, were lower than those of the previous year by 217,000 bales, while exports were higher by 2.2 lakhs bales. Mill receipts of Indian cotton of staple length " $\frac{7}{8}$  inch and above" rose by 37,000 bales

during the year, the offtake of short staple cotton (below  $\frac{7}{8}$ " ) being lower by nearly 2.5 lakhs bales as compared with the previous year. "Long and medium staple" and "short staple" cottons formed 57 and 43 per cent, respectively, of the total exports during the season, as compared with 44 and 56 per cent in the previous year.

### STOCKS.

The information collected in respect of stocks of cotton held in the country on the 31st August, 1944, was published in Statistical Leaflet No. 2 (1943-44). Trade associations, market committees and other authorities gave valuable assistance in the collection of figures of stocks of cotton held in the country at the end of the season. Stocks of Indian cotton held in India by the trade at the end of the season 1943-44 on the basis of voluntary returns, amounted to 28.3 lakhs bales, showing an increase of 10.4 lakhs bales on the previous year. The scope of the census of stocks of cotton held by the trade was extended during the year under report but the figures still do not cover certain areas, while the information collected for some other areas remains incomplete. On the basis of the figures of actual crop, exports, mill receipts, etc., the carry-over of cotton held by the trade on the same date is estimated at some 35.1 lakhs bales; one important cotton firm estimates the stocks at 40.7 lakhs bales. With a view to making the trade stocks figures as complete as possible, the Provincial Governments have been requested to introduce legislation providing for the collection of the required information on a compulsory basis.

As the season adopted for the cotton crop of the Madras Province is the year ending 31st January, figures of stocks of cotton held in the province on this date are collected annually in addition to the figures relating to the 31st August. The relevant figures for the 31st January, 1944, together with comparative details for previous years, are given in Appendix IV.

### INDIAN MILL CONSUMPTION.

Figures of consumption of Indian cotton in mills in British India and Indian States for the years 1929-30 to 1943-44 based on the monthly statements issued by the Committee, are given in Appendix V. The total consumption of Indian cotton in mills in India during the season under report, viz., 41,19,461 bales, showed a decrease of 1,87,370 bales as compared with the previous season. With the exception of Bengal and Punjab and Delhi,

all other provinces recorded decreased consumption. Out of the total reduction of 1,87,370 bales, Indian States accounted for about 28%.

### EXPORTS.

The exports of Indian cotton from British India during the season totalled 3,62,000 bales against 1,55,000 bales in 1942-43. On the average of the three financial years ending 1943-44, the value of cotton (including waste) exported from British India formed 20% of the total value of export of "Raw materials and produce and articles mainly unmanufactured" and 5% of the total value of all merchandise exported.

### STATISTICS OF COTTON PRESSED.

During the season under review, 33,56,098 bales of cotton were pressed in British India and 15,97,924 bales in Indian States, making a total of 49,54,022 bales for all-India; the corresponding figures for 1942-43 were 30,21,287, 12,11,344 and 42,33,631 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 392 lbs., against 391 lbs. in the previous season.

### UNPRESSED (LOOSE) COTTON STATISTICS.

The statistics of cotton pressed do not account for the whole of the Indian cotton crop as, apart from the quantity utilised for extra-factory consumption, chiefly in the form of *kapas*, mills situated in cotton growing areas often use considerable quantities of ginned, unpressed cotton. During the year, 3,72,416 bales of unpressed cotton were consumed in mills in India against 4,60,868 bales during the preceding year. The relevant figures for the years 1929-30 to 1943-44 are given in Appendix V to this report.

### STATISTICS OF COTTON GINNED.

The figures of cotton pressed do not cover the entire crop as, apart from ginned unpressed cotton consumed in spinning mills for which figures are available, both ginned unpressed cotton and *kapas* are also utilised for domestic purposes, such as, hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If, however, ginning returns could be instituted, all that would be necessary for arriving at the actual crop would be to estimate the quantity of *kapas* used for domestic purposes. The ginning and pressing returns would at the same time serve as a check on each other. The submission of ginning returns is now in force in the Central Provinces and Berar, Bombay Province, Bengal, Sind, the United Provinces and Ajmer-

Merwara and certain Indian States. The Committee approved, during the year under report, the draft form of return proposed to be submitted by ginning factories in the Madras Province and the list of varieties for which information is to be obtained. As the Punjab is the only important cotton growing province other than Madras that has not yet instituted ginning returns, the Punjab Government has been requested to take early steps to implement the recommendation of the Committee in the matter by availing of the provisions of Section 5A of the Cotton Ginning and Pressing Factories (Amendment) Act, 1942, passed by the Government of India. The desirability of collecting information regarding the variety of cotton ginned has been stressed and to begin with the Provincial Government has been requested to collect the figures under two heads, *viz.*, "Punjab *desi*" and "Punjab-American."

#### IMPROVEMENT OF COTTON FORECASTS.

The all-India cotton forecasts of the 1942-43 season were, as usual, subjected to a post-mortem examination by the Cotton Forecast Sub-Committee of the Indian Central Cotton Committee, at the close of the season, with a view to detecting sources of errors and suggesting remedial measures. The actual crop for all-India during 1942-43 was estimated at 49.6 lakhs bales against 45,54,000 bales forecasted in April 1943. The discrepancy lay mainly in the forecast estimates of the Punjab, Sind, Bombay and Madras Provinces. It was also observed that in regard to the Nizam's territory the forecast was an over-estimate by about 21% of the actual. In accordance with the decision of the Committee, the attention of the forecasting authorities in the Provinces and States was drawn, where necessary, to the discrepancies between the forecasts and the estimated actual crop.

The need for an up-to-date publication explaining the procedure followed in the preparation of official cotton forecasts has often times been stressed at the meetings of the Committee and recently it was decided that a note on the subject should be compiled and published for general information. A Manual on the preparation of all-India cotton crop forecasts was accordingly issued during the year under report.

As in the past, the estimates of the cotton crop were received by wire from the Department of Commercial Intelligence and Statistics and released in Bombay at a time previously fixed to synchronise with the time of their release in Calcutta.

### **SCHEME FOR CROP ESTIMATING SURVEY ON COTTON IN THE CENTRAL PROVINCES AND BERAR.**

The object of this scheme is to provide a suitable technique for conducting crop-cutting experiments on cotton which form the most reliable direct basis for estimation of yield. The scheme was originally sanctioned by the Committee in July 1942 for a period of one year. It came into operation on the 15th October, 1942, the venue of experiments being the Akola district. At its meeting in July 1943, the Committee agreed to extend the scheme to the Buldana district for a period of one year. Crop-cutting experiments were accordingly carried out during the year under report in the Akola and Buldana districts for estimating the yield of cotton in the two districts. Side by side, arrangements were made to ascertain, by executive enquiries, the movement of loose cotton in and out of these two districts so that this information together with the statistics of cotton pressed already available could be used as an independent check on the result of the crop-cutting experiments. The reliability of yield estimates obtained from the crop-cutting scheme was borne out by a comparison with the results obtained from the executive enquiries.

In July 1944, the Committee approved of the proposals received from the Director of Land Records, Central Provinces and Berar, for extending the scheme to the whole cotton tract of the Province for a period of one year in the first instance. The object is to determine accurately the yield of *kapas* per acre and the total production for the whole of the cotton area in the Province, by the method of harvesting random plots. The experiments will be carried out in 204 villages selected at random from various cotton-growing *tahsils* of the Province, the average being six villages per *tahsil*. In each selected village, four random fields having a plot 33' in breadth and 132' in length will be taken for carrying out the experiments.

It is at the same time also intended to train the staff of the Land Records and Agricultural Departments in the practical working of the method so that the work could ultimately be taken over by these departments as a routine procedure for carrying out crop-cutting experiments.

### **REVISION OF CLASSIFICATION OF INDIAN COTTON ADOPTED IN THE ALL-INDIA COTTON FORECASTS.**

The Committee considered certain suggestions for modifying the classification of Indian cotton used in the all-India cotton forecasts and decided that a draft scheme of classification, taking into account the changes effected in the different varieties of cotton produced in the various tracts during the

last few years, should be drawn up and placed before the Committee. It was further decided that a cotton map showing the proposed varietal classification should be prepared.

### REPORT ON THE ACCURACY OF THE ALL-INDIA COTTON FORECASTS.

The publication of Statistical Leaflet No. 5 entitled "Report on the accuracy of the all-India cotton forecasts" has been suspended for the duration of the war, commencing with the issue for the 1941-42 season.

### PUBLICATIONS.

The undermentioned statistical publications were issued during the year under report :—

- (1) *Statistical Leaflet No. 2.*—Tenth Issue (1942-43), "Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1943."
  - (2) *Statistical Leaflet No. 3.*—Tenth Issue (1942-43), "Receipts at mills in India of raw cotton classified by varieties—1942-43 season."
  - (3) *Statistical Leaflet No. 4.*—Tenth Issue (1942-43), "Exports by sea of Indian raw cotton classified by varieties—1942-43 season."
  - (4) *Statistical Leaflet No. 1.*—Eleventh Issue (1943-44), "Report on the staple length of the Indian cotton crop of 1943-44 season."
  - (5) *Statistical Bulletin No. 12.*—"Supply and Distribution of the Various Types of Indian Cotton during the 1941-42 season."
  - (6) A Manual on the preparation of All-India Cotton Forecasts.
-

### CHAPTER III.

## PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The year under review witnessed further progress in the spread of improved varieties which covered 9,897,000 acres or 48% of the total cotton area, as compared with 10,382,000 acres or 54% of the total in the previous year. In accordance with the policy of increasing the production of better staple cottons, the improved varieties disseminated have been mostly of medium and long staple. The introduction and extension of superior varieties of cotton has contributed to raise the average staple of the Indian cotton crop as will be seen from the following table in which an attempt has been made to classify the Indian cotton crop according to varieties and staple lengths.

(Quantities are in thousand bales\* of 400 lbs. each.)

Description of cotton.	Average 1922-27	Average 1938-43	1943-44.	% increase (+) or de- crease (-) of col. 4 over col. 2.
1	2	3	4	5
<i>Short staple—below 3/4".—</i>				
(1) Bengals .. .. .	905	943	627	
(2) Oomras .. .. .	1,890	1,051	439	
(3) Central India .. .. .	324	260	297	
(4) Broach (Part) .. .. .	65	227	84	
(5) Dholleras .. .. .	525	309	278	
(6) Kumpta and Upland (Part) ..	(a)	38	56	
(7) Bijapur and Bagalkot Jowari.	(b)	143	..	
(8) Westerns (Part) .. .. .			87	
(9) Warangal and Cocanadas .. ..	49	32	32	
(10) Salems .. .. .	30	6	8	
(11) Chinnapathi .. .. .	39	44	1	
(12) Comillas .. .. .			35	
Total Short staple { Quantity .. .. .	3,827	3,053	1,938	—49
{ % on "Total-All Staples."	70	57	38	

\* Statistical bales containing 400 lbs. of cleaned (lint) cotton.

(a) Included under item (19) separate figures not being available.

(b) " " " (20) " " " "

Description of cotton.	Average 1922-27	Average 1938-43	1943-44.	% increase (+) or de- crease (-) of col. 4 over col. 2.
1	2	3	4	5
<i>Medium &amp; Long staple—<math>\frac{7}{8}</math>" &amp; above.—</i>				
(13) Americans—Punjab and Sind (staple, 1" and above)* ..	..	276	587	
(14) Americans—Punjab and Sind (staple below 1") .. ..	264	926	889	
(15) C. P. and Berar Verum .. ..	..	76	113	
(16) Hyderabad Gaorani .. ..	332	140	156	
(17) Broach (Part) .. ..	214	11	141	
(18) Surti .. ..	..	150	130	
(19) Kumpta and Upland (Part) ..	259	178	140	
(20) Westerns (Part) .. ..	..	..	53	
(21) White and Red Northern ..	251	58	18	
(22) Tinnevellies (including Karun- gannies) .. ..	155	151	130	
(23) Cambodias .. ..	147	194	235	
(24) Jarila .. ..	..	152	484	
(25) Buri .. ..	..	28	80	
Total—Me- dium & Long staple. { Quantity .. ..	1,622	2,340	3,156	+95
{ % on "Total—All Sta- ples" .. ..	30	43	62	
TOTAL—All Staples ..	5,449	5,393	5,094	-7

\* Includes 'Punjab-American 289F/K.25' Sind Sudhar (Sind-American 289F-1) and 'Punjab-American 289F/43', and Sind-American—M4.

It will be seen that the proportion of cotton of staple length  $\frac{7}{8}$ " and above to the total production increased from 30% in the quinquennium 1922-27 to 43% in the quinquennium 1938-43; the proportion in 1943-44 was 62% against 60% in 1942-43. The production of 'medium and long staple' cotton in 1943-44 increased by 1,534,000 bales or 95% as compared with 1922-27; under "short staple" there was a reduction of 1,889,000 bales or 49%. The production of cotton of staple length '1" and above,' which was nil in 1922-27, amounted to 654,000 bales in 1943-44.

In tackling the question of improving the quality of Indian cotton, the importance of raising the yield per acre has not been overlooked. A notable increase has already been achieved as will be evident from the following table, in which two sets of figures of yield, one based on the official crop forecasts

and the other on the figures of actual crop accounted for by mill consumption, exports and extra-factory consumption, are given:—

Year (1st Sept.—31st Aug.)	Area (Thousand acres.)	Production Government estimates (Thousand bales of 400 lbs. each.)	Yield per acre (lbs.) Col. 3 Col. 2.	Approximate (commercial) crop. (Thousand bales of 400 lbs. each.)	Yield per acre calculated from approximate (commercial) crop. (lbs.) Col. 5. Col. 2.
1	2	3	4	5	6
Average 1922-27 .. .. .	24,723	5,440	87	*5,054	96
"   1927-32 .. .. .	24,738	5,206	84	*5,851	95
"   1932-37 .. .. .	23,912	5,315	89	*6,447	108
"   1937-38 .. .. .	25,746	5,737	89	† 6,370	99
"   1938-39 .. .. .	23,490	5,051	86	† 6,051	103
"   1939-40 .. .. .	21,580	4,909	91	† 5,884	109
"   1940-41 .. .. .	23,311	6,080	104	† 7,032	121
"   1941-42 .. .. .	24,151	6,223	103	† 6,949	115
Average 1937-42 .. .. .	23,656	5,600	95	† 6,457	109
"   1942-43 .. .. .	19,203	4,702	98	† 4,961	103
"   1943-44 .. .. .	20,393	5,094	100	5,723	112

\* Calculated from mill consumption (a) † exports (b) † extra-factory consumption (c). Variation in stocks has not, however, been taken into account.

(a) Mill consumption in Burma included up to 31st March, 1937.

(b) Includes exports from Burma up to 1934-35.

(c) The new figure for extra-factory consumption, viz., 450,000 bales for the whole of India, based on enquiries conducted by the Committee, in selected areas, has been used throughout.

† Best estimate of the crop as arrived at by the Indian Central Cotton Committee in connection with the annual post-mortem examination of all-India cotton forecasts.

From the second set of figures given in column 6, it will be seen that the average yield per acre rose from 96 lbs. in the quinquennium 1922-27 to 109 lbs. in the quinquennium 1937-42. The average yield in 1943-44 was 112 lbs. per acre against 103 lbs. in 1942-43.

The main criterion in a general policy of cotton improvement in India must be the return to the grower from the varieties recommended for cultivation by the Provincial and State Departments of Agriculture. This criterion has always been upheld by the Committee as of primary importance. Although exact data regarding the total additional benefit derived by the cultivators by growing improved types of cotton are not available, there is little doubt that the gain has been considerable. In 1943-44 according to the figures furnished by the Provincial and State Departments of Agriculture, the gross extra income realised by the grower of certain improved varieties of cotton, covering an area of 16.0 lakhs acres, amounted to about two crores of rupees. This works out to Rs. 12/8 per acre on the average, and on this basis, the total increased income, accrued to the cultivators in 1943-44, by

growing improved cottons on an area of 9,897,000 acres, may be estimated at about 12.37 crores of rupees.

The progress made in the introduction of improved varieties of cotton in the various provinces and States of India as a result of the joint efforts of the Indian Central Cotton Committee and the Provincial and State Departments of Agriculture is summarised in the following paragraphs.

### BOMBAY.

*Broach tract.*—During the year, the Agricultural Department controlled 25,084 acres, of pure 1027 A.L.F. and 15,131 acres of “Suyog” for seed multiplication including 752 acres grown with Farm Pedigree 1027 A.L.F. and 199 acres grown with Farm Pedigree Suyog respectively.

The Department purchased in all 10,14,231 lbs. 1027 A.L.F. seed of which 11,704 lbs. were the produce of the Surat Farm. The above stock was distributed in the District through the depôts in the interior and 3,23,257 lbs. were supplied to Rajpipla State and others. 2,00,132 lbs. were distributed directly to growers by the Hansot, Panoli, Nana-Varachha societies and Nawapur Taluka Development Association. Thus the total quantity of 1027 A.L.F. handled by the Department was 12,14,363 lbs.

The Department also purchased 84,633 lbs. Suyog seed, of which 6,214 lbs. were the produce of Surat Farm. A further quantity of 16,99,32 lbs. was also directly supplied by Sonsek Co-operative Cotton Sale Society to different Co-operative Societies. Thus the total quantity of Suyog seed handled by the Department was 2,54,565 lbs.

The amended Cotton Transport Act of 1923 restricting the transport of seed cotton and cotton seed from north of River Tapti into Surat area remained in force during the year.

The Bombay Cotton Control Act of 1935 was repealed and the Bombay Cotton Control Act of 1942 was passed for regulation and prohibition of the cultivation of any variety of cotton, of the mixing of the prohibited variety of cotton with any other cotton and of the possession or use of, or trade in, the prohibited variety of cotton in any part of the province of Bombay.

Under the Scheme for Grading and Marking of 1027 A.L.F. and Suyog cottons (under the Grading and Marking Act of 1937) in Surat tract, 8,114 bales of 1027 A.L.F. and 6,316 bales of Suyog were agmarked, out of which 6,771 bales of 1027 A.L.F. and 4,857 bales of Suyog were sold at premiums

varying from Rs. 6 to Rs. 26 over local for 1027 A.L.F. and Rs. 4-8 to Rs. 25 for Suyog, respectively, leaving a balance of 1,343 bales of 1027 A.L.F. and 1,459 bales Suyog. There is no improvement in the marketing of agmark 1027 A.L.F. of guaranteed purity of 97% and above when compared to last season, while in case of Suyog Agmark certified it was satisfactory and remunerative on account of its high ginning.

In 1943-44 (this being the first year of the scheme) the Agricultural Department controlled 15,257 acres of pure Vijaya cotton for seed multiplication which included 571 acres grown with Farm Pedigree seed from Broach Farm and the Registered seed growers.

The Department stocked with the Nabipur Amod, Kisanad and Samin Societies 12,36,700 lbs. of Vijaya cotton seed, which was distributed in the interior. Besides 4,076 lbs. collected from the Broach Farm and the Registered seed growers, were subsequently distributed from different centres for further multiplication. In addition, 87,000 lbs. were supplied to Baria and Baroda States by the said Societies. Thus the total quantity of seed handled by the Department was 13,28,376 lbs.

*Wagad tract.*—The total area under Wagotar cotton was 772 acres during 1943-44. The whole of this area was controlled by the Department. 91 acres out of the above area were grown with pedigree seed of Cotton Breeding Station, Viramgam, and Registered Seed Growers. The total quantity of improved seed distributed was 6,068 lbs. mainly in Viramgam, Sanand, Dholka and Dhandhuka talukas. The regular scheme for spread of this variety has been started from 1-12-1943.

*Khandesh—Jarila* :—*Jarila* cotton which has been introduced for general cultivation in Khandesh is superior to local or *Banilla* in staple and is highly wilt-resistant. Its yield and ginning outturn are equal to those of the local type. It is suited to conditions in Khandesh and is appreciated both by the cultivator and the trade. The year under report is the seventh year of the Scheme financed jointly by the Indian Central Cotton Committee and the Government of Bombay, for multiplication and distribution of the seed of this variety. During the year 1943-44, 12,54,370 lbs. of *Jarila* cotton seed stocked by the Department and 53,02,570 lbs. of seed stocked by 40 approved stockists who are mostly Co-operative Organizations were distributed in the Division, the area covered being 3,80,000 acres. Out of this, an area of 1,04,463 acres under stages III, IV and V, was organized for multiplication.

In addition an area of 147 acres was grown under this variety on Jalgaon and Mamurabad Seed Farms (near Jalgaon Farm) under stages I and II.

The total area under *Jarila* including natural spread, is estimated at about 8,38,548 acres, out of the total area of 8,62,637 acres in this division, i.e., about 97% of the *Oomra* area. During the year 1944-45 it is estimated that no other cotton will be grown in *Oomras* tract in Khandesh. Out of the pure seed produced on Government Farms and on the controlled areas 82,65,270 lbs. of *Jarila* seed have been stocked by the Department, Co-operative Banks, Societies and Taluka Development Associations, for distribution during the season of 1944-45. The production of *Jarila* including natural spread is estimated at 2 lakhs of bales or approximately 93 lbs. of lint per acre on an average.

During the year 1943-44 there were heavy rains towards the middle of October. These rains affected the cotton crop adversely as regards its yield and quality. The proportion of immature bolls (*kavdis*) and yellow stains was greater and as a result the Khandesh *Jarila* was quoted at Rs. 50 to Rs. 60 off at the Bombay Market. During the marketing season the demand for cotton on account of the above defects as well as difficulties of transport was slack. Owing also to the Bombay Growth of Food Crops Act, 1944, and to better rates and demand for groundnuts, the demand for *Jarila* cotton seed was somewhat restricted. The premium for *kapas* and lint continued to be high as compared to that of local as before.

A notable feature of the year is the application of the Cotton Control Act to the East Khandesh District. Arrangements are also in progress to apply it to the West Khandesh District (excluding talukas of Nandurbar and Taloda and Nawapur Peta) and to the talukas of Malegon, Nandgaon, Baglan, Kalwan and Yeola of the Nasik District. The provisions of the amended Ginning and Pressing Factories Act, 1925, have fairly assisted in prohibiting mixing in ginning and pressing factories.

As mentioned in the last year's Report there are now 16 Co-operative Cotton Sale Societies for marketing and agmarking pure *Jarila* cotton in the Division. The work of agmarking could not be taken up on account of seasonal effects on the quality of cotton, viz., yellow stains, immature bolls (*kavdis*) and black leaf.

There was no controlled area under *Banilla* cotton, during the year and this variety is no longer cultivated in pure state.

*Sholapur District.*—The monsoon started at the right time, but there was a long break in rains till August 1943, and continuous rainfall thereafter in September and October 1943. The cotton sowings were thus delayed. The total cotton area was 12,945 acres against 12,314 acres in the previous year. Out of this, 3,883 acres were under *Jarila*, 2,149 acres under *Banilla* and 6,913 acres under mixed cotton.

*Deccan.*—The Deccan Canals area—The rainfall for the crop was, in general, adequate and fairly well distributed all over the Barsi-Nagar Tract; the only unfavourable feature of the season was the continuous and heavy rainfall during the latter part of September and early October. No pest or disease of any serious nature damaged the crop. The crop yield was estimated at 60 per cent of the normal.

The area under cotton in the Barsi-Nagar tract continued to be maintained at the same low level as in the previous year, due to the intensive "Grow More Food Crops" Campaign. It was only 79,000 acres. The reduction in area continued to be particularly marked in the canal irrigated tract where the policy of not allowing pre-seasonal watering was continued. The total area there was only 502 acres as against 3,000 acres during the last year.

The Scheme for multiplication and distribution of seed of *Jarila* cotton continued to be held in abeyance during the year; the progress in the extension of the area under this variety was, therefore, due to only natural spread. The areas under different varieties of cotton are estimated to be as under:—

S. No.	Name of Variety.	AREA (in acres)			Remarks.
		1941-42.	1942-43.	1943-44.	
1	Banilla .. .. .	8,000	4,000	2,000	***
2	Jarila .. .. .	1,000	10,000	20,000	
3	N. R. Mixed .. .. .	1,77,600	64,800	57,000	
	Total .. .. .	1,86,600	78,800	79,000	

\*\*\* The increase in the area under *Jarila* was due to its marked superiority over *Banilla*.

During the season (November to January) at Ahmednagar the premiums obtained for *Jarila* ranged between Rs. 380 to Rs. 390 and those for *Banilla* between Rs. 320 to Rs. 325 against those for the local at Rs. 250 to Rs. 260 per *candy*.

*Satara District* :—*Jayavant* cotton is grown in the Walva and Tasgaon talukas of the Satara district, where 23,940 lbs. of *Jayavant* cotton seed, sufficient for about 3,420 acres, were supplied to the cultivators. The natural spread was estimated at 350 acres during the year 1943-44, bringing the total area under *Jayavant* cotton in the district to about 3,770 acres. The premium obtained for *Jayavant* cotton in the Sangli market over the local cotton ranged from Rs. 15 to Rs. 20 per *Nag* (1344 lbs.) of *kapas*. Reduction in the cotton area in the Satara district is due to the increased area under food crops.

*Kumpta Dharwar Tract*.—The work of extending the two improved varieties of cotton, *viz.*, *Jayavant* and Gadag No. 1, was carried out on an extensive scale in 13 centres through the approved agents and the Hubli, Gadag, Naregal, Annigeri, Nargund, Bagalkot and Bijapur Co-operative Cotton Sale Societies as well as through the Sale Shop at Haveri.

The total reserved area organised for multiplying pure pedigree seed of *Jayavant* cotton at different centres was 1,03,274 acres as against 1,38,921 acres in the previous year and that of Gadag No. 1 cotton 28,475 acres against 25,895 acres in 1942-43. The quantity of seed secured and stocked so far by the approved agents and Co-operative bodies from these reserved areas is about 54,20,240 lbs. of *Jayavant* and 8,72,300 lbs. of Gadag No. 1 sufficient to cover 5,42,000 and 87,200 acres, respectively, during 1944-45. In addition, some seed is stocked by the cultivators themselves from their crop. Owing to the shrinkage of cotton area as a result of the application of the Bombay Growth of Food Crops Act, there will be some reduction in the purchase of seed.

For distribution of the general pedigree seed stocked by the approved agents and the Co-operative bodies a sufficient number of seed depôts were opened in the interior of the tract at several places in each centre. The general area under pure *Jayavant* was 4,15,226 acres against 4,62,113 acres last year and that under pure Gadag No. 1 was 1,30,125 acres against 1,29,495 acres in the previous year. The total area under *Jayavant* and Gadag No. 1 was 5,18,500 acres and 1,18,600 acres as against 6,01,034 and 1,55,390 acres, respectively, last year. Besides, an area of about 1,34,700 acres under *Jayavant* and about 35,000 acres under Gadag No. 1 was covered by natural spread, making in all 6,53,200 acres under *Jayavant* and 1,55,600 acres under Gadag No. 1 during the year under report. The estimated yield of *Jayavant* cotton was about 90,000 bales against 70,000 bales and that of

Gadag No. 1 was 20,000 bales as against 10,000 bales of last year. Due to "Grow More Food Crops" campaign the area under cotton crop was reduced, but the yield was good.

A premium of Rs. 15 per *Nag* (1344 lbs.) of seed cotton in the case of *Jayavant* and Rs. 25 per *Nag* in the case of Gadag No. 1 was obtained in auction sales over local cotton sold in *bazar*. Even in private sales, *Jayavant* cotton fetched Rs. 8 to Rs. 10 more per *Nag* than the prevailing prices for Kumpta cotton. Similarly, Gadag No. 1 cotton fetched Rs. 15 more per *Nag* than the local rates for Dharwar-American cotton. The extra profit, secured to the cultivators of improved cotton is, therefore, Rs. 17,87,500 during this year as against Rs. 13,00,000 in the previous year. Though the yield is fairly satisfactory on the whole, the reduced demand and low price for cotton have had a discouraging effect on the cotton growers.

Since the consumers of cotton are not realising the importance of Agmarked bales due to one reason or other, Agmark work was worked out this year also as optional. As in the last year, two grade specifications, *viz.*, Agmark certified pedigreed and Agmark certified were continued and labels were given accordingly for reserved area and general area cotton. During the year under report, 2929 bales of *Jayavant* cotton were pressed under Agmark. Unless the millowners appreciate Agmark bales and are prepared to pay adequate prices for the Agmarked bales over the un-graded cotton, the Agmark work will not be very popular.

#### SIND.

1. *Area under cotton*.—Prior to the opening of the Lloyd Barrage canals, the annual area under cotton cultivation averaged slightly over 300,000 acres. With the advent of timely and assured perennial supply of water as a result of the opening of the Barrage canals and greater interest in cotton growing, the area has increased to 899,365 acres (including Khairpur State) during 1943-44 with an approximate outturn of 531,107 bales of lint (400 lbs. each). The area was divided between American and *desi* cottons as under:—

	<i>British Districts.</i>	<i>Khairpur State.</i>
American cotton .. ..	788,629 acres.	63,358 acres.
<i>Desi</i> cotton .. ..	44,084 ,,	3,294 ,,
Total .. ..	832,713 ,,	66,652 ,,

An interesting feature of cotton growing in Sind has been the phenomenal increase in the area under improved American cottons and the great reduction in the acreage under *desi* cotton. The area under cotton this year was 163,820 acres more than in the previous year. The increase in area can be attributed to very high prices for cotton prevailing during the season and also more settled conditions in the district as compared with last year.

The following statement gives the area and outturn of improved varieties of cotton in Sind during 1943-44 :—

Variety.	British districts		Khairpur State	
	Area in acres.	Outturn in bales of 400 lbs. each.	Area in acres.	Outturn in bales of 400 lbs. each.
<b>A. Sind-American.—</b>				
Sind Sudhar .. .. .	365,000	230,000	55,000	22,500
M—4 .. .. .	195,000	119,000	..	..
289F. .. .. .	191,629	106,900	5,358	2,017
Sind American 98 .. .. .	30,000	17,000	..	..
4F .. .. .	7,000	4,040	3,000	1,460
<b>Total American.</b>	<b>788,629</b>	<b>476,940</b>	<b>63,358</b>	<b>25,977</b>
<b>B. Sind Desi.—</b>				
27 W. N. or N. R. .. .. .	25,000	15,000	..	..
Desi .. .. .	19,084	11,840	3,294	1,350
<b>Total Desi ..</b>	<b>44,084</b>	<b>26,840</b>	<b>3,294</b>	<b>1,350</b>
<b>Grand Total ..</b>	<b>832,713</b>	<b>503,780</b>	<b>66,652</b>	<b>27,327</b>

The season was quite normal for the cotton crop and average yields were obtained.

(2) *Cotton varieties grown and the seed of improved varieties distributed during 1943-44.*

The Agricultural Department has evolved improved strains of American and *desi* cottons which, on account of better yield, higher ginning outturn and superior spinning performance, have brought increased returns to the cultivator and have, therefore, been extended into general cultivation.

**A. Sind-American cotton.**—There are three improved strains of Sind-American cotton which are widely cultivated in different tracts of the Province.

1. *Sind-Sudhar* (*G. hirsutum*).—The area under this improved variety has decreased during the year. This variety is a selection from Punjab 289F imported into Sind in 1924 and is now the standard American cotton in Lower and East Sind. This is grown chiefly in Thar Parkar and Hyderabad districts. It possesses a staple length of 1", gins 29 to 30% and spins 45 H.S.W.C. It gives a good yield under widely varied conditions.

2. *Sind-American 98* (*G. hirsutum*).—This variety covered an area of 30,000 acres during the year under report. It has been evolved by selection from ordinary 4F cotton originally imported from the Punjab. It has a staple of  $\frac{7}{8}$ ", a ginning outturn of 33% and a spinning value of 35 H.S.W.C. Sind-American 98 was found to be the most suitable type for cultivation in newly opened areas on the Right Bank of the Indus and is grown in the districts of Dadu, Larkhana and Upper Sind Frontier. Sind-American 98 is being largely replaced by the new variety M-4.

3. *M-4* (*G. hirsutum*).—This variety has been evolved from N. T. 21 (bulk). It has been under trial for the last few years and has been found suitable for growing in Eastern Sind where it is gradually replacing Sind-Sudhar in many tracts. It has also become popular on the Right Bank and has largely replaced Sind-American 98 on account of its earliness. It is earlier than S. A. 98 by about 4 weeks and therefore escapes frost which sometimes occurs very early on the Right Bank.

B. *Sind-Desi cotton*—has a special market on account of its rough, bright and white lint which is used extensively for mixing with wool. It is confined to Central Sind, being grown extensively in Nawabshah district, Sanghar taluka of Tharparkar district and to some extent to the Hala and Guni talukas of Hyderabad district. The improved strain, Sind N. R., evolved by the Department is very popular with the growers and covers over 60% of the total area under *desi* cotton in the British districts.

Sind N. R. (27 W. N.) (*Gossypium arboreum* var. *neglectum* forma *bengalensis* H. and G.) is the improved Sind-*desi* strain evolved by the Sind Agricultural Department by selection from the local *desi* stock. It gives 16 to 20% higher yield and 4 to 5% higher ginning outturn than the ordinary Sind-*desi*. It has a staple of  $\frac{5}{8}$ " and ginning outturn of 40% and it spins 6 H. S. W.C.

3. Improved strains of Sea Island and Egyptian cotton (*G. barbadense*) have also been evolved by this Department.

They are, however, not cultivated commercially to any extent on account of uneconomic yields. They are maintained at the Cotton Research Station, Mirpurkhas, where work on long staple cottons is being carried out under a scheme financed by the Indian Central Cotton Committee.

4. *Quantities of seed of improved variety controlled and distributed.*—During the year 1943-44, large quantities of pure seed of improved varieties were made available by roguing areas grown under seeds distributed by the Agricultural Department. The following quantities of the seed were distributed for the *Kharif* of 1943 :—

				By the Agri- cultural Department directly.	By the fac- tories directly.	Total.
				lbs.	lbs.	lbs.
Sind-Sudhar	..	..	..	64,800	65,000	129,800
M-4	..	..	..	29,000	30,000	59,000
4F-98	..	..	..	6,500	500	7,000
Total	..			100,300	95,500	195,800

#### PUNJAB.

The total area in the British districts of the Punjab was 2,602,263 acres (762,195 acres *Desi* and 1,840,068 acres American) against 2,319,567 acres (735,048 acres *Desi* and 1,584,519 acres American) in the previous year. This represents an increase of 12% over the total area of last year, but 8% and 2% decrease on the quinquennial and decennial averages respectively. Medium and long stapled American cottons thus constituted 70.7% of the total Punjab cotton crop, the highest proportion ever yet attained. The increase in the area during the year under report is due entirely to the good prices which prevailed in the previous year. The total baled crop according to press returns was 920,188 bales of 400 lbs. each in the previous year.

*Punjab-Desi Cottons.*—The “Grow More Food” campaign brought down the area under *desi* cottons appreciably, a further decrease of 3½% having been effected in the area of such cottons over the figures of last year. Of the total area under *desi* cottons, 487,710 acres were occupied by the improved varieties given out by the Department of Agriculture and only 274,485 acres were under unselected local sorts. Among the improved varieties, 39 Mollisoni alone

covered 433,130 acres, which is 56.9% of the total Punjab-*desi* cotton crop and 88.8% of the area under improved varieties.

*Punjab-American Cottons.*—The long stapled varieties, namely, 289F/43, 289F/K.25 and L.S.S., continued to increase in popularity, this being the first year when each of these varieties individually possessed a markedly greater area than 4F, which hitherto was the most extensively cultivated American cotton. The total area under these improved long stapled varieties was estimated at 1,391,900 acres during the year under review as compared to 894,060 acres in the previous year. On this basis, these long stapled cottons represented 75.6% of the total Punjab-American crop. It may be noted that the area under long stapled varieties takes into account the acreage of two new strains also, namely, 124F and 199F, which, though not formally given out so far by the Department of Agriculture, are spreading in certain areas, chiefly in the districts of Multan, Montgomery, Dera Ghazi Khan and Muzaffargarh on their own merits. The estimated acreage under each of the American varieties during 1943-44 was as follows :—

4F	..	..	..	..	..	440,700 acres.
L.S.S.	..	..	..	..	..	516,900 ,,
289F/K.25 and 289F/43	..	..	..	..	..	785,900 ,,
289F other than 289F/K.25 and 289F/43						1,400 ,,
124F	..	..	..	..	..	86,200 ,,
199F	..	..	..	..	..	1,500 ,,

The American strains have a well marked regional suitability. L.S.S. is predominant in the districts of Lyallpur, Sheikhupura and Sargodha—289F/43 is mostly grown in Dera Ghazi Khan, Muzaffargarh and major portion of Montgomery district. The new strain, 124F, is spreading in the entire south-western Punjab and also in the Lower Bari Doab Canal Colony.

87,222 *maunds* of cotton seed of improved varieties (*Desi* 6225 *maunds* and American 80997 *maunds*) were sold by the Agricultural Department to cultivators during the year.

#### CENTRAL PROVINCES AND BERAR.

The total area under cotton in the Central Provinces and Berar during the year 1943-44 was 30.9 lakhs acres against 32.7 lakhs acres in the previous year. The decrease is attributed to the "Grow More Food" Campaign.

V. 434.—The area under Verum 434 was 5.32 lakhs against 6.62 lakhs acres in the previous year. This strain possesses a fine, strong staple, about  $\frac{7}{8}$ " in length, and is capable of spinning up to 30's highest standard warp counts. The average premium obtained during the season 1943-44 was Rs. 31-8-0 per *khandi* of lint on *Jarila* (I.C.C.). 45, 940 maunds of seed were distributed for sowing purposes through departmental, co-operative and other agencies.

*BURI 107* :—The total area under this variety in different parts of the province was 1.25 lakhs acres out of which 45,000 acres were grown in the Burhanpur tahsil, where a seed distribution scheme financed by the Indian Central Cotton Committee was in progress. This strain possesses a fine staple, about 1" in length and is capable of spinning up to 40's highest standard warp counts. The average rates for *desi* were Rs. 13 and Rs. 18, respectively, per *maund* of *kapas*. The total quantity of seed distributed in the tahsil through Government seed depôts and the Tahsil Agricultural Associations amounted to Rs. 2,931 *maunds*, in addition to 1,282 *maunds* in other parts of the Province and adjoining States.

#### MADRAS.

The total cotton area in the Madras Province during 1943-44 according to the forecast issued on 23.8.44 was 2,146, 100 acres against 2,209,889 acres in the previous year as reported in the Season and Crop Report. There was a fall in acreage under all varieties except 'Tinnies.'

A. *Cambodia Cotton*.—The area under Cambodia cotton during the year was 501,100 acres of which 399,353 acres were under improved strains, (*vide* Table 1). This works out to 79.69% which is much higher than the last year's record of 59.5%. The largest concentration existed in Coimbatore and Madura Districts and an increase of 14% in Co. 2 was mainly due to the extended cultivation in the latter district. The area under Co.3 was more than doubled and phenomenal increases were noticed in Salem and South Arcot districts. The area in Ramnad district has dwindled down to the negligible figure of 40 acres on account of the preference evinced for Co.4 and alternative food crops. South Arcot, Tinnevely and Madura have registered substantial increases under Co.4. 920 and x4463 were practically confined to Coimbatore and their strains went up by over 50%. The demand for seed was met by arranging seed farms run by the Madras Agricultural Department, Tiruppur Co-operative Sales Society and Village Co-operative Seed Societies

in Ramnad. In all cases the crop was grown and ginned under expert supervision. The seeds were purchased after testing the germination capacity at a premium from the seed farm growers and sold to farmers in sealed bags. Strains Co.2, Co.3 and Co.4 were concentrated in Coimbatore, Salem and Ramnad Districts, respectively. A scheme financed by the Indian Central Cotton Committee, Bombay, continued to be in operation for the multiplication and distribution of Co.3 in Salem district.

TABLE I.

Cambodia Cotton :

Total area 501,100.

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Chingelput .. ..	Co. 2	56	..	5
South Arcot .. ..		1,370	23,750	2,670
Chittoor .. ..		630	..	43
North Arcot .. ..		3,048	..	342
Salem .. ..		588	Not available.	200,030
Coimbatore .. ..		327,621	3,197,320	181,854
Trichinopoly .. ..		1,180	21,025	6,083
Malabar .. ..		11,200	27,500	1,500
South Canara .. ..		30	..	3
Madura .. ..		28,892	84,000	96,620
Ramnad .. ..		5,915	..	1,055
Tinnevely .. ..		1,752	20,138	2,630
Kurnool .. ..		32	..	112
Anantapur .. ..		1,004	3,810	491
Cuddapah .. ..		1,059	..	125
East Godavari .. ..		..	..	27
<b>Total ..</b>		<b>384,345</b>	<b>3,377,543</b>	<b>313,590</b>

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Chingelput .. ..	Co. 3	3	..	2
South Arcot .. ..		2,692	2,850	1,804
Chittoor .. .. .		870	..	110
North Arcot .. ..		233	..	25
Salem .. .. .		227,360	..	9,280
Trichinopoly .. ..		960	10,070	1,100
Total .. .. .		232,118	13,420	12,361
Chingelput .. .. .	Co. 3	2,825	..	287
South Arcot .. .. .		26,874	17,284	6,897
North Arcot .. .. .		326	..	29
Madura .. .. .		39,694	40,000	8,110
Ramnad .. .. .		54,044	Not available.	16,885
Tinnevelly .. .. .		10,850	42,832	5,411
West Godavari .. ..		55	..	4
Kurnool .. .. .		..	..	500
Anantapur .. .. .		654	290	102
Total .. .. .		135,322	100,406	38,225
North Arcot .. .. .	920	50	..	3
Coimbatore .. .. .		13,935	382,280	21,387
Ramnad .. .. .		711	..	59
Total .. .. .		14,696	382,280	21,449
Coimbatore .. .. .	x4463	66,837	218,400	13,328
Trichinopoly .. .. .		4,365	..	400
		71,202	218,400	13,728
Total Cambodia under improved strains .. .. .		837,683	4,092,049	399,353

Co.2 continued to occupy the largest individual area. Strains Co. 3 and Co.4 were found to be more remunerative than Co.2 in the districts of Salem, South Arcot, Tinnevely, Madura and Ramnad and would eventually replace it to a very great extent. 920 and x4463 were more popular than Co.2 with the cultivators in portions of Coimbatore district. In quality and earliness, Co.3 and Co.4 maintained their levels.

*B. Tinnevellies.*—260,544 acres (Table II) were under improved varieties of Karunganni cotton out of the total area of 597,500 acres. This works out to 43.61% which is lower than that (53%) reported for 1942-43. K.1 continued to be the main strain under distribution and the fall in the percentage was mainly due to the great reduction in the area under cotton in Tinnevely district.

TABLE II.

Tinnevellies :— Total area 597,500.

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Madura .. .. .	K. 1	13,073	137,000	14,168
Ramnad .. .. .		64,924	..	91,825
Tinnevely .. .. .		180,482	172,320	74,256
North Arcot .. .. .		328	..	32
Coimbatore.. .. .		77,166	1,109,025	80,089
Total .. .. .		335,973	1,418,345	260,370
Coimbatore.. .. .	C. 11-2	795	2,250	174
Total Tinnevellies.		336,768	1,420,595	260,544

*C. Salems.*—Karunganni strain K. 1 occupies an area of 562 acres in Trichinopoly district alone out of a total acreage of 40,800 under this trade variety.

TABLE III.

Sailems :—

Total area 40,800.

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Trichinopoly .. ..	K. 1	150	6,430	562

*D. White and Red Northern.*—The area under this variety was 167,000 acres against 175,000 acres in the previous year. 57,008 acres or 34.1% of the total area under this cotton were under improved strains. The substantial reduction in the percentage during the year under report was due to want of suitable organisation for both multiplication and distribution of improved types.

TABLE IV.

White and Red Northern :— Total area 167,000.

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Kurnool .. .. .	N. 14	300	..	25,100
Kurnool .. .. .	N. 23	..	..	400
Kurnool .. .. .	H. 1.	520	..	8,517
Cuddapah .. .. .	H. 1.	16,081	..	22,991
Total White and Red Northern .. .. .		16,901	..	57,008

*E. Western.*—The total area under this cotton was 715,000 acres in 1943-44 against 727,000 acres in 1942-43. The area under improved varieties was 426,448 acres representing 59.6% of the area under cotton. The largest increase was noticed in Bellary district which registered 335,000 acres under H.1 compared to 149,528 acres during the previous year.

TABLE V.

Westerns :— Total area 715,000.

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
Bellary .. .. .	H. 1	560,509	2,824,170	325,000
Anantapur .. .. .		36,668	871,700	91,448
Total Westerns ..		597,177	3,695,870	426,448

*F. Warangal and Cocanadas.*—The total area under this denomination including 'chinnapathi' was 124,700 acres compared to 131,100 acres during the previous season. Only 215 acres were under the improved strain x20. The rate of spread was slow since no suitable organisation for its multiplication and distribution exists.

TABLE VI.

Warangal and Cocanadas :— Total area 124,700

District.	Name of Strain.	Quantity of seeds distributed in lbs. by		Total area in acres.
		Department.	Private Agency.	
East Godavari .. .. .	x20	..	..	3
Kistna .. .. .		100	..	12
Guntur .. .. .		..	..	150
Nellore .. .. .		..	..	50
Total 'Warangal and Cocanadas'. .. .. .		100	..	215

### UNITED PROVINCES.

The revised final area under cotton in the province during the season 1943-44 amounted to 372,361 acres against 311,486 acres (revised) last year, showing an increase of 60,875 acres or about 19.5%. Compared with the average area for the previous 5 and 10 years, the area during the year under report shows a decrease of about 27 and 36% respectively.

The revised final outturn of the crop (lint) was 112,000 bales against 92,000 bales (revised) last year, showing an increase of 20,000 bales or about 22%. As compared with the average outturn for the preceding five and ten years, the outturn this year shows a decrease of about 28 and 37%, respectively.

*Improved Varieties.*—C520 which is an improved strain of the 'short staple' group, suffered in its extension owing to unfavourable climatic conditions during the present and past seasons. Perso-American was the principal variety recommended by the Department for extension in suitable areas in the Western Circle. The area sown under Perso-American and C520 during 1943-44 in the whole province and the amount of the seed distributed by the Department of Agriculture are given in the following table.

Variety.	Total area under the variety (including natural spread.)	Amount of seed distributed by the Department.
P. American .. .. .	21,294 acres	Mds. 4380
C520 .. .. .	11,063 „	1023

The work of the extension of Perso-American Cotton is now progressing in pursuance of the scheme financed by the Indian Central Cotton Committee although on account of very high prices of food-grains and low prices fixed for cotton, the advance is not as rapid as desired.

*Chief Characteristics of the Improved Varieties.*—C520 cotton is a pure line selection from the 'roseum' type of U. P. Bengals, originally extracted from the material collected in Saharanpore and Bijnor districts as early as 1920-21. It yields high under irrigated and unirrigated conditions. When grown on a commercial scale at the Government Cotton Research Farm, Raya (Muttra) the variety yields about 9 to 10 maunds of *kapas* per acre.

With a staple length of about 0.73", ginning about 35-37 p.c. it is capable of spinning up to 10 to 12½ highest standard warp counts.

The variety has spread in general cultivation in the Middle and Upper Doab and is gaining ground almost all over the cotton growing areas in the U. P. Recently, it has been in demand from many of the Central India States and Rajputana also. When marketed pure, its *kapas* is valued at about Rs. 8 per *maund* more than that of the ordinary *desi*.

The Perso-American Cotton is a selection from the American types of cotton imported from Persia (Iran) and acclimatized in the U. P. When grown on commercial scale at Raya and other suitable areas, *e.g.*, Budaun, it gave an yield up to 13 to 14 *maunds* per acre. With a staple length of 0.85", a ginning outturn of 30 to 32% it is capable of spinning up to 28 to 34 highest standard warp counts. The *kapas* of this variety ordinarily fetches a premium of Rs. 2-8 to Rs. 3 per *maund* over *desi*, but during the last two seasons it was sold at a price of about 35 to 50% higher than the local *desi* cotton.

#### HYDERABAD STATE.

The total area under cotton in His Exalted Highness the Nizam's Dominions during the year 1943-44 was 4,150,368 acres.

*Gaorani 6*.—*Gaorani 6* is a selection from the indigenous *Gaorani* or *bani* cotton of the State. Pure seed obtained last year from the reserved areas, amounting to 5,820,960 lbs., was purchased and distributed to cultivators under departmental control both on the *taccavi* system and on cash payment. An area of 363,810 acres in Mudhol, Biloli, Deglur, Nanded and Hadgaon taluqas of Nanded District, Nirmal taluqa of Adilabad District and Hingoli taluqa of Parbhani District was covered by this seed. Reserved areas of the variety were formed in Nanded and Mudhol taluqas, the crops of which were rogued and the seed obtained for further distribution.

*Parbhani-American No. 1*.—This cotton is a selection from the American component of local crop of Parbhani District. Pure seed was obtained last year from the reserved area, amounting to 94,640 lbs. It was distributed to cultivators under departmental control over an area of (11,830) acres for further multiplication.

*Jarila Cotton*.—*Jarila* cotton is a selection of the *Verum* variety. Pure seed was obtained last year from Jalgaon through the Department of Agri-

culture, Bombay Presidency, and multiplied in the taluqas of Sillod, Bhokardan, Jalna and Ambad of Aurangabad District. A reserved area was also formed last year and the resulting crop rogued. Pure seed amounting to 636,856, lbs. was obtained from this reserved area during the season under report and distributed to cultivators under departmental control to cover 63,685 acres.

*Jayawant Cotton.*—This cotton was introduced in the southwestern portion of Raichur District in the year 1931 by importing the seed from the Co-operative Cotton Sale Society at Hubli and it has made steady progress since then. During the year 1943-44 the quantity of seed produced was 385,037 lbs. and the area covered 39,178 acres. The natural spread under this strain covered 164,439 acres.

The Department of Agriculture, H. E. H. the Nizams Government, has set up an organisation for seed multiplication, its distribution and the marketing of the produce. The predominant features of this organisation are as follows :—

(i) Special staff is maintained by the Department to ensure every year the purity of the crop of the general as well as the reserved areas. Close supervision is maintained throughout the life of the crop and also at the time of marketing, ginning and pressing of the produce.

(ii) A Special *taccavi* grant is provided by the Government every year to purchase all the seed of the reserved area for distribution to cultivators of the general area.

(iii) The purity of the produce of the general as well as the reserved areas is guaranteed to the trade.

(iv) On the strength of both the superiority and guaranteed purity of improved varieties, a substantial premium on the prices of local varieties is secured from the trade.

With this special organisation in which a collaboration of interests of both the cultivator and the purchaser alike is effected, a rapid extension of the area under improved varieties is achieved.

#### BARODA STATE.

The total area under cotton in the State during 1943-44 was 584,733 acres against 688,000 acres in the previous year. The decrease was largely due to the "Grow More Food Crops" campaign.

*Navsari District.*—The total area under 1027 A.L.F. in this district was 165,000 acres, of which the controlled area was 17,312 acres. Except for a small wilt affected area where B.D.8, a resistant strain, was grown, the whole of the district was under 1027 A.L.F. commercial cotton. The total seed issued by the Department was 225,056 lbs. Attempts to switch over to —(Seg. 8-1)—‘Suyog’ from 1945 are being made and 51,975 lbs. of seed of ‘Suyog’ have been stocked.

*Baroda District.*—In this district the Cotton Control Act has been applied since May 1943 making B.D.8 and B.9. the standard cottons for the black and *Gorat* soils of the district, respectively. B.D.8 variety was cultivated in seven *talukas*, viz., Karjan, Shinor, Dabhoi, Sankheda, Tilakwada, Baroda and Padra, while B.9 was grown in Waghodia and Savli (*Gorat* area). The total cotton area in this district during the year was about 330,000 acres of which 250,530 acres were under B.D.8. The premium realised over *Jarila* by the certified B.D.8 ranged from Rs. 120 at the beginning to Rs. 20 at the close of the season. 2,501,440 lbs. of different grades of B.D.8 cotton seed have been distributed for sowing during 1944-45. The Indian Central Cotton Committee has sanctioned a new seed scheme, which aims at the replacement of B.D.8 cotton by ‘Vijaya’ over approximately 300,000 acres in the black soil areas of Baroda State. About 2,470 acres of ‘Vijaya’ were grown during the year and 19,835 lbs. of controlled seed distributed by the Department.

B.9 has been selected as the standard cotton for the *Gorat* or light soil which covers an area of about 150,000 acres and is mainly confined to the Savli and Waghodia *talukas*. A scheme to expand this cotton has been in operation since 1st September, 1942. The area under this variety during the year was 77,000 acres in Baroda district and 1,700 acres in Mehsana district. The certified cotton fetched on an average Rs. 3 more per *bhar* over uncertified cotton. About 883,466 lbs. of controlled seed were distributed by the Department in Baroda and Mehsana districts.

*Mehsana district.*—The Department is concentrating on Wagad 8 in this district and is building up a seed organisation for this variety. The scheme sanctioned by the Indian Central Cotton Committee to expand this type came into operation in December 1943. Wagad 8 covered an area of 21,859 acres. Wagotar or Seg. 4-1, a new improved strain, which has been found superior to local Wagad, has been introduced into Baroda and the area covered by it during the year was 1,692 acres. The Department distributed 126,358 lbs. of Wagad 8 and 27,955 lbs. of Wagotar seed.

*Amreli district.*—The cotton on which the Department is at present concentrating in this district is C. 520. During the year the area under it was some 2,765 acres. A selection from local Mathio, S.31, has been found to be consistently good during the past two years and its seed has been multiplied over an area of 12 acres under the name of 'Pratap.'

### RAJPIPLA STATE.

The Rajpipla Cotton Improvement Act, which was passed in 1921, prohibited the import and sowing of *Goghari* or any other short staple cotton in the State. The export, likewise, of cotton by rail or boat is entirely prohibited except in the form of fully pressed bales, an exception being made only in favour of *bona fide kheduts* who are allowed to take their cotton in carts for sale outside the State. During the year under report, the best seed of the 1027 A.L.F. variety was obtained through the Cotton Superintendent, Surat, and supplied by the State to the *Kheduts*. This was the only strain grown throughout the State.

The monsoon and the weather conditions were very favourable and as a result the outturn of cotton crop was higher than normal in the season.

The total area under cotton cultivation throughout the State during the year was about 109,337 acres the total outturn was 49,252 bales pressed within the State exclusive of about 7,068 bales pressed outside the State limits from cotton transported by some cultivators of the outlying limits for sale outside the State. The cotton grown in the State has attained a high standard of reputation on account of its purity and finds ready customers in the market.

---

## CHAPTER IV.

### RESEARCH.

A year is a short period in the work of cotton crop investigations and it seems needless to repeat at this brief interval the explanations of the aims and methods of the experiment stations given in previous reviews. Due progress has, however, been made in many directions on lines laid down in the programmes already established. The main line of work under the various research schemes of the Committee is plant breeding and selection. Its object is to enable the grower to secure the most profitable yield. To do this there have to be taken into account (a) the quality of the lint on which demand and prices depend, and (b) yield.

A number of research schemes among which the most important are those for cotton breeding for the improvement of quality, are in operation in the various cotton growing Provinces and States. The majority of these schemes are financed entirely by the Committee, while the cost of others is borne partly by the Committee and partly by the Provincial Government or State concerned. Since January 1943, the expenditure on new schemes and extensions of old schemes sanctioned by the Committee, which are for the benefit of cotton growers, is being met from the Cotton Fund at the disposal of the Government of India. Research on cotton technology is carried on at the Committee's Technological Laboratory. In addition, trained Technological Assistants are posted at the Cotton Research Stations at Lyallpur, Mirpurkhas, Cawnpore, Surat, Dharwar, Coimbatore and Nanded, to help the botanists in charge in their work of breeding improved varieties of cotton.

### RESEARCH ON COTTON TECHNOLOGY.

Research on cotton technology and the testing of cotton fibres, yarns and cloth are carried on at the Committee's Technological Laboratory. A brief summary of the work done during the year is given below ; full details are given in the Annual Report of the Laboratory which is issued as a separate publication.

The year under review witnessed an appreciable increase in the activities of the Laboratory in many directions. In addition to the usual tests done at the Laboratory, tests were also carried out for several Empire countries

and allied Governments such as Belgian Congo, East Africa, etc., to help them in their work of improving their cottons. The total number of samples received for tests rose from 1129 in the last year to 1514 in the year under report, representing an increase of nearly 34 per cent. The number of reports issued from the Laboratory rose from 234 to 379 showing an increase of 62%. It is interesting to note that the number of samples tested on payment of fees in the Testing House of the Laboratory was more than double of that received last year, a special feature being a large increase in the number of samples sent for tests by cotton mills. In addition to the reports issued from the Laboratory, technical advice was given to several mills who referred their difficulties or sought information on technical matters.

Among the tests carried out on agricultural samples, mention may be made of cottons grown pure and in mixed cultivation in Hyderabad State and Ujjain, cottons grown on *chalka* and *regur* soils in Warangal, *desi* cottons grown in wilt-free and wilt-sick soils at Indore, Co.2 grown in Mysore State from seed irradiated with X-rays, L.S.S. grown after giving different photo-period treatments to seedlings, dye absorption capacity of Cocanada strains etc., etc. In the attempts made at several stations to develop long staple varieties which would satisfy the requirements of the mill industry for fine spinning and could be grown at economic levels, the valuation reports issued from the Laboratory, and prepared by an expert grader, help the breeders to estimate the acre cash values of their improved strains.

As usual, spinning tests were made on representative standard and trade varieties of Indian cottons, the results for which were published for general information in the form of technological circulars and bulletins.

Tests were made for the second year on a large number of samples of 1027 A.L.F., V, 434 and Sind *Sudhar* cotton in order to fix suitable criteria for quality control in applying AGMARK to these cottons. The work on the scheme for the survey of cellulose bearing materials of India on behalf of the Council of Scientific and Industrial Research was also continued and carried a stage further during the year.

In addition to the above-mentioned tests good progress was made in technological investigations which are either of a fundamental nature or are of direct practical value to the trade and the industry. These include experiments on the pre-cleaning and ginning of Indian cottons, a study of the effect of employing different speeds of beater and fan in the crighton opener,

study of the effect of using different weights and front roller speeds in the draw-frame, tests on combing of good quality Indian cottons, optimum treatment for reducing neppiness in neppy cottons, tests on mixings of Indian cottons with special reference to their fibre-properties, comparison of different methods of measuring halo-length and lint length and standardisation of a technique for halo length determination, prediction of strength of yarn spun with different twist multipliers, etc., etc.

Among the other investigations mention may be made of (1) the size absorption capacity of different Indian cottons, (2) kier boiling and bleaching of linters and yarns, (3) preparation of cellulose films and sheets from Indian linters, (4) preparation of cords for belts and tyres from Indian cottons, etc., etc.

Bulletins and circulars dealing with (1) spinning tests on mixtures of staple fibre with Indian cottons, (2) preliminary observations on the suitability of cotton cloth for covering bales instead of hessian, (3) the effect of storage under certain specified conditions on the quality of Indian cottons, (4) variations in copper number, cuprammonium fluidity and fibre-strength of cotton stored under high humidity (5) variation of fibre length in a bulk sample of cotton and in a single seed of the bulk and (6) pre-cleaning and ginning tests on Indian cottons were published during the period. The Laboratory also took part in the exhibition held in Bombay in March 1944 under the auspices of the First All-India Textile Conference.

### FUNDAMENTAL RESEARCH.

Fundamental research on cotton is carried out at the Institute of Plant Industry, Indore, which was established with the object of providing a central research station in the black soil areas of the Malwa Plateau. In April 1940, the working of the Institute was re-organised as a result of which fundamental research on genetics and plant breeding, physiology and field plot technique is carried out under a special scheme—the Cotton Genetics Research Scheme. An annual subsidy of Rs. 30,000 is, however, given to the Institute for work on other crops for the Member States, as well as for seed multiplication, distribution and demonstration and such agronomical and chemical investigations as might be considered necessary for the benefit of the States. The work of the Institute, *viz.*, varietal tests and seed multiplication, followed the lines of the previous years. A detailed account of this work is published separately

in the Annual Report of the Institute. A review of the progress made during the year under the Cotton Genetics Research Scheme is given below :—

**Genetics :—**

*Lintless Genes.*—The genetics of two more lintless mutants, Nandyal lintless (*G. arboreum*) and Viramgam lintless (*G. herbaceum*) has been studied. In the latter, a new type of stellate hair with 20-30 short arms has been discovered and this has proved a simple recessive to the normal stellate hair which has only 8-10 but longer arms. Genetical studies on fuzz grades in *G. hirsutum* show that the simple dominance of tufted over fuzzy seed holds good only when the parents belong to the same variety of cotton. Different varieties of *G. hirsutum* have different modifier backgrounds for this character and crosses among fuzzy grades coming from different varieties always give a continuous range of types from low tuft to high fuzz grades in the  $F_2^s$ . It has also been observed that selection for very low fuzz grades in some progenies has led to obtaining sparse linted types showing a partial association between low fuzz grade and low fibre density.

*X-ray works.*—Large scale yield trial with bulks from X-ray progenies has confirmed the superiority of them over control in yield, ginning percentage and lint length. The bulks have recorded 20-30% increase in yield, 2% increase in ginning and 1 m.m. improvement in halo length, all increases being significant.

*Locular Composition.*—The attempt to evolve a homozygous 5-lock boll type in *G. arboreum* referred to last year has confirmed the simple recessive nature of this to the normal 3-4 lock condition. The gene responsible is, however, unstable in that while some of the progenies selected from the 5-lock family are breeding pure for the 5-lock condition, others always throw a very small number of plants with 3 lock bolls.

*Red Leaf in G. hirsutum.*—Considerable work has been done during the year on the appearance of the red leaf (different from Jassid red) and incidence of jassid in *G. hirsutum* cottons. That this character has a genetic basis has been confirmed from observations on *hirsutum* varieties, most of which appear to carry the character in a heterozygous condition, as well as from  $F_2^s$  of definite crosses. The year's work has shown that the character, though genetic, is considerably influenced by the environmental conditions under which the plant grows. While some preliminary

observations have been recorded on the environmental effects, work programmed for the coming season should define the particular environmental conditions that affect the expression of the character. While the information available so far would appear to show that this character can be eliminated by breeding where it is considered undesirable, under Indore conditions the red leaf plant appears to suffer from no disadvantage and its earliness in maturity is in its favour.

*Jassid Resistance.*—An attempt was made in the previous season to score plants for different degrees of jassid resistance on the basis of leaf crumpling. Progenies from four apparently homozygous families, jassid resistant and jassid susceptible with and without red leaf, were grown in a replicated experiment. In the progenies where the red leaf was not present the classifications for jassid resistance and jassid susceptibility has proved absolutely reliable. The main difference between the two groups appears to be that while progenies belonging to both the groups show slight jassid incidence in the early stages, the resistant plants are able to throw off the attack and grow normally later while the susceptible plants continue to suffer right through. Though the distinction between the two groups where red leaf was present was not apparent on the incidence of jassid, the two groups do appear to be distinct from their final productivity, the susceptible group producing very much fewer bolls than the resistant group. It would appear quite feasible to use the amount of leaf crumpling produced as a criterion for judging jassid susceptibility in breeding work. In fact, the variation in hairiness of the plant body which character is generally related to jassid incidence was not sufficient to distinguish the susceptible and resistant families in the material studied here. That the jassid attack could be very serious is clear from the fact that in the susceptible groups 80 per cent of the plants give less than two bolls per plant and several of them no bolls at all.

*Wilt Work.*—Some further progress has been made in the study of wilt and breeding for wilt resistance. Twentytwo plants which had been selected out of the Glass House test were grown in the field for obtaining more seed. Several of these belong to the Malvi type although coming from the Malvi x *Jarila* cross. The best of these in halo length and ginning percentage will be put under a small bulk trial in the coming season. The homozygosity test with some progenies under intense wilt conditions in plots have brought out further improvement in wilt resistance in that 2 progenies of Dhar 43 (family 2) do

not show heterozygosity for wilt infection and one of them is also slightly better than the bulk in halo-length. Breeding for wilt resistance has been taken a step further in that small bulks of a few selected progenies from *Jarila* x *Malvi* cross which are as good as *Jarila* in fibre quality and field resistance for wilt and as good as *Malvi* in yield are now available for undertaking proper yield trials.

*Study of the potentialities of different ecotypes with regard to combination of economic characters.*—With regard to the study of the potentialities of different ecotypes of *G. arboreum* as parents, the  $F_1$  data have now been completely analysed and it is found that every character that has been examined shows a clear heterosis, its magnitude, however, differing in individual hybrids. The analysis of the  $F_2$  data was taken up during the year. Examination of  $F_2$  halo length shows that as in  $F_1$ s, the  $F_2$  means are consistently higher than the parental averages but the excess over parents is considerably less than in the  $F_1$ s. While the reduction in  $F_2$  as compared to  $F_1$  is more or less uniform among the 5 superior parents, it is very much variable in the Bengals parents. It is also seen that the  $F_2$  means are generally in the same order as the parents involved with the exception of C.520 and R. 18 strains which give larger  $F_2$  means than is indicated by their own values. There are also differences in  $F_2$  variability in the different crosses some showing more than others. Both among superior and Bengals parents  $F_2$  variability is generally less in those crosses where  $F_2$  means are higher and this should set a limit to improvement by selection. Analysis of the  $F_2$  data for other characters will be continued and meanwhile a replicated trial with 400  $F_3$  progenies from random  $F_2$  plants has been carried out during the year.

*Interspecific hybridisation.*—Under interspecific hybridisation about 22 bolls have been obtained by crossing the doubled hybrid, *G. arboreum* x *G. thurberii* with *G. hirsutum*. The lint in these bolls is brown and short but silky and strong. It has been found that the *thurberii* crosses do show some resistance to boll worm attack in the early stages, just when the flowers are opening. The other interspecific hybrid *G. hirsutum* x *G. raimondii* was self sterile but when doubled became partially self fertile. The doubled hybrid does not, however, give fertile seeds when crossed with *G. hirsutum*. While *G. raimondii* is stated to be jassid resistant in Peru, under Indore conditions it does get attacked producing the characteristic leaf curl.

### Physiology.

Bartlett's 'rate index' with some modifications named 'earliness index' has been used as an alternative to node number for denoting earliness. It cannot be said yet that this index is superior to node number. Separation of larger and smaller seed for sowing purposes in *Jarila* appears to be worth while in that the larger seed fraction which is about half of the whole gives a 20% increase in yield than the unselected seed. The experiment has to be repeated on a larger scale to confirm the results. An experiment with different placements of two fertilisers, ammonium sulphate and groundnut cake to supply 40 lbs. per acre failed to give any significant difference in yield mainly due to a high error resulting from high differences in stand. So far as germination is concerned, groundnut cake either sown with the seed or placed below the seed in the same furrow affects the germination very considerably while ammonium sulphate placed below the seed affects germination only to a small extent. The experiment will be continued omitting such treatments that affect germination as trials elsewhere with different placements of fertilisers for cotton do give yield increases of 23 to 100 per cent. To determine the place effect on yield, ginning percentage and halo length, pure *Jarila* seed obtained from three different sources, Indore, Akola and Jalgaon was grown in a replicated experiment at Indore and Akola. The sources of seed do give significant differences in yield and other characters. While there are differences in the seed weight of seed sown, these differences tend to be maintained in the harvested produce also which indicates that there could be genetic variability with regard to seed weight in established commercial varieties. The point that Hutchinson had drawn attention to, namely, that the selfed boll gives less yield of *kapas* than open-pollinated boll does appear to be correct in a *desi* cotton variety during the year. This has to be confirmed by further tests.

### Statistics.

A discriminant formula for selection for yield was described last year based on a wide range of *arboreum* varieties obtained from all over India. A similar formula was derived during the year from an experiment with selections from local Malvi cotton. Both the formulæ are given below for comparison. The two are very similar except for the coefficient for ginning percentage. Last year's formula suggested that selection for a higher ginning percentage would result in lowering the yield of both seed cotton and lint. The coefficient

for ginning percentage obtained for Malvi selections though still negative is now very much smaller. This would show that within Malvi selection for higher weight of seed cotton per seed though important in comparison to other characters is not disproportionately so while selection for ginning percentage has very little effect on the yield of seed cotton. The discriminant formulæ should naturally differ according to the range of variability in the material tested and which of the two formulæ should be used will depend upon whether the breeder is dealing with material of a small homogenous group or widely varying material as in a hybrid population.

	For yield of seed cotton.		For yield of lint.	
	Whole range of <i>arboreums</i> .	Malvi cotton.	Whole range of <i>arboreums</i> .	Malvi cotton.
No. of bolls per plant .. ..	+ 0.498	+ 0.596	+ 0.447	+ 0.581
No. of seeds per boll .. ..	+ 0.325	+ 0.393	— 1.569	+ 0.368
Weight of seed cotton per seed.	+ 3.093	+ 0.777	+ 5.029	+ 0.800
Ginning percentage .. ..	— 2.041	— 0.037	— 1.775	+ 0.835

## COTTON RESEARCH IN PROVINCES AND STATES.

### BOMBAY.

(a) Broach Cotton Breeding Scheme.—The Cotton Breeding Scheme at Broach has been in operation since April 1932. The original object of this scheme was to obtain, by selection or hybridization, suitable types of cotton possessing wilt-resistant, high yielding, high ginning and superior spinning qualities, to replace the local mixture, a large proportion of which consisted of *Goghvri*, a short staple, high ginning (40%) variety. In view, however, of the Committee's policy to replace, wherever possible, short staple with medium and long staple cottons, attention is now being concentrated on wilt resistance, high yield and fibre length.

The breeding of wilt-resistant types originally formed part of the Broach Breeding Scheme, but as it was considered desirable that this work should be done under optimum conditions of wilt infection, and as the required conditions, especially soil temperature in pots, were difficult to maintain at Broach,

this part of the work was transferred to Poona in June 1935, together with similar work on cottons for the Jalgaon tract.

The synthetic strain 'Vijaya' (Segregates 1-2 and 1-6) evolved under the scheme is stated to be highly wilt-resistant besides possessing a ginning percentage of 41 against 33.7% of B.D.8 and 41.3% of Broach Local and a spinning value of 38s compared to 38-1/2s of B.D.8 and 13-1/2s of Broach Local. In respect of yield, it is reported to be on a par with B.D.8.

During the year under review, 8 strains, 3 derived from (B.D. 8 × G.A.26), —Segs. 30-57, 54-59, 73-33, 4 from (B.D.8 × G. A. 26) × B.D.8—Segs. 1-2, 1-6, 3-50 and *Vijaya*—, and P.G.L.7-29 were tested against B.D.8 and Broach Local in a replicated variety trial in wilt-free soil. None of the strains was found to be significantly better in yield than B.D.8 but all of them gave a higher ginning outturn than B.D.8 by nearly 8%. *Vijaya*, 1-2 and 1-6 gave 60, 80 and 101 lbs. more lint per acre respectively than B.D.8. In the test with the above eight strains against B.D.8 and Broach Local on the wilt-infected soil, B.D.8 and all the strains were found to be free from mortality and partial wilt. The yield data showed that *Vijaya*, 1-6, 54-59 and 73-33 were on a par with B.D. 8. Twenty-seven selections are reported to have been made for early maturity from 9 promising early types, viz., B.D.8 early, early selection 2, Maktampore selections 2-1, 2-2, 2-3, 2-5, 2-6, 2-7 and 2-8; the tests showed that these nine types matured 7 to 10 days earlier than mass B.D.8 and *Vijaya*. They were also fairly uniform in respect of economic characters.

Under the wilt breeding part of this scheme, the object of which is to evolve a cent percent wilt-resistant type, from the material available at Broach, testing was confined to 30 progenies in pot culture at Poona, comprising 7 cultures of Seg. 1-2, 7 of Seg. 1-6, 1 of Seg. 5-18, 1 of Seg. 7-29 and 1 of Seg. 3-1. In all, 3,177 plants were under observation and 273 plants were selected for transplanting. It was observed that the Segs. 1-2 and 1-6 are not yet free from wilt, but the former showed a higher degree of resistance than the latter. It is stated that the study of F<sub>2</sub> generation of the cross (K.F. × G.E.5, a susceptible cotton) has confirmed the results obtained previously with (K.F. × 1027 A.L.F.), viz., that resistance to wilt in *G. herbaceum* is due to a single factor.

(b) **Jalgaon Cotton Breeding Scheme.**—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridi-

zation, suitable wilt-resistant types with heavy yielding, high ginning and good spinning qualities to replace the local mixture of N.R. and *Banilla* cottons in Khandesh. Wilt breeding work was originally included in the Broach and Jalgaon Cotton Breeding Schemes, but, in August 1936, it was decided that the wilt work should be treated as a separate scheme from the 1st April, 1937. In July 1941, the wilt-breeding scheme was extended up to 31st March, 1947.

During the year under report, four Dokras cultures and seven selections derived from the cross (*Jarila* × N.R. 5) were tested against *Jarila* for yield at Jalgaon. Two derivatives from the cross, 403-5 and 670-4, gave significantly better yield than the control. All of them with the exception of one Dokras culture, 4-G-2-3, were, however, superior to *Jarila* in ginning outturn. A similar test conducted at Dhulia confirmed the superiority of the two selections referred to over *Jarila*.

Under the wilt breeding part of this scheme, progenies of 4 plants of two cultures of *Jarila* were tested in pot cultures under controlled conditions of infection. Twenty plants were transplanted in the infected field for further testing.

(c) **Scheme for breeding wilt-resistant cottons in Surat area.**—This scheme was sanctioned by the Committee in August 1936 and commenced work in April 1937. The object of the scheme is to obtain a strain of cotton completely resistant to wilt and suited to the natural conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A.L.F. or by crossing this cotton with B.D.8 or other wilt-resistant strains.

During the year under report, cultures from the following crosses were tested in the wilt-sick plot at Shera :—

- (1) (8-1 × K. F.)
- (2) [8-1 (B.D.8 × G.A. 26) × B.D.8] F<sub>6</sub>1-6] F<sub>5</sub>
- (3) [1027 A.L.F. (B.D.8 × G.A. 26) × B.D.8] F<sub>6</sub>1-6] F<sub>5</sub>
- (4) (8-1 × 1027 A.L.F.) F<sub>9</sub>
- (5) (Seg. 22-3-2-8 × B. C. 1-6) F<sub>6</sub>.

The derivatives from Nos. 1, 2 and 5 above were found to combine high resistance with desirable agricultural characters, while the progeny of Nos. 3 and 4 proved to be highly susceptible to wilt. Selected cultures from Segregate 8-1 were tested both at Poona and Shera. The results from the pot-culture

tests at Poona during the past three years are reported to have been so conflicting that it is considered too early to draw conclusions regarding the possibility of selecting a 100% wilt resistant type from Segregate 8-1.

(d) **Scheme for improvement of Wagad cotton at Viramgam and Jagudan.**—While examining the possibility of growing medium and long staple cottons in the short staple areas of India, the Committee, in August 1935, decided that, in view of the absence of any serious attempt to improve the cotton of the large *Dholleras* tract, a comparative study of Indian and Iranian *herbaceum* cottons should be undertaken, with the object of finding out one or more suitable types for the tract. A special officer was deputed to Iran to collect *herbaceum* types of cotton grown there and, in August 1936, a five-year scheme was sanctioned for the improvement of *Wagad* and *Mathio* cottons, the work on *Wagad* cottons being centred at Viramgam and that on *Mathio* at Amreli. The objects are the improvement of *Wagad* cottons for (a) quality and yield and (b) earliness in order to escape frost, and the replacement, if possible, of the inferior *Mathio* cotton of Kathiawar by early *herbaceum*. These are sought to be achieved by (a) selection in *Wagad* cotton, (b) hybridization with Surti-Broach quality cottons like 1027 A.L.F. and B.D.8 and (c) hybridization with Iranian *herbaceums* known to be early and of better quality.

The whole of the *Wagad* area is divided into two main tracts: (i) the Viramgam tract, characterised by low rainfall and (ii) the Dholka tract with greater and more regular rainfall. The main breeding station is situated at Viramgam and simultaneously a small immune area is being maintained under irrigation at Jagudan to safeguard the work at Viramgam. In July 1941, it was decided to establish another sub-station at Dholka for conducting botanical work on the promising material obtained from Viramgam.

It is reported that during the year, 12 close-boll types were tested against *Wagad* 8, *Wagotar* and local *Wagad* in randomised and replicated experiments at Viramgam, Jagudan and Dholka. Six types—W. 87, W. 293, K. 72-2, K. 80-3-B, B. 1-A and (S<sub>1</sub>X99X163) 10— which were superior to *Wagotar* in quality and in yield of *kapas* and lint, have been retained for further testing. Trials with four close-boll early types, viz., H. 8-1, E. 31-1, (I<sub>x</sub>99) 20—1 and K. 61-3-1, at the three centers of experimentation revealed that, though they mature distinctly earlier than *Wagotar*, maturity is not sufficiently early to escape frost completely. At Dholka, where conditions akin to drought were met with, all the four types were found to be on a par with *Wagotar* in respect

of yield. At the other two places, K. 61-3-1 alone was equal to *Wagotar*, while the rest were significantly inferior to it. This strain is also as good as *Wagotar* in respect of ginning and fibre properties. All the four types have been retained for further trials. Similar trials were carried out at Jagudan, in the Latio tract, with four open-boll types, viz., Seg. 1-2, Seg. 1-6, Seg. 7-1 and B. 9; the Broach segregates (1-2 and 1-6) were found to be significantly lower than Seg. 7-1 and B. 9 in respect of yield of *kapas*. In view of their failure during the past two years, it is proposed to discontinue these trials.

(e) **Scheme for improvement of cotton crop in Kaira District.**—This scheme was sanctioned by the Committee in August 1939, subject to the condition that it would not come into operation until the Government of Bombay had declared Kaira district as a protected area under the Cotton Transport Act to prevent the import of inferior cotton from Nandurbar. In April 1941, the Government of Bombay issued a notification creating the Mahi-Sabarmati Zone (which includes the whole of the Kaira district) a protected area under the Cotton Transport Act, 1923; the scheme came into operation in September 1941.

Kaira district grows two kinds of cotton, (1) *G. herbaceum* var *frutescens*, popularly known as Kanmi and (2) *G. arboreum* var *typicum* known as *Rozi*, the former is an annual cotton of superior type and is generally grown in black soils, while the latter, which is found as a subordinate crop with cereals in *goradu* soils, is a perennial type, with short coarse staple and 25 to 26% ginning outturn. The area grown under these two cottons is, on an average, 78,000 acres, that under *Rozi* being 10,000 acres. Though the bulk of the cotton grown is the better *kanmi* quality, its reputation has, of late, been spoiled by the admixture of *Rozi* cotton in the gins. The object of the scheme is to find a superior type of cotton by selection or by introduction and trial of other perennial or annual cottons, to replace the *Rozi* type on the *goradu* soils of the Kaira district.

During the year under review, 58 *Rozi* selections were under study, of which 40 were found to be superior in yield and staple characters to bulk *Rozi*. A few were also early maturing and resistant to root rot. As in the past year, the test with two perennial types—Nadams from Madras and Baluchistan *herbaceums* from Viramgam—and two annual types, Co.2 and *Kar-khadi*, was repeated, but all of them are reported to have suffered from jassid attack. A selection of 28 plants has been made for testing in the next year.

A seven year rotational-varietal experiment has been undertaken with the object of studying the economics and the possibility of replacing the perennial *Rozi* with the annual *Vijaya*. The first series was laid out during the year under report. The results showed that of the two cottons, *Rozi* and *Vijaya*, included in the trial, *Vijaya* yielded less and suffered, to some extent, from root rot. As, however, its quality was superior to that of *Rozi*, it fetched a better price. *Vijaya*, with Kodra, gave a higher monetary return than *Rozi* with Kodra.

(f) **Scheme for interspecific hybridization in Cottons at Surat.**—This scheme was sanctioned by the Committee in January 1938, for a period of five years, with the object of obtaining, if possible, fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American and hardness and adaptability to Indian climate of the Asiatics. Work on crossing Asiatic and American cottons, begun at Surat in 1932, had already yielded 23 hybrids in which the American parents used were mostly the acclimatised Upland types from different parts of India, while the Asiatic parents were forms of *G. herbaceum* and *G. arboreum*. The hybrids produced from these were, however sterile and efforts to induce fertility in them were successful only when they were back-crossed to American types.

During the year under review, eight families derived from six back-crosses, viz., B. C. No. 22, 68, 125, 134, 170 and 189, were tried in replicated randomised compact family blocks with 1027 A.L.F., and Co.2 as controls. The analysis of the yield data revealed that none of the families was statistically superior to either of the checks; four cultures were, however, on a par with Co.2. In another trial with nine families, the control, 1027 A.L.F., again out-yielded all the selections. Four families from this test were found equal to Co.2 from point of yield. The controls were excelled by a number of families in ginning percentage. One hundred and nine cultures from 17 advanced back-crosses were studied in non-replicated rows with Co.2 as the check and 166 plants possessing the desirable combination of yield and ginning percentage were selected for further trial. It is reported that the  $F_2$  population of the crosses between the tetraploid—(Hexaploid—(American  $\times$  Asiatic)  $\times G. armourianum$ )— $\times$  cultivated American types, showed wide variation in many morphological and economic characters; 104 plants were selected in the field and 29 of them were found to combine ginning outturn above 36% and yield exceeding 5 *tolas*. Their staple length varied from 17 to 26 mm.

Material from the interspecific crosses was supplied to various Cotton Breeders in Bombay, Punjab, Sind, Madras and Indore. Reports of trials, however, do not indicate that encouraging results have been obtained at any of the places. It is claimed that cytological examination of many interspecific hybrids, back-crosses and polyploids has helped to explain some of the causes of sterility and species relationship.

(g) **Scheme for improvement of Dharwar-American Cotton.**—This scheme was sanctioned by the Committee in July 1941 and commenced work in April 1942. The object of the scheme is to improve the Dharwar-American cotton crop grown in the Kannada districts of the Bombay Province, the adjoining areas of the Madras Province and in Hyderabad and Mysore States. This is sought to be achieved by the development, by selection or hybridisation, of an early maturing type, superior to Gadag 1 in respect of yield, staple length and ginning percentage, and which is, at the same time, more resistant to 'red-leaf' blight. The work is being done at Gadag, where conditions of soil, climate, rainfall, etc., are suited to the cultivation of *hirsutum* cottons.

During the year under review, owing to very heavy rains, flowering and harvesting were delayed throughout the tract. As in the previous year, large scale replicated trials with two strains—9766 and 4411—derived from the back-cross (G1 X Co.2) X G1 were carried out; the yield of strain 9766 was on a par with that of the control, G1, but significantly better than that of strain 4411. The two strains maintained their superiority over G1 in respect of ginning percentage. Their lint has been adjudged suitable for spinning 36s and 38s highest standard warp counts respectively, against 34s of Gadag 1. Nine improved exotic types from various provinces and the Indore and Hyderabad States were tested against G1 for yield and other economic characters. Gadag 1, however, surpassed all of them in yield though some of them were distinctly superior to G1 in ginning percentage or staple length. LSS, which was earliest in maturity, has been crossed with G1 and 9766. A few other crosses were also made between G1 and 289F/K.25, 186F, M4, Indore 1, Sind *Sudhar*, Parbhani American, *Buri* 107, Perso-American, Moco, Jinjya and Kampala varieties. Back-crossing the  $F_1$ s with G1 and inter-crossing of the various  $F_1$ s are proposed to be undertaken in the ensuing year.

(h) **Scheme for investigation of 'small leaf' disease of cotton.**—This scheme is an off-shoot of the Mungari Cotton Breeding scheme. It was sanctioned by the Committee in January 1942, for a period of three years and came into operation on the 1st June, 1943. The object of the scheme is to

investigate the causes of "small leaf" disease of cotton, and to determine whether or not the disease is of virus origin. The work is being carried out at Poona. A survey of the disease was undertaken during the year in the provinces of Bombay, Madras and the Punjab and the Hyderabad State. The disease was found to be severe in *Rozi* cotton in Kaira district in North Gujerat and in Mungari cotton in Madras Province and Hyderabad State. American cottons in the Bombay Province did not show symptoms of the disease, but, in the Punjab, it was only these that manifested signs of infection. The disease is characterised by extreme stunting of the aerial organs of the plant and sterility is the chief symptom in most cases. The malformation appears to be correlated to root development. Grafting experiments conducted during the year have shown that the disease is of virus origin. There appears to be no indication that the disease is transmitted by the seed. A study of the pathological histology of the diseased plants is under way.

#### SIND.

(a) Scheme for production of long staple cottons in Sind.—Ever since the opening of the Lloyd Barrage, the question of the establishment of a compact block of long staple cottons in Sind has engaged the attention of the Indian Central Cotton Committee. Although attempts in the introduction of long staple quality cottons in Sind in the past have not met with the success it was anticipated they would, the project, nevertheless, is considered to have possibilities which are well worth investigating. Accordingly, a five year scheme for cotton-breeding investigations for the production of long staple cottons has been launched. The scheme came into operation in April 1940. The experimental stations are situated at Mirpurkhas and Oderolal. The most important problem to be tackled is to see whether high quality cottons, preferably of the American types, but possessing a better staple than Sind *Sudhar*, can be produced. The aim is to evolve a cotton longer than 1-1/16" which would spin about 60 counts and give a high acre cash value of *kapas* relative to the commercial cotton crops now being grown in Sind. This is sought to be achieved by selecting extra long staple Upland types from a wide range of places all over the world, and, after testing them under Sind conditions, hybridising the best of them with the hardiest Upland types of cotton, such as Sind *Sudhar* and M-4, now grown on a commercial scale in Sind.

As a result of the replicated tests with 200 hybrid progenies belonging to the direct F<sub>3</sub>, and Back-Cross generation of the 1943-44 season conducted

during the year under review, about 30 progenies combining yield, staple and ginning have been obtained. Though all the long staple exotic parents used in the cross have been extremely susceptible to Red-Leaf, *Tirak*, very poor in yield and had transmitted these undesirable characters into the hybrid progenies to an alarming degree, by careful selection it has been possible to obtain a few healthy high yielding progenies which do not differ significantly from the Sind *Sudhar* and M4 controls in yield. In addition to retaining the potentialities for the yield of the commercial cottons now grown in Sind, these progenies possess an extra staple length of 1/8 inch. The mean values of the progenies and the co-efficient of variability within each progeny, assure the possibility of further improvement in yield, staple and ginning by responding to further selection which is in progress. The scheme has so far worked successfully and the material on hand holds out definite promise of ultimately producing strains fulfilling the objects of the scheme.

(b) **Scheme for Cotton Jassid Investigation.**—In Sind, jassid attack is most prevalent in the south-east Tharparkar district where it is proposed to establish a compact block of long staple cotton. One of the harmful effects of this pest is improper development of the seed, so that, in certain seasons, good seed is not available for sowing purposes, and this gives a setback to the extension of improved varieties. Accordingly, in August 1937, the Committee sanctioned the above scheme, for a period of three years and six months, with the object of studying the habits of jassids, their alternative hosts and the manner in which certain varieties of cotton resist jassid attack. In January 1941, the scheme was extended up to 18th April 1945. In July 1943, however, the Committee decided that the scheme in its present form should be wound up forthwith, as it was considered that there was very little prospect of any results of practical value emerging from it. The scheme accordingly terminated on the 29th August, 1943. The progress made during the period under review is described below :—

The observations on the relative infestation of jassids on 6 varieties of cotton, *viz.*, Sind *Sudhar*, M4, L.S.S., S.L.D. 1, Co.4, K. 25, tested in the varietal trial, showed that jassid population was lowest in M.4 and S.L.D. 1, whilst K.25 and Sind *Sudhar* harboured the largest numbers; L.S.S., and Co.4 occupied an intermediate position. The seasonal sowings in April, May and June with M.-4 and Sind *Sudhar* indicated that late sowing in June encouraged jassid attack and gave poorer yield than either the April or May

sown crops. The study of the influence of the cultural practices like manuring, watering, spacing, drilling *versus* broadcasting the seed, on the density of jassid population had not yielded results of any value. In the experiment designed to study the correlation between jassid abundance and hairiness, it was observed that except in the case of 4F.98 and N.T.38, there was a tendency for the more hairy types to be more resistant to jassids.

(c) **Scheme for Co-ordination of Research on Black-headed Cricket in Sind and Baluchistan.**—The scheme for investigation into the black-headed cricket in Sind was sanctioned by the Committee in January 1938, for a period of three years, with the object of establishing the identity of the pest and studying its life history, seasonal behaviour and the extent of the damage caused by it. Before the opening of the Lloyd Barrage, the black-headed Cricket had been known as an occasional pest of *Sorghum* and cotton in Upper Sind and some parts of the Punjab. With the introduction of cotton cultivation on the Right Bank of the Indus, however, this insect has become a serious pest of cotton in the seedling stage in Khirtar and Johi tracts in Sind and in some parts of Baluchistan. The pest appears in the cotton fields towards the end of April and disappears in June. The period of its activity synchronises with the sowing time of cottons and causes almost wholesale destruction of the crop. The pest appears to belong to the same species as met with in Baluchistan, *viz.*, *Gryllulus domesticus*. Since April 1941, the scheme has been merged in the scheme for co-ordination of research on black-headed Cricket in Sind and Baluchistan.

The objects of the co-ordinated scheme are (1) to study the life cycle and seasonal behaviour of the pest with special reference to the breeding places in both the provinces, (2) to investigate suitable control measures, special attention being paid to the recent literature on anti-locust measures and (3) to control and prevent the ravages of the pest by means of poison baits.

The Baluchistan part of the above scheme has been dealt with elsewhere.

During the year under review, attention was concentrated on testing the efficacy of various poison baits and on the improvement of the standard established, *viz.*, sodium fluosilicate, molasses, rice bran and water mixed in the proportion of 1 : 1 : 20 : 12-1/2. The efficacy of this standard mixture was found to improve when bran with more flour and less of rough husk was mixed with it, the lower grades of bran making it less attractive. Trials were undertaken with rice bran, saw dust, jowar *kadby*, each separately mixed

with molasses, also soaked cotton seed and cowdung ; these showed that the attractive power of jowar *kadbi* and molasses mixture was more than that of the others. Soaked cotton seed, however, proved to be the most preferred food. The efficacy of the standard bait was proved in a laboratory test when it was scattered on young and adult seedlings, the pest preferring the bait to the seedlings, thus proving its utility as a bait for field scale trial. Tests with attractants, like fruit juices and amyl acetate, when added to the standard bait in different quantities, did not give any conclusive results. A few drops of orange juice added to the standard bait are said to enhance its attractive power ; the addition of salt also made it a superior attractant but these results need confirmation. With a view to finding out which early maturing variety could be sown late, sowings were done in March and April, after the pest had subsided, for comparing their behaviour and yield with late sowings, but the experiment proved a failure due to the closure of the canals over a long period. Four varieties sown late gave very poor yields, thus indicating that late sowing is not likely to prove helpful.

(d) Scheme for bollworm investigation and clean-up campaign in Sind.— This scheme was sanctioned by the Committee in January 1940, for a period of 3-1/2 years, and it came into operation on the 1st September, 1940. The work proposed to be carried out under the scheme during the first seven months was (a) to survey the host plants during the off-season of cotton and (b) to test the efficacy of the implements evolved elsewhere. During the remaining period, it is proposed to carry out a clean-up campaign and to study its effect on succeeding year's crop. The investigations are confined to the Tharparkar district.

The campaign area was increased during the year under review to 1,200 square miles, against 700 sq. miles in the previous year. The clean-up operations, undertaken in the beginning of December 1943, were completed by the 15th March, 1944, during which period, 99% of the area was cleaned. The eradication of *patiteer* and other alternative host plants was also completed within the same time. The study of the effects of the 'clean up' campaign on the incidence of the boll-worm on the new cotton crop showed that the pest was practically absent from cotton seedlings in the cleaned area during May to July 1943, but fairly active in the uncleaned area. During August to November 1943, the boll-worm population was 2 to 3 times higher in the untreated than in the treated area. The night caging experiments were

done on the same lines as in the past year. There was not much difference in the yield obtained from caged and uncaged plants in the cleaned area but in the uncleaned area the difference was marked. A comparison of the total number of bolls picked from the uncaged plants in each of the areas showed that plants in the cleaned area gave seven more bolls per plant than those in the uncleaned area. It is reported that the increased yield from over 93,000 acres, cleaned up during 1942-43, was some 1,39,500 maunds and that the additional profit to the cultivators who adopted these measures amounted to about 28 lakhs of rupees.

### PUNJAB.

(a) Punjab Botanical Scheme.—This is one of the earliest schemes of the Committee. Sanctioned in 1923 for a period of five years, it came into operation in August 1925, and has been extended from time to time, the last extension, which will expire on the 28th February, 1945, being approved by the Committee at its meeting held in January 1940. Until 31st March, 1936, the entire cost of the scheme was borne by the Committee, but since then, the expenditure is shared on a 50 : 50 basis between the Committee and the Provincial Government. The original object of the scheme was to investigate the causes of the periodic failures of American cotton in the Canal Colonies of the Punjab where a large area is annually grown under such cottons, and to obtain suitable types of American and *desi* cottons. In view, however, of the immediate economic importance of improved types of cotton, work was concentrated on breeding, and a separate physiological scheme was sanctioned for investigating the problem of periodic failures of American cotton. The Botanical scheme has thus been concerned mainly with the improvement of both *desi* and American cottons. As more than half the cotton area in the Punjab lies in the Canal Colonies, attention was first directed to the improvement of the cottons of that area. The South-Western tract of the Province, comprising the arid districts of Multan, Muzaffargarh and Dera Ghazi Khan, were given attention next and a sub-station for this purpose was opened at Multan in 1935.

During the year under review, the total area under cotton in British Districts was 2,620,000 acres, of which 1,850,000 acres were under American and 770,000 acres under *desi* varieties. Medium and long stapled American varieties thus constituted 70.6% of the total Punjab cotton crop. Large scale tests with new selections from 289F/43 and L.S.S. were conducted during

the year under review ; the results indicated that the selections from 289F/43, while retaining the good qualities of the parent type, possess 3 to 4% higher ginning outturn. Of the selections from L.S.S., four proved earlier in ripening, superior in ginning and significantly higher in yield than L.S.S. It is expected that, through further testing of these promising cultures, it will be possible to select strains with the desirable combination of characters, suitable for the various areas. The examination of jassid resistance and other economic characters of the 43, F<sub>4</sub> families of the cross (920 Cambodia × 58F) × 289F/43 and 13 families of (920 Cambodia × 58F) × 124F, showed that several families are completely immune to jassid infestation, besides possessing a much finer quality of lint than any of the varieties grown in the Punjab. These are stated to constitute a valuable asset, not only for controverting the jassid menace but also for evolving new types with superior technological properties. Crosses have been made, with the same object, between Punjab-American types and Co.3 and Co.4, but these are still in their early stages. Hybridisation of Punjab-American with some of the reputed long linted types was undertaken during the year with the object of producing a strain capable of replacing the varieties now being imported from South Africa and other countries.

The improvement of the lint qualities of *desi* cottons is sought to be effected by crossing Jubilee and Mollisoni with the wild Nigerian cotton—*G. anomalum* and the high quality South Indian *arboreums*.

Extensive trials with the new promising strains, 124F and 199F, were carried out on the Departmental farms and estates of big *zamindars* in Multan district. The results obtained confirmed the previous finding that 124F is the most suitable variety for the entire South-western tract. It has already covered an area of 60,000 acres in the districts of Multan and Montgomery, entirely on its own merits. Type 199F was seriously affected, owing to heavy attack of white fly during the year. It is, nevertheless, considered a promising strain combining high ginning, long lint and good yield with extraordinary jassid resistance.

At the Jhang sub-station, 244F and 268F gave significantly higher yield than 4F and have been retained for further study.

At Hansi, the centre of the South-eastern tract, the performance of the new *desi* strain, 231 Rosea, has been consistently satisfactory during the last two years. Owing to its superiority over Mollisoni 60A<sub>2</sub>, the present *desi*

cotton of the South-eastern tract, both in respect of yield and ginning outturn, it is said to fulfil the requirements of the tract. As a result of the work done at this sub-station, it has been found possible to grow American cottons most successfully in some of the irrigated areas of the tract, which hitherto were considered suitable for the cultivation of *desi* cottons only. One variety of American cotton, 216F, has not only proved to be a higher yielder than Mollisoni 60A<sub>2</sub> during the past two years, but it also possesses the quality of very early maturity, owing to which it is expected to withstand the droughty conditions obtaining in the tract.

(b) Scheme for improvement of Punjab-American 289F/K. 25 Cotton.— This scheme was sanctioned in January 1938, for a period of five years and commenced work from the 9th July, 1938. The object of the scheme is the improvement of 289F/K.25 cotton which was evolved at the B.C.G.A. Farm some years ago. Though this strain is very popular in the Lower Bari Doab Canal Colony and the area under it has expanded very rapidly, it suffers from the defect of susceptibility to jassid attack. One of the aims of the present scheme, therefore, is to develop jassid-resistant strains from this cotton.

During the year under review, owing to the incidence of severe white fly attack and the prevalence of *tirak*, the average yield of 289F/K. 25 on the British Cotton Growing Association Farm was only 8.5 maunds per acre, against 16.17 maunds in 1942-43. The performance of the strain, 124F, is said to have been very promising under Khanewal conditions. On the British Cotton Growing Association Farm, its yield averaged 9 mds. 18 seers per acre, compared with 8 maunds 20 seers of 289F/K.25.

Two hundred and ninety-one single plant selections were tested in progeny rows against three controls, *viz.*, 289F/K.25, 289F/K.25 mass selection and 124F; 52 cultures which gave statistically significant yields were retained for further study. Of these, 18 sibs, which are derived from the cross between 289F/K.25 and 289F/43 are said to be densely hairy and likely to prove highly jassid resistant.

In the varietal trials at Khanewal, some of the reselections from 289F/K.25 and derivatives from 289F/K.25 × 289F/43 proved to be superior to the parent strains in respect of yield, ginning outturn and jassid resistance; it is expected that the promising material now in hand will yield suitable types, thus fulfilling the object of the scheme.

(c) **Physiological Scheme.**—Partial failures of the American cotton crop in the Punjab occurred in the years 1919 to 1921, 1926 to 1928, 1931 and 1932. The external symptoms of the cotton plants during these failures were early reddening and shedding of the leaves, premature opening of the bolls with immature seeds and low quality lint and, in extreme cases, the dwarfing of the plants. To account for these failures, various views were advanced, such as the heat stroke theory (Milne, 1924), attack of White Fly (Roberts, 1929) and unfavourable combination of climatic and biotic factors (Trought, 1931). As, however, these theories could not be supported by sufficient data, it was thought that the failures might be due to malnutrition of the plant and a physiological scheme was accordingly started by the Committee in March 1935, to study the physiology of the cotton plant with a view to determining, if possible, the nature of the nutritional disorder, its causes and the measures necessary to combat it. The scheme started work in 1935. In March 1937, the Empire Cotton Growing Corporation loaned the service of Dr. Mason to the Committee to inspect and report on the scheme, and, on his recommendation, a soil survey on a large scale was undertaken to connect up soil conditions with cotton failure. The scheme terminated in March, 1944.

The work done so far has indicated that two sets of soil conditions are associated with the development of 'tirak' viz., (i) soils with saline sub-soil and (ii) soils with nitrogen deficiency. These conditions may exist separately in separate fields or together, the intensity varying from field to field.

The growth of plants is normal in the earlier stages of development on both the soil types. From the flowering stage the plants on light sandy-soils deficient in nitrogen are characterised by yellowing and reddening of leaves followed by premature defoliation. The leaves of the plants on soils with saline subsoil exhibit drooping from the middle of August onwards. Wilting becomes more and more accentuated with the advance of time after every irrigation. The leaves do not turn yellow before they are shed.

The association of a chemical substance giving tannin reaction with the deficiency of nitrogen is another important finding which serves as a biochemical index of nitrogen starvation. By subjecting the water-extract of a few bits of cotton leaves to 'tannin test' in August, it is now possible to forestall whether the cotton crop in a particular field requires application of nitrogenous manure or not. If the 'tannin test' is positive nitrogen application will prevent the development of 'tirak' on light sandy lands.

Extra water at the fruiting stage has been found to ameliorate 'tirak' and give increased yield only on soils which are saline in the subsoil. Additional water supply will not, however, have any appreciable beneficial effect on light sandy soils where 'tirak' is caused by nitrogen deficiency. Similarly applications of manure will ameliorate 'tirak' on light sandy soils but not on soils possessing saline subsoil. In order to obviate the difficulty experienced in distinguishing the soil types and deciding upon the correct remedy, a common ameliorative measure for the two abnormal conditions has been devised. It consists in delaying the sowing of cotton in general. The optimum period for sowing American cotton has been indicated to be in the month of June rather than in May. There was a substantial improvement in the opening of bolls in respect of late sowings irrespective of the soil types.

When sowings were done in June, the number of bolls per plant was reduced, affecting the yields adversely even though 'tirak' was ameliorated. This disadvantage that accompanies late sowings is counteracted by sowing the rows at 2 ft. instead of at 3 ft. and by reducing the distance between plant to plant. This practice would increase the number of plants per acre and a reduction in boll number per acre will be avoided.

June sowings do not suffer from a decrease in yield on normal fertile lands which are neither deficient in nitrogen nor are saline in the subsoil. Thus June sowings can be practised as a general measure to combat 'tirak' in spite of the great heterogeneity of Punjab soils.

Arising out of the work done in the Punjab under this scheme and in view of the desirability of investigating the applicability of the results achieved under it to other areas, the Committee, at its meeting in January 1944, sanctioned a new scheme for Cotton Physiological Research with headquarters at Indore. Under this scheme, it is proposed to commence work in three cotton tracts, viz., (1) irrigated (2) partially irrigated and partially rainfed and (3) totally rainfed. The province of Sind will receive special attention as the problems to be tackled there are almost similar to those in the Punjab, though the climatic and soil conditions are different. The aim will be to find out the fundamental facts and then attempt to apply the knowledge gained into practice for improving the quality and quantity of cotton in general.

During the year under review, the optimum sowing time for the Sea Island variety of cotton in the Punjab was found to be quite different from that found for the American types. The experiments conducted in 1942-43

season showed that the highest yield of about 10 maunds per acre was obtained in March-April sowings ; later sowings gave low and negligible yields. This result was again confirmed during 1943-44. Though the yield obtained was 9 maunds per acre, it was evident that the vegetative growth was high and bearing proportionately low. Early formed flowers and bolls were also shed. The crop matured in December though planted early. In order to overcome these disadvantages pruning was resorted to and the main stems and the branches were topped early in the month of August. This led to immediate development of fruiting branches, the bolls began to set and by the middle of October the crop was ready for the first picking. The unpruned plants had no ripened bolls by that time. This work is being continued in the current season.

The June-sowings of the Punjab American cottons on rice reclaimed lands was found to be superior to May sowings. Thus late sowings were also found to be doing well on rice reclaimed lands. It was, however, found that such lands required very heavy manuring. A crop like gram did not replenish the nitrogen lost by leaching when rice was grown and heavy and frequent irrigations were given to wash the salts down. Application of the sulphate of ammonia gave very increased yields, while the control plots showed symptoms of nitrogen deficiency.

As the sulphate of ammonia was not available at present or it was available at prohibitive cost, the manurial value of oil cakes to cotton on light sandy soils was investigated. In all the experiments Toria cake was found to be the best manure, next only to sulphate of ammonia ; cotton cake, however, did not produce any visible effect. The experiments are being repeated.

The finding that a thick sown June-crop suffered much less damage from Jassids than a thin sown June-crop was again confirmed for the third year in succession.

The manner in which potash deficiency occurred in 'tirak' affected plants in two different soil types, *i.e.*, soils with saline subsoils and on light sandy soils, has been determined.

Investigations were undertaken during the year in Sind to determine the causes of 'tirak' in Sind-American cottons also to see if the same remedial measures for 'tirak' found successful for the Punjab-American cottons would prove effective for *tirak* in the Sind-American cottons. Attempt was made

to determine the optimum sowing periods for different commonly cultivated varieties of cottons in different parts of Sind and to ascertain whether late sowing would be a common ameliorative measure for 'tirak.'

The investigations carried out in Sind showed that 'tirak' occurred on the same two types of soils, viz., (1) soils with saline subsoils and (2) light sandy soils as were found to be associated with 'tirak' in the Punjab. Both the soil types were found to be widely distributed in Sind. The soils with saline subsoils varied from heavy sandy loams to light sandy types.

Factorial experiments were laid out to study the effect on 'tirak' of (1) late sowings on both the soil types, (2) the applications of the sulphate of ammonia to light sandy soils and (3) applications of extra irrigations in the fruiting period to saline subsoils. 'Tirak' was found without exception to be ameliorated by late sowings on all soil types. It was found to be a common ameliorative measure for 'tirak' for all the Sind American cottons grown in the Central and Southern tracts. Sind *Sudhar* was found to be more susceptible to 'tirak' than M.4 on saline subsoils. Extra irrigations to saline subsoils and applications of the sulphate of ammonia to light sandy soils also proved effective on the respective soil types.

The results of yields obtained in the same experiments indicated that in addition to amelioration of 'tirak' yields can also be substantially increased by late sowings provided closer spacing of plants than normal, viz., 3 feet between rows was adopted. Highest yields in the southern tracts were obtained in crops sown about the middle of May and in the Central tracts in crops sown towards the end of June and beginning of July.

The optimum sowing periods both from the point of view of 'tirak' and yields appeared to be different from the general sowing periods for cottons that are in vogue at present in Sind. In the southern tracts cotton sowings are completed by the end of April and May-sowings are considered to be bad. The results obtained, however, indicated that the month of May is the optimum sowing period. Similarly in the Central tracts of Sind the optimum sowing period was found to be later by one month than the general practice. This difference in the optimum sowing time as determined by experiments and that as at present prevalent in Sind may be due to the introduction of closer spacing in the late sown crops. If the above findings are again confirmed during the next cotton season 1944-45, the whole practice of cotton sowings in Sind will have to be changed as is being done in the Punjab.

Preliminary investigations on the Red Leaf disease in Sind have shown that the reddening of the leaves in Sind-Americans occurs in two ways. In one case, the change in colour is from green to yellow and then to red; in the second case the change is directly from green to red without the intervening stage of yellowing. The first type of reddening occurs on light sandy soils while the second type is confined to heavy sandy loams. Yellowing is a symptom of nitrogen deficiency, while, reddening of the leaves appears to be associated with a seasonal factor. Thus yellowing of leaves may not be followed by reddening when the second factor is not operating.

Experimental evidence supported the above conclusions. On light sandy soils the plots manured with the sulphate of ammonia showed much less or no yellowing and reddening of the leaves while it occurred in the control plots. Similarly late sown plots suffered much less or not at all from this trouble than the plots sown early, as the former did not suffer from a deficiency of nitrogen. The lower leaves showed yellowing while the younger leaves were green.

Preliminary investigations were also carried with *hirsutum* cotton grown in Central India.

(d) Cotton Jassid Investigation in the Punjab.—This scheme is concerned with the study of the Jassid insect in the Punjab, as regards its habits, alternative host plants and characters of the cotton plant which determine resistance to the pest.

It is reported that jassid attack during the year under report was severe and that the observations on the resistance of varieties indicated that 124F was the most susceptible and the three selections from 289F/43, viz., 233F, 234F and 238 F the most highly resistant. In an experiment designed to study the influence of agronomic factors on jassid population, it was found that wide spacing, late sowing and increase in the number of irrigations resulted in an increase in the population of the pest. Among the morphological characters, the dominant ones which determined the intensity of the attack were toughness of the leaf-veins and density of hairiness of the leaves. It is stated that toughness of the veins has been found to be positively correlated with hairiness and negatively with jassid population. In a late sown crop, the leaves of the plant tended to become succulent and develop fewer hairs than in an early sown crop; this is said to explain why late sowings suffer from severe infestation. The study of the effect of selenium on the mortality of jassid

showed that even a minimum dose of 4 lbs. per acre, added to the soil prior to sowing, proved fatal to the pest. *Bhindi*, *Hibiscus mutabilis*, hollyhock, luffa, tomato and *gurhal* were found to be the most favoured hosts of the pest. The collection of jassids by the use of light traps showed that large numbers were attracted during the period—mid-June to mid-September; no jassids were entrapped after the 17th November.

### CENTRAL PROVINCES AND BERAR.

**Central Provinces and Berar Cotton Breeding Scheme.**—The Central Provinces and Berar Cotton Breeding Scheme was sanctioned by the Committee for a period of five years with effect from the 1st April, 1939, and replaced the Central Provinces Botanical Scheme which terminated on the 31st March, 1939. The object of this scheme is to evolve, by selection or hybridisation, suitable new strains of cotton which can compete successfully with the local *Oomras* in point of ginning outturn and yield and which, at the same time, possess a staple capable of spinning between 20s and 25s highest standard warp counts. The scheme is worked at Nagpur and at Akola, to suit the special requirements of the Central Provinces and Berar, respectively.

The Central Provinces Cotton Breeding Scheme is concerned with the breeding of improved strains of cotton suitable for Nagpur, Wardha, Chanda and parts of Chhindwara districts and capable of replacing the ordinary short staple mixed cotton of these areas. The scheme at Akola is concerned with the production of high-yielding superior strains of cotton suitable for the Berars and possessing a staple of at least  $\frac{3}{8}$ ", with the softness, colour and strength of V. 434 and a ginning percentage above 33. Breeding of high ginning new strains of *Buri* cotton for the Burhanpur *tahsil* also forms part of this scheme.

It is stated that V. 434 was grown during the year over an area of 5,32,564 acres in the Central Provinces and Berar, against 6,61,904 acres in 1942-43. The area under *Jarila* was 1,348,304 acres, compared with 1,368,048 in 1942-43; *Buri* 107 occupied some 45,000 acres in the Burhanpur *tahsil*. Yield trials were carried out with H. 415, H. 420, V. 434, *Jarila* and local *Jadi* in a number of representative localities in the Central Provinces and Berar; the results showed that, in the Central Provinces, H. 415 was more promising than the others. *Jarila* is stated to have proved a poor yielder; in Berar, however, in the majority of the trials, *Jarila* was found to be leading. As regards

quality of lint, the new strains—H. 420 and H. 415—are stated to have been found capable of spinning 32s and 27s highest standard warp counts, respectively; against 30s of V. 434 and *Jarila*. It is now proposed to undertake extensive trials in a number of localities in the Central Provinces and Berar to finally decide whether H. 420 should be given out for distribution.

In the preliminary yield test carried out with seven American cottons, the differences in yield due to varieties were insignificant. Judging, however, from the comparative yields and ginning percentage of the types, the new strain B. 103-927 is considered promising. *Buri* 107, which is very popular in the Burhanpur *tahsil*, is said to have spread to certain parts of Berar also. Its average yield per acre on the Akola farm was 711 lbs. and its lint is adjudged suitable for spinning 38s H. S. W.C. against 36s of *Buri* 103.

#### MADRAS.

(a) **Pempherus Scheme.**—This scheme as originally sanctioned and started in 1931 consisted of two investigations, one for the cotton stem weevil (*Pempherulus affinis*), and the other for the evolution of a strain in *Karunganni* cotton, resistant to the harmful effects of February rains. The second investigation was terminated in 1938, as the experimental work had been brought to a stage when further work could be continued by the Agricultural Department itself. The problem of the control of the cotton stem weevil was pursued in three directions, botanical, biochemical and entomological. In 1938, when the work was reviewed, it was felt that the latter two aspects could be stopped and the former one, *i.e.*, the botanical aspect, could be pursued as indications were obtained to the effect that quicker and more tangible results could be secured by concentrating attention on the breeding side. The scheme terminated on the 30th April, 1943.

The most important result of the work done on the scheme is the isolation of four biotypes, *viz.*, X 102-2-4, X 108-4-1, X 82-1-5 and I-37-1-2, with lower mortality and higher yields than the standard strain Co.2. Their defects, however, are a coarser lint and a longer maturity period by one week than Co.2. Work to remedy these has been undertaken by the Provincial Department of Agriculture.

(b) **Scheme for Improvement of Mungari Cotton in Madras Province.**—

This scheme was sanctioned by the Committee in 1937 and has for its object the evolution of strains suitable to the red soils and combining the quality of

the *Westerns* with the yield of *Mungari*, to replace the inferior *Mungari*, the existence of which affords opportunities for mixing, with the result that the better cottons of the tract fail to get their proper value. On the black soils of Anantapur, Bellary and Kurnool districts of the Madras Province, cottons commercially known as *Westerns* and *Northerns* are grown. These are medium staple varieties, capable of spinning 24s to 32s. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of *Mungari*, which is a coarse, short staple variety, similar to *Bengals*, and not fit to spin more than 8s or 10s. The co-existence of these widely different varieties in the same tract favours undesirable mixing, with the result that the better cottons suffer in value. It is to overcome this difficulty that the *Mungari* scheme was started.

During the year under review, yield trials were conducted with 25 strains, 8 of which were from the previous year's tests, and 17 new selections, in replicated randomised blocks on red and light black soil areas at Adoni. Of these, 7 strains, *viz.*, V. 434, 6042, 883, 1595, 1585, 881F and 1127C, were on a par in respect of yield with the local *Mungari* on both types of soil. They possessed good staple and were high ginners but, with the exception of V.434, they were all late maturing and, therefore, were not considered suitable for the *Mungari* area. H.1, which equalled the local in respect of yield in the late sowings of the previous year, failed to keep up this level when planted early.

District trials were carried out at 9 centres in three districts—Anantapur, Bellary and Kurnool; *Jarila* and P. 710 were found to be the best and most consistent in their behaviour. It is stated that examination of the previous yield data from varietal trials on cultivators' fields indicated that among the early medium staple types, V. 434, P. 710 and *Jarila* were as good as the short staple local; the American varieties were generally good in this respect in Anantapur and Kurnool districts. Dharwar-American was cultivated on fairly extensive areas of red soil in Anantapur district. Umri-Bani-believed to be G.6—has been observed to be spreading in the *Mungari* area of Kurnool district. It is proposed to confine further village trials to early maturing types like P. 710, *Jarila*, Umri-Bani and selected American types.

Of the 355 hybrid cultures tested in progeny row tests, 4 sibs derived from crosses involving P. 26H, P. 710, *Jarila* and M. 274 were found to combine yield, medium staple, high ginning and early maturing habit.

A study of varietal resistance to stenosis in all available *arboreum* and *herbaceum* cottons revealed that only two varieties—G. 4M. 11 and G. 9—were consistently high yielding and resistant to the disease. The cultivation of V. 434 and Co.4 as a mixed crop is stated to have had no effect on the incidence of stenosis, while there was progressive reduction in yield with the increase in the proportion of the American component, Co.4. In another experiment, the effects of spacing and time of sowing on the yield, incidence of stenosis and earliness were studied. The results showed that stenosis was not influenced by the time of sowing, but the yield was significantly lowered in late sowings. Further trial with cucumber belt as a measure of control against the red hairy caterpillar indicated that it can be used as a trap crop.

(c) **Scheme for Improvement of Cocanadas cotton in Madras Province.**—This scheme was sanctioned by the Committee in November 1938, for a period of five years. The work was started from 1st February, 1940. The object of the scheme is to improve the yield and ginning percentage of Cocanadas cotton, preserving at the same time the light pinkish colour of its lint owing to which it is in great demand for the manufacture of dyed yarns.

As the Cocanadas cotton is cultivated on both black and red soils, arrangements were made to sow the seed material at two places, *viz.*, at Narasaraopet to represent the red soils, and at the Agricultural Research Station, Guntur, for black soils.

Colour improvement being one of the objectives of the scheme, greater attention was paid to investigate the limits of variation in the different standard lint colour grades. Seeds of plants representing five standard grades were sown in six agricultural research stations. When the *kapas* of each plant was analysed, it was observed that grades 2 and 3 were not different from one another. Grades 4 and 5 were likewise similar. All the above four grades showed dilution in colour, the dilution being greater at Coimbatore than at other places. It was further noticed that the colour was not influenced by the time of sowing and that wide variations were present in the colour of the lint produced on the same plant even after removing the effect of exposure. Studies of the effect of exposure showed that all grades except No. 1 deepened in colour within certain limits peculiar to each grade. It was clear from the observations that the standard grades needed regrouping based on the ranges of variation in each, and that the upper limit of improvement of lint colour in Cocanadas cotton by the method of single plant selection could only be

grade 3. Further intensification in colour is possible only by crossing it with imported varieties. It is stated that amongst the Asiatic cottons the highest grade of lint recorded so far was 5, while in the Americans the depth reached grade 7. Arrangements were made to cross the standard strain in the Cocanadas variety, viz.,  $\times 20$  with higher grades up to 5. Besides, a Cambodia strain having lint of grade 1 was crossed with cottons of grade 6 and 7 with the object of evolving a type of American cotton suited to the red soils of the tract. The studies also indicated that it would be necessary to determine whether the lint colour standards used by the trade were the result of genetic or environmental factors. Such a clarification would be necessary since, in case the former set of factors was found responsible for deeper colour, it will not be possible to combine lint length and colour owing to the negative correlation existing between them.

During the year under report, 178 cultures comprising selections from various bulks and derivatives from intervarietal crosses, possessing colour grade 3, were tried in replicated row tests, using  $\times 20$  as control. Twenty one progenies recorded yields significantly better than the control, but, of these, only ten combined the desirable economic characters. Four promising selections carried forward from the previous season, viz., 123, 129, 805 and 1626, were compared against  $\times 20$  and local bulk in large plots at Narasaraopet and Gurzala. Selection 805 appeared to be the best.

It was found that coloured types were generally coarser and less strong than the white selections. In the preliminary tests conducted at the Committee's Technological Laboratory, Matunga, with two direct dyes, no relationship between depth of colour and dye-absorption could be found.

The improved strain  $\times 20$  is reported suitable for cultivation in the Red Rajamundry and Red Northern Zones but not in the Chinnapatti area.

New crosses were made to synthesise colour and staple and their first generation was raised at Sriyilliputtur to effect a saving of time.

#### UNITED PROVINCES.

The United Provinces Botanical Scheme.—This scheme was sanctioned by the Committee in 1938. The object of the scheme is (1) to develop improved strains of *Bengals* cottons, for the rain-fed and irrigated tracts of the United Provinces, from the material collected in the course of the survey of cottons in Rohilkhand and Bundelkhand, (2) to test the suitability of the

United Provinces improved cottons—C.402, C.520 and Perso-American—against local and other promising introductions, both on Government farms and cultivators' fields, and (3) to investigate the possibilities of American cottons under the United Provinces conditions. The scheme terminated on 31st March, 1944.

The area under cotton in the United Provinces, during the year under review, was 363,932 acres against 311,486 acres in 1942-43 and the total production was 1,10,000 bales compared with 92,000 bales last year.

During the year, seven strains, including A and D isolated from the original survey collections were compared with C. 520/2 (a sub-strain of C. 520) and four survey strains with C. 520 as control, both under irrigated and unirrigated conditions, at a number of Government farms in the province. The results at five unirrigated centres have shown that strain D has given the highest yield followed by C. 520/2, thus confirming the superiority of this strain over the others for the fifth year in succession. The results at eight irrigated centres have shown that C. 520/2 was highest in respect of yield, followed by C. 520 and D.

In the preliminary and bulk trials, most of the survey strains tested compared favourably with C.520 in yield and quality; strains 35/1 and 35/3 were outstanding at all the research stations.

In the experiments for comparing the performance of the Punjab-American cottons, *viz.*, 100F, LSS, 83F, 289F, N15 and Perso-American with C. 520 at seven centres in the province, it was observed that the difference in yield amongst the strains was significant at all the centres. 100F out-yielded significantly all other American types at Raya and Meerut, and LSS at Kalai. At Cawnpore, while LSS did not differ significantly from Perso-American and 289F, it gave a significantly better yield than all the remaining American cottons and C. 520. At Belatal, under rain-fed conditions, strains B<sub>2</sub> and B<sub>7</sub>—selections from Perso-American—were found significantly superior to the parent strain, Perso-American, B<sub>2</sub> recording a yield of 738 lbs. against 400 lbs. of the control.

#### BENGAL.

(a) Scheme for cultivation of long staple cotton in Bengal.—The object of this scheme is to test the possibilities of introducing long staple cottons in the well drained highland soils of Bengal. It is financed jointly on a 50:50 basis, by the Provincial Government and the Bengal Millowners' Association

and it came into operation in April 1938. In January 1941, the Indian Central Cotton Committee agreed to provide a supervising officer for the scheme for a period of two years. In addition to supervising cotton cultivation work at the different centres, the officer will also undertake botanical work.

During the year under report, the season is stated to have been very unfavourable for cotton. Varietal yield tests and sowing-date-cum-spacing experiments were laid both at the Dacca and Midnapur Farms besides in two more centres; thus there were five centres in all, one in the district of Dacca, one in Rangpur, two in Murshidabad and one in Nadia. The experiments in the district farms proved a failure. At Dacca they were practically washed away by the heavy July-August rains, and, at Midnapur labour difficulties and abnormally dry weather conditions during the bolling period made the result very poor. Of the five centres, the one in the Dacca district met the same fate as the experiments in the Dacca farm, conditions being more or less identical in the two places. The centres in the Rangpur and the Nadia districts again maintained their record of high yield. The yields at the two centres in the Murshidabad district were not satisfactory. Of the varieties, Dacca Parbhani, Dacca *Buri* and Dacca Kampala proved to be better than the rest. On an average about 740 lbs. of seed cotton per acre have been obtained in some places.

### BALUCHISTAN.

**Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan.**—The scheme for the control of Black-headed Cricket in Baluchistan was originally sanctioned in August 1939, for a period of two years, to run concurrently and in co-ordination with the scheme for investigation into the Black-headed Cricket in Sind sanctioned by the Committee in January 1938. The combined scheme for the co-ordination of work in progress in Sind and Baluchistan was sanctioned in January 1941, for a period of three years from the 1st April, 1941. In January 1944, the scheme was extended for a further period of one year from the 1st April, 1944. The objects of the scheme are: (1) to study the life cycle and seasonal behaviour of the pest with special reference to the breeding places in both the provinces, (2) to investigate suitable control measures, special attention being paid to the recent literature on anti-locust measures, and (3) to control and prevent the pest by means of poison-baits.

The control work in Baluchistan consisted in preventing the migration of the pest from the strip of land known as "Pat" along the Khirtar canal by destroying the insects at the canal bridges.

During the year under review, the control work in the Usta *tehsil* in Baluchistan was carried out on the lines of previous years. The authorities of the Kalat State have for the first time undertaken control measures against the pest in their area. Owing partly to floods and partly to the control operations in Kachhi area, there was a decrease in the population of the migrating crickets.

### HYDERABAD.

(a) Botanical Research Scheme.—The object of this scheme, which was sanctioned by the Committee in 1929, is to study the several varieties of cotton grown in Hyderabad and to secure from them high ginning medium staple types, to replace the existing varieties in the different parts of the State. A large number of improved pure strains has been evolved under the scheme, amongst which *Gaorani* 6 is the most outstanding. The scheme was extended in July 1938, for a further period of five years from the 1st April, 1939.

The headquarters of the scheme were transferred during the year to the new Cotton Research Station at Nanded. The work in connection with the production of wilt-resistant types of *Gaorani* is, however, being continued at Parbhani, as part of the newly sanctioned scheme for the improvement of *Oomras* cotton.

During the year under report, varietal trials were conducted at Nanded, Madhol and Latur with three or four improved *Gaorani* strains against local and *Gaorani* 6 as controls. *Gaorani* 6-E-3 proved to be superior in respect of lint yield, spinning capacity and acre cash value at the first two places. *Gaorani* 12F-2 is reported to be a good all-round type for the Latur area. 262 single plant selections were tested at the 3 centres mentioned above and 30 promising cultures have been retained for further study. Of these, 4 progenies which are derivatives of G. 4M-11 are said to be particularly encouraging owing to their early maturing habit. District trials were conducted with 3 or 4 improved varieties at 25 places in the *Gaorani* and Tellingana areas. The trials at 2 places in each of these areas proved failures. The results at the remaining 21 centres indicated that G. 6E-3 and G. 12F-2 are suited to the northern and southern sections of the *Gaorani* area. The results

of the trials in Telingana area were not conclusive. As a result of the various agronomic experiments conducted during the year, it was observed that none of the variations from the local practice in regard to the frequency and timings of the preparatory tillage and post sowing operations brought about an increase in yield. The effects of weeding were significant and plots weeded twice gave a significantly higher yield than those weeded once. In the manurial experiments, a dose of 20 lbs. of N per acre was found to be sufficient to improve the yield of cotton. Advantage of an additional dose was considered doubtful. Ammonium sulphate was found to be an efficient source of nitrogen only for well-drained light soils. For heavy black cotton soils, groundnut cake was considered more useful, its cheapness was also a factor in its favour.

(b) **Scheme for improvement of cotton of Oomras tract in Hyderabad State.**—This scheme was sanctioned by the Committee in August 1940, for a period of five years, and it came into operation on the 8th October, 1941. The object of the scheme is to improve the cotton of the 'Oomras' tract of the State. This is sought to be achieved.

- (1) by the production of an early maturing and high ginning strain of *Gaorani* 12F, for the eastern half of Parbhani District and Hadgaon *taluka* of Nanded district,
- (2) by the production of an early maturing and high ginning strain of Parbhani-American, for the *Ghat* area of Aurangabad District,
- (3) by evolving a wilt resistant strain from G. 16C, by crossing it with New Million Dollar, for the western half of Parbhani District and part of Bhir District,
- (4) by breeding a high ginning, quick maturing, wilt and drought resistant variety capable of spinning 12-16s highest standard warp counts, for the southern half of Aurangabad District.

During the year under review, *Gaorani* 12F2 maintained its performance of the previous year in respect of earliness, spinning capacity and wilt-resistance. In the district trials, this variety was found to be superior to the two controls, local and *Jarila*, as regards yield of seed cotton at Jalna and Pimpalwadi, but equal to them in this respect at Parbhani. It is considered that this strain would be ideal for the *Oomras* tract, if its ginning outturn were improved. Efforts to remedy this defect are in progress. *Indicum* 17 is another promising strain combining high yield and high ginning outturn with wilt-resistance. In the preliminary wilt experiments, some 749 selec-

tions were tested in single rows in the wilt-sick plots. Thirteen progenies showed no deaths, 26 had a mortality ranging from 1 to 5% and 66 from 5 to 10% against 40 to 85% and 33 to 95% in the case of the respective controls. Of the 13 progenies mentioned above, 2 were derived from parents which recorded nil mortality in the previous year. Fifty-six wilt-resistant strains were tested for yield in wilt free soil against Parbhani local, *Gaorani* 16C and *Jarila*. Of these, seven strains gave significantly higher yields than all the three controls. A sib of *Gaorani* 4, viz., II-41-6634, is reported to combine a high degree of wilt-resistance with significant yield during the past two seasons. During the year, Parbhani American, was cultivated over an area of 9,600 acres in the *ghat* area\* of Aurangabad district, the total production being some 910 bales. This fetched a premium of O.S. Rs. 10-8 per *palla* of 120 seers over local *Jarila* at Aurangabad. The extra income derived by the growers of this variety is said to have amounted to Rs. 19,215. Amongst the new strains, L-II-40-591, L-II-40-593, L-II-40-594 and L-II-38-255-41, which were mentioned as being promising last year, have maintained their qualities of earliness, high ginning and good yield both at Parbhani and Sillod in the *ghat* area.

The work in connection with the production of wilt resistant types of *Gaorani* was carried out as in previous years at Poona under the Cotton Wilt Breeding Scheme from the material available at Parbhani. Out of the five promising wilt-resistant *Gaorani* strains reported last year, three did well during the season. In the preliminary test conducted on fresh *Gaorani* material, two strains are reported to have shown a high degree of resistance.

(c) Scheme for improvement of *Kumpta* cotton.—This scheme was sanctioned for a period of five years and it came into operation in November 1937. The object of the scheme is to develop certain strains of *Kumpta* cotton bred from the local variety of Raichur which, in the preliminary tests conducted at the Government Experimental Farm, Raichur, prior to the starting of the scheme, had given better yields of both seed-cotton and lint than either the local variety or improved *Jayawant*. After two years' work, the strain, Raichur-*Kumpta* 15 was selected for further development. It was sown in 1939-40 on an area of about 40 acres in a cultivator's field, and an average yield of 293 lbs. of seed cotton per acre was obtained. Though this yield was a good deal better than the average of the local variety in the adjoining fields, the Committee, at its meeting held in August 1940, suggested that this

strain should not be distributed on account of its susceptibility to wilt, and that strain R.K. 19 should be tested instead and attempts made at once to produce a wilt-resistant Kumpta type.

The cotton crop at Raichur and Hunsihalhuda during the year was satisfactory. Three Raichur *Kumpta* strains, viz., R.K.19, R.K.25 and R. II-38-673, a new *Kumpta* selection, were tested against Hagari and the local; the new strain gave significantly better yield than the other types. The wilt test conducted at Hunsihalhuda showed that all the new *Kumpta* strains of the R. II series were significantly superior to the controls—R.K.25 and local—in respect of wilt resistance. Of the 660 single plants tested in the wilt-sick plots at the same place, 34 resistant and high yielding progenies have been retained for further study. In the district trial at Karatgi, R.K.19 is stated to have given the same yield as Hagari and local *Jayawant* used as checks.

None of the *Kumpta* progenies tested for wilt resistance at Poona were promising.

#### BARODA.

(a) **Root Rot Scheme.**—This scheme, which has for its object the study of the root rot disease of cotton in Baroda and the production of strains resistant to it, has been in operation since February 1932. The scheme terminated on the 31st May, 1943.

No positive results of value have come out of the investigation. The testing for resistance, of a large number of varieties, both imported and indigenous, showed that the cotton selections obtained from the village *Karkhadi* were the only promising cultures resistant to root rot under field conditions. The *Karkhadi* selections, however, though distinctly less susceptible than Broach 9, gave a spinning performance of only about 10s, against 24s of B.9. The failure to obtain a 100% resistant strain of *Karkhadi* is attributed to the difficulty in sifting the truly resistant from the escapes in the infested plots, where mortality occurred in patches. Progenies of *Karkhadi* cultures grown in glass-house did not prove to be any better than the field selections.

(b) **Scheme for improvement of Mathio cotton at Amreli.**—This scheme has for its object the improvement of *Mathio* mixture in respect of yield, ginning percentage and quality and the trial at Amreli of the early strains

of Wagad evolved at Viramgam with a view to replacing, if possible, inferior *Mathio* by early *herbaceums*. The scheme came into operation in June 1937.

During the year under review, varietal trials were conducted with four types—S. 20-2-12, S. 21-2, S. 24-2 and S. 31—at Amreli and with the last three types at four other centres in Kathiawar, viz., Ingorala, Damnagar, Palitana and Jamnagar. C. 520 and local *Mathio* were introduced as controls. None of the types gave significantly better yield than the controls. S. 24-2 and S. 31 are, however, considered worthy of further trial as they spin 18s and 34s highest standard warp counts against 13s and 14s of *Mathio* and C. 520, respectively. The performance of S. 31 has been consistently good during the past two years and it is stated that the Baroda Department of Agriculture has decided to multiply its seed over an area of 12 acres next year under the name of 'Pratap.' Nineteen families, 3 selected from *Mathio* and 16 derived from the F3 progenies of two crosses—S.5×*Jarila* and S. 6×*Jarila*—were tested against local *Mathio* and C. 520 in a replicated progeny trial; besides S. 31 and S. 24-2, six other families appeared to have combined good yield with desirable economic characters and these have, therefore, been retained for further study. S. 31 and C. 520 were crossed, during the year, with the object of transferring the hardiness of the latter to the former.

#### BIKANER.

**Bengals Cotton Improvement Scheme.**—The opening of the Gang Canal under the Sutlej Valley Scheme resulted in the colonization of a new and virgin area, known as the Gang Canal area, with immigrant peasants, mostly from the Punjab, who were accustomed to the cultivation of the Punjab *desi* and American types of cotton. These cultivators found it difficult to successfully cultivate cotton under local conditions, evidently because the new environment was not quite the same as they were accustomed to in the Punjab. This scheme was, therefore, started in January 1931, for the purpose of studying the local problems of the agriculturist and for obtaining by selection and hybridization one or more superior types of cotton suitable to the locality. The poor stand of the cotton crop under the Ganganagar conditions was reported to be due to (1) poor germination of seed and (2) mortality of the plants at all stages of growth due, chiefly, to whiteant attack. Until 1934, the botanical work was confined to the testing out of a large number of outside varieties, both *desi* and American. After that year, however, extensive survey of the Rajputana tract was undertaken to collect

breeding material, at the same time, extensive trials of the few selected cottons from outside were continued to test their suitability to the tract. Agronomic work was pursued intensively from the beginning of the scheme. At the end of the first five years, it was found that C. 520 was the most profitable cotton to grow in the tract and that the American cottons were generally unsuitable because of their low yield and susceptibility to disease. Also the staple of Punjab-American cottons was found to deteriorate both in length and strength when grown under Ganganagar conditions. A large amount of data and useful information regarding sowing times, seed rate, frequency and distribution of irrigation, optimum spacing for the *desi* and American cottons, rotation and manuring have been collected. Since 1934, greater attention has been paid to selection and breeding problems. The scheme terminated on the 31st March, 1944.

Arrangements have been made for the multiplication of the seed of R. 18 (re-named Ganganagar 1), a new *desi* strain, evolved under the scheme. This variety is similar to W. 520 (the *desi* strain originally recommended for the colony) in quality, but has 4 to 5% higher ginning percentage and 10% higher yield. Amongst the American varieties tried, 199F was found to be outstanding in respect of lint yield. Owing to its superiority in ginning outturn, it gave 100 lbs. more lint than 289F/43, the type recommended for the tract. It is stated that 199F should prove a good substitute for 289F/43 for the colony if its performance continues to be as good as obtained in the trials conducted so far.

#### MYSORE.

**Mysore (Doddahathi) Cotton Scheme.**—This scheme, which was sanctioned in 1935, is concerned with the breeding, from the local *Doddahathi* or American cotton, of suitable types, resistant to "red leaf" disease which stands in the way of the expansion of this crop in the Irwin Canal area in Mysore State.

During the year under report, the new Mysore-American varieties, M. A. V. to M. A. IX, were tested in a varietal-seasonal trial against Co.4 at the Irwin Canal, Babbur and Hebbal farms. Owing to unfavourable seasonal conditions, the yields obtained at Hebbal were low. The sowings at the Irwin Canal farm were done in the months of January, February, March and April and those at the Babbur Farm, in the months of July and August. At the Irwin Canal farm M.A.V. gave the highest yields for the February and March sowings and M.A. IX and Co.4 for the January and April sowings, respectively.

At the Babbur farm, M.A.VI not only gave higher yield but also matured earlier by 1 to 2 weeks than the other strains under trial. A similar varietal-seasonal trial was undertaken at the Irwin Canal farm with five varieties of Egyptians, viz., Giza 7, Giza 12, Sakel, Marrad and Ashmoni. For these cottons, October-February appeared to be the most favourable period for sowing in this tract. Giza 7 and Giza 12 were found to be better than the others. On the Babbur farm, the manurial and seasonal trials with Giza 7 and Giza 12, indicated that sowings done during July and August, with groundnut cake applied at four different periods of plant growth, are the best. Preliminary trials of S . I. V. 136 showed that the October-February sowings produce healthy vigorous plants giving better yields than sowings in other months. Spacing wider than  $2\text{-}1/2' \times 3'$  was not found advantageous under Mysore conditions. Further study on the X-ray treated material was continued. It was observed that only two selections in Co. 1267, three in Co.3 and two in M.A. II possess a staple of 1 to 2 mm. more than the controls. M.A. IX (irradiated Co.2), which has been found to combine drought resistance, high yield and long lint, is expected to replace M.A. II in Banavar and parts of Davangere.

During the season pure seed of M.A. V was distributed to cover an area of 45 acres in the Irwin Canal tract, 30 acres in Banawar area and 25 acres in Chitaldrug area. In addition, pure seed of M.A. VI, sufficient to cover an area of 6 acres, was distributed in the Babbur area of the Chitaldrug district.

---

## CHAPTER V.

### SEED DISTRIBUTION AND EXTENSION SCHEMES.

From the point of view of the grower, special significance attaches to the Seed Distribution and Extension Schemes of the Committee, as they form the real link between the Experiment Station and the cultivator. The total amount so far spent by the Committee on such schemes amounts to some Rs. 16 lakhs. During the period under review, there were twenty one seed distribution and extension schemes in operation in the various cotton growing provinces and States ; a brief report on the working of these schemes is given below :—

#### BOMBAY.

(a) **Surat Seed Distribution Scheme.**—This scheme was first sanctioned in November 1929 for a period of two years. In December 1931, it was extended for another two years, pending the final decision of the Committee on the cotton policy to be adopted in the Surat area. In January 1934, after a thorough examination of the relative merits of 1A and 1027 A.L.F., the Committee decided in favour of the latter and extended the scheme for five years for the distribution of 1027 A.L.F. seed in the Surat area. In November 1938, the scheme was extended for a further period of one year, in August 1939, for three years, and again in July 1942, for a period of two years from the 1st April, 1943.

During the year under review, the Agricultural Department controlled a seed multiplication area of 21,307 acres of pure 1027 A.L.F. (including 686 acres grown with farm pedigree seed) against 30,731 acres (including 757 acres grown with farm pedigree seed) last year. An area of 15,131 acres under *Suyog* (Seg. 8-1) was also controlled. It is reported that as *Suyog* seed found favour with the grower in Surat District, the demand for 1027 A.L.F. seed declined. The Agricultural Department handled 10,33,972 lbs. of seed, of which 7,10,515 lbs. were distributed in British areas and 3,23,457 lbs. supplied to States, the corresponding figures for the previous year being 16,37,476 lbs., of which 11,86,636 lbs. were distributed in British areas and 4,50,840 lbs. in the States.

The Scheme for grading and marking of 1027 A.L.F. was in operation during the year under review ; the Agmark labels were given to 1027 A.L.F.

and *Suyog* cottons of guaranteed purity. 240 bales of Agmark (red label) and 6,925 bales of Agmark (black label) of 1027 A.L.F. cotton and 105 bales of Agmark (red label) and 5,075 bales of Agmark (black label) of *Suyog* cotton were pressed and disposed of at premiums varying from Rs. 6 to Rs. 26 for 1027 A.L.F. and from Rs. 4-8 to Rs. 25 for *Suyog*. The corresponding premiums obtained last year for these cottons were from Rs. 10 to Rs. 25 and Rs. 13 to Rs. 20 respectively.

(b) **Scheme for selection 1A Cotton.**—This scheme was sanctioned in November 1938, for a period of three years, subject to the condition that it should come into operation only if and after the Government of Bombay had isolated Olpad and part of Chorasi Taluka, and that it should continue only so long as this area was effectively isolated. On the fulfilment of this condition, the scheme came into operation in February 1940. In July 1942, it was extended for a further period of two years and two months. The objects of the scheme are (1) to confine the growth of 1A, as far as possible, to Olpad Taluka, by restricting the movement of cotton and cotton seed out of that area and by making provision for pure seed of Selection 1A for cultivation within the Taluka area, and (2) to check the cultivation of 1A in the rest of the Surat area by arranging for the distribution of adequate quantities of pure seed of 1027 A.L.F. and by intensive propaganda against Selection 1A.

During the year under review, four check stations (including one permanent) were established on the Tapti River from 10th February, 1944, to prevent illicit import of cotton by road from Olpad to Surat protected area. Ginned cotton, however, was allowed to be transported, under licence, to Surat for being pressed and marked 'Olpad' before sale, this work being supervised by the Cotton Assistant, Surat. 13,926 half-pressed bales were allowed to be imported into Surat under licence and were pressed into 23,272 full pressed bales.

An analysis of the prices obtained for 1027 A.L.F. and Selection 1A showed that pure 1027 A.L.F. realised Rs. 15 over local Surti and Rs. 14 over Selection 1A marked 'Olpad.' The position of 1027 A.L.F. is reported to be in no way better than it was in previous years. With the introduction of the improved strain '*Suyog*', which combines the good qualities of both 1A and 1027 A.L.F., the opposition of the Co-operative Cotton Sale Societies has disappeared and they are reported to have purchased the seed of the new strain for sowing in the coming season. As the question of the comparative merits of the two varieties 1A and 1027 A.L.F., has ceased to be a problem with the introduction of '*Suyog*', further continuance of the scheme is considered unnecessary.

(c) **Jarila Seed Distribution and Extension Scheme.**—This Scheme was sanctioned in March 1937, for a period of ten months in the first instance. It was extended in January 1938, for a period of one year, in November 1938, for three years and again in July 1941, for a further period of five years. Its original object was to replace Banilla in the Khandesh tract with *Jarila*, which is wilt resistant, over an area of some 1,55,000 acres. In view, however, of the general suitability of *Jarila* for the Khandesh area, the expansion now aimed at is 8,00,000 acres, out of a total cotton area of 11,00,000.

The scheme is operated in five stages of which the first two are the Government Farms at Jalgaon and Bhadgaon. The seed produced at the Jalgaon Farm is used for further multiplication in the wilt affected regions, and that at Bhadgaon Farm for the wilt free zone of Khandesh. In January 1943, the Committee approved of the proposal to close down the seed farm at Bhadgaon and to transfer the seed multiplication work being done there to the Jalgaon Farm and the Mamurabad village adjoining it.

*Stages I and II.*—The selfed seed from the previous year was sown on an area of 32 acres on the farm and gave 10,000 lbs. of seed for multiplication in stage II during 1944-45. The quantity of seed produced from about 111 acres of tenants' holdings at Mamurabad (near Jalgaon farm) was 27,460 lbs. which was handed over to the Cotton Superintendent, Jalgaon, for further multiplication. All the cotton under the two stages was ginned in the farm gin and the lint sold by open bidding at Jalgaon; it fetched Rs. 212 per *boja*, i.e., Rs. 480 per candy F.O.R. Bombay, against the Bombay *Jarila* quotation of Rs. 486 per candy on that day.

*Stages III and IV.*—During the year under report, 65,56,940 lbs. of *Jarila* seed were distributed by the Department and approved stockists over a controlled area of 3,80,079 acres (including a reserved area of 1,04,463 acres). This falls short of the stipulated area of 3,92,000 acres by 11,921 acres and is attributed to (1) the "Grow More Food Crops Campaign" and (2) stock of about 5000 bags of seed remaining unsold. The total area under *Jarila* cotton (including natural spread) is estimated at 8,38,548 acres against 7,71,339 acres last year.

The growers who sold their produce in the village markets realised on an average Rs. 14-7-0 per *maund*. The auctions organised by the Co-operative Societies during the year were not as successful as before, on account of absence of transport facilities, seasonal inferior quality and lower demand.

They, however, sold, during the year, 2,149 bales of *Jarila* at prices varying from Rs. 372 to Rs. 480 per *candy* against the Bombay price of Rs. 438 to Rs. 487. On an average, *Jarila* is stated to have fetched Rs. 4-10-0 more per *maund* of *kapas* than the local. The gross extra income realised by cultivators of *Jarila* is estimated at Rs. 1,11,10,761.

For sowing in 1944-45, the Agricultural Department and approved stockists have stocked 81,00,820 lbs. of seed, sufficient to cover 450,000 acres.

The Bombay Government have applied the Cotton Control Act to the East Khandesh district from 1st April, 1944, and have fixed *Jarila* as the prescribed variety for the tract. Arrangements are stated to be in progress for the application of the Act to West Khandesh district (excluding Taloda, Nandurbar and Nawapur *talukas*) and to the *talukas* of Baglan, Nandgaon, Malegaon, Yeola and Kalwan of the Nasik district. Further arrangements are also in progress to carry out a survey of the areas to which the Cotton Control Act has been applied, to establish check stations under the Cotton Transport Act and to prohibit imports of cotton except under a licence.

(d) **Deccan Canals (Jarila) Seed Distribution Scheme.**—This scheme was sanctioned in January 1934, for a period of five years and came into operation in April 1934. In August 1939, a further extension for five years was sanctioned. At the same time the venue of seed multiplication was also changed from Kopergaon and organised on new lines in Baramati tract.

The original object of the scheme was to distribute seed of Banilla to enhance general cotton yields and to improve the quality of the cotton in the Deccan Canals tract in the Poona, Sholapur and Ahmednagar districts. In view, however, of the susceptibility of Banilla to the wilt disease, the Committee at its meeting held in January 1942 approved of the proposal to replace Banilla by *Jarila*, which gives a bigger return per acre and is, at the same time, capable of resisting wilt to a great extent.

During the year under report, the scheme was kept in abeyance as irrigation under Deccan Canals was being regulated with a view to encouraging the cultivation of food crops and to discourage the growing of cotton.

(e) **B. D. 8 Seed Distribution Scheme.**—This scheme is concerned with (1) the marketing of pure B. D.8 cotton in order to secure a price commensurate with its quality, (2) the multiplication of pure seed for further extension and (3) propaganda work for increasing the production of pure B. D.8. It was sanctioned in August 1935, for a period of three years and came into

operation in December 1935 ; in July 1938, it was extended for a period of five years. The scheme terminated on the 30th November, 1943.

During the eight years that the scheme was in operation, the area under B. D. 8 fluctuated widely from year to year, depending upon the premium realised during the previous year. The table below shows the acreage covered and the premium obtained for this variety for the years 1935 to 1943 :—

Year.	Area under B. D. 8 in acres.	No. of F. P. bales of B. D. 8.	Base April/May.	Premium realised over Broach Local per candy.
			Rs.	Rs.
1935-36 .. ..	3024	615	180 to 210	37 to 53
1936-37 .. ..	20012	4500	226 to 250	37 to 52
1937-38 .. ..	6268*	2035	160 to 170	45 to 54
1938-39 .. ..	14294	3254	148 to 155	43 to 52
1939-40 .. ..	30951@	5374	240 to 275	43 to 52
1940-41 .. ..	9728†	691	189 to 240	85 to 132
1941-42 .. ..	13178‡	1491	150 to 220	95 to 120
1942-43 .. ..	27339	1871	440 to 640 +	145 to 225

\* Owing to difficulty in sale of seed-cotton and adverse weather condition, area dropped under B. D. 8.

@ Includes 12,715 acres controlled by the Department. † Includes, 4,156 acres controlled by the Department. The premium obtained during 1939-40 was very inadequate and hence fall in area.

‡ Includes 6,280 acres controlled by the Department.

|| Includes 5,747 acres controlled by the Department. The premium obtained for B. D. 8 cotton was most encouraging due to high demand for staple cotton and hence the increase in area.

+ Indian Cotton Contract.

Although B.D.8 possesses fine staple and is highly wilt resistant, it is not favoured by gin-owners, chiefly because of its poor ginning capacity compared with the local. In spite of its better quality, consumers in Bombay purchased B. D. 8 at the prevailing rates for Broach Local and the cultivator thus was not compensated for the 7% lower lint outturn of this cotton. These factors have necessitated its replacement by 'Vijaya' (Segregates 1-2 and 1-6) which is said to combine all the desirable economic characters, such as, high ginning percentage, good yield, superior ginning capacity and wilt resistance. The new scheme for multiplication and distribution of *Vijaya* cotton seed in Middle Gujerat was put into operation on the 1st December, 1943.

#### (1) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme.—

This scheme, which was sanctioned in August 1935, for a period of five years, replaced five seed schemes in the Southern Division of the Bombay Province, viz., the Hubli, Gadag, Athani, Haveri and Bailhongal schemes. It came into operation on the 1st June, 1936 ; in August 1940, it was extended for a period

of one year and again in July 1941, for a further period of four years from 1st June, 1942.

The original object of the scheme was to eliminate local mixtures and to extend pure *Jayawant* and Gadag No. 1 in the Southern Division of the Bombay Province, over an area of 9-1/2 lakhs acres, within a period of five years. During the extension period of the scheme, it is proposed—

- (1) to cover an additional area of 425,000 acres with *Jayawant* and 75,000 acres with Gadag No. 1 ;
- (2) to carry on intensive propaganda for the cultivation of improved cottons and to check the growing of inferior types ;
- (3) to have *Jayawant* and Gadag No. 1 pressed under departmental supervision and marketed under ' Agmark '
- (4) to make seed distribution work self-supporting by gradually reducing the subsidy on cotton distributed, until, by the 31st May, 1944, it is eliminated ; and
- (5) to entrust the work of the scheme to efficient co-operative organisations, provided the working of the scheme is not adversely affected.

The scheme is operated from eleven centres for *Jayawant*, viz., Dharwar, Hubli, Nargund, Haveri, Bailhongal, Gokak, Athani, Bagalkot, Hungund, Bijapur and Muddebihal, and from two centres for Gadag No. 1, viz., Gadag and Ron. Decentralisation is the key-note of the scheme, the idea being that no single agency should have too big an area to cover or too great a responsibility to shoulder.

During the year under report, the Department organised an area of 111,200 acres of *Jayawant* and 29,600 acres of Gadag No. 1, of which 103,274 acres and 28,475 acres, respectively, were rogued. 36,742 bags of *Jayawant* seed and 11,254 bags of Gadag No. 1 seed were distributed to cover 518,500 acres and 118,600 acres, respectively. The area under natural spread is estimated at 134,700 acres and 35,000 acres under *Jayawant* and Gadag No. 1 respectively, thus bringing the total area under *Jayawant* to 653,200 acres, and that under Gadag No. 1 to 153,600 acres.

It is stated that 26,272 *docras* of *Jayawant* and 13,217 *docras* of Gadag No. 1 were sold in auction at a premium of Rs. 12 per bag of 1,344 lbs. for *Jayawant* and of Rs. 16 for Gadag No. 1 over the *bazar* rate.

For sowing in the next season, 68,965 bags of *Jayawant* and 18,720 bags of Gadag No. 1 are proposed to be stocked; up to 31st May, 1944, 25,805 and 8,000 bags, respectively, of the two varieties were purchased for the purpose.

It is stated that since the consumers of cotton did not appear to appreciate the value of Agmarked bales for one reason or other, Agmark work was done voluntarily. Up to the end of May 1944, only 1,643 bales of *Jayawant* cotton were pressed under Agmark. The view is expressed that unless the mill-owners appreciate the value of Agmarking and are prepared to pay adequate prices for Agmarked bales, the Agmarking of cotton would not become popular.

**(g) Scheme for cultivation of 1027 A. L. F. Cotton in Nawapur Taluka.—**

This scheme was sanctioned by the Committee in January 1942, for a period of three years. It came into operation on the 4th May, 1942. The object of the scheme is to bring an area of 25,000 acres in Nawapur taluka under 1027 A.L.F. cotton.

During the year under report, 180,291 lbs. of seed of 1027 A.L.F. were distributed over an area of 14,000 acres, including a certified area of 3,277 acres. The produce was pooled and marketed by public auction at Rs. 10 per *bhar* of seed cotton over local. The growers of 1027 A.L.F. are reported to have realised a gross extra income of Rs. 1,02,375 at Rs. 7-5-0 more per acre over the local.

**(h) Scheme for multiplication and distribution of "Vijaya" cotton in Middle Gujerat.—**This scheme was sanctioned by the Committee in July 1943, for a period of five years and it came into operation on the 1st December, 1943.

The object of the scheme is to completely replace local Broach and B. D. 8 cottons by *Vijaya* cotton over an area of 5 lakhs acres in the Nerbudda-Mahi and the Mahi-Sabarmati zones of middle Gujerat.

The Agricultural Department, during the year under review, controlled a seed multiplication area of 15,257 acres (including 571 acres grown with farm pedigree seed). Out of a total quantity of 13,28,376 lbs. of *Vijaya* seed handled, 12,40,776 lbs. were distributed in British tracts and 87,600 supplied to Indian States. Owing to a serious fire accident at the Nabiput ginning centre in April 1944, 62,000 lbs. of seed under stages II and III were destroyed

and this is expected to result in a reduction in area in the coming year under stages III and IV of about 1,500 and 6,300 acres, respectively. 7,883 bales were pressed from the produce of the controlled area of which 7,358 bales were sold at Rs. 5 to Rs. 60 'off' the May Indian Cotton Contract quotation and 401 bales at a premium of Rs. 10 over *Jarila*.

(i) **Scheme for multiplication and distribution of "Wagotar" cotton in Ahmedabad district.**—This scheme was sanctioned by the Committee in July 1943, for a period of three years and 4 months. It came into operation on the 1st December, 1943.

The object of the scheme is to organise the multiplication of *Wagotar* cotton seed so as to extend this cotton over an area of 2 lakhs acres in the Wagad tract of the Ahmedabad district comprising the talukas of Viramgam, Sanand, Dholka and Dhanduka, where at present local Wagad mixture and Wagad 8 are grown.

During the year under review, 6,063 lbs of seed were distributed around four major centres in the district to cover an area of 772 acres under stages IV and V. Stages II and III were organised at Jakhvada and Shiyal, in Viramgam taluka, in an area of 10 and 221 acres, respectively. 203 *maunds* of seed of stages IV and V have been purchased by the Department for sowing 6,030 acres in 1944-45.

Agents were appointed for purchasing *Kalas* of stages IV and V in the Dholka, Sanand and Dhanduka talukas and they paid a premium of annas 2 to 3 per 40 lbs. over the prevailing market rate. About 200 *maunds* of *Kalas* of stages IV and V were sold direct by cultivators to other merchants who paid a higher premium.

#### SIND.

(a) **Seed Distribution and Extension Scheme.**—This scheme was sanctioned in December 1930, for a period of three years and came into operation in April 1931. It was extended in August 1933, for five years from the 1st April, 1934, and in November 1938, a further extension for two years was sanctioned. In August 1940, it was extended for a further period of five years from the 1st April, 1941.

The main objects of the scheme are :—

- (a) Varietal tests of improved strains—Sind American cottons.
- (b) Trials of high quality cottons—Egyptians and imported American cottons.

- (c) Demonstration of cotton cultivation on non-cotton growing areas of new barrage lands.
- (d) Seed multiplication, distribution and extension work.
- (e) Propaganda, demonstration and advisory work in connection with the extension of improved varieties of cotton and better methods of cultivation.
- (f) Assistance to cotton growers in marketing cotton.

The work on the Right Bank mainly consists of the extension of cotton cultivation, while on the Left Bank, attention is largely devoted to seed multiplication and distribution of improved varieties of cotton and the introduction of better methods of cultivation.

During the year under review, the total area under cotton in Sind (British districts) was 8,99,365 acres against 7,28,797 acres in the previous year. Owing to the 'Hur' menace and martial law, most of the cultivation was neglected or given up. The area under improved strains comprised 74.4% of the total cotton area, against 67.8% in 1942-43. The short stapled *desi* varieties are reported to have been almost completely replaced.

The new improved American type, M-4, which is superior to Sind *Sudhar* in ginning outturn and yield, is in great demand owing to its suitability for cultivation in all parts of Sind and its early maturing habit, as a result of which, it gives the bulk of its yield in the first picking and escapes bollworm and red-leaf blight attack.

The estimated area and yield per acre of the two principal improved strains in Sind and their relative acre cash values are given below :—

Name of the improved variety.	Estimated area.	Estimated yield per acre.		Estimated acre cash value.
		Acres.	Mds. Seers.	
Sind <i>Sudhar</i> .. .. .	4,20,000	9	38	213 15 0 (certified). 208 15 0 (uncertified).
M-4 .. .. .	1,95,000	10	34	230 9 0 (certified) 227 14 0 (uncertified).

The extra gross income to the growers of the above improved varieties is estimated at Rs. 2,01,80,187.

For sowing in 1944-45, 22,600 maunds of Sind *Sudhar* and 49,000 maunds of M-4 were distributed by the Department; the factories sold 25,000 maunds and 75,000 maunds, respectively, of these varieties. In addition, 10,000 maunds of seed of N.R. were also sold by the factories.

(b) **Financing of Seed Distribution.**—This scheme was sanctioned by the Committee in January 1938, for a period of three years, subject to the condition that it would not be put into operation until the Rules under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, have been brought into force. This condition was fulfilled on 18th April, 1941, and the scheme came into operation in January, 1942.

The object of the scheme is (1) to establish a compact block of improved varieties of long staple cotton in Sind, (2) to make large quantities of pure seed available to the cultivators and (3) to provide an organization for effective distribution of seed even to the remotest corners of the cotton zones.

During the year under report, the areas rogued on the Left and Right Banks under departmental control were as follows :—

					Left Bank.	Right Bank.
					Acres.	Acres.
Sind <i>Sudhar</i>	..	..	..	..	44,600	100
4F-98	..	..	..	..	....	500
M-4	..	..	..	..	46,300	466
Sind N. R.	..	..	..	..	700	..
			Total..	..	91,600	1,066

Owing to the "Grow More Food crops campaign" and the high prices of grain crops, cotton cultivation on the right bank is stated to be declining.

On account of its satisfactory performance under varied conditions, in all parts of the Province, including Nawabshah district where other American types had failed, and its earlier maturation than Sind *Sudhar* by 3 to 4 weeks, as a result of which it escapes boll-worm attack, red leaf blight and damage by early frosts, it is reported that M-4 seed was in great demand

during the year. The quantities of pure seed of the three varieties purchased by the Department for distribution is shown below :—

	Left Bank. Mds.	Right Bank Mds.
Sind <i>Sudhar</i> .. .. .	22,691	300
M-4 .. .. .	49,056	300
4F-98 (A & B classes) .. .. .	..	2,727
Total ..	71,747	3,327

Ginning and pressing were supervised by the Department and certificates of purity were issued to ginners. Certified full pressed bales fetched a premium of Rs. 2-8-0 to Rs. 3 per *maund* of lint. Growers received from the ginners about 8 annas per *maund* extra premium for certified *kapas*.

The following table shows the standards of purity and soundness of the cotton seed during 1943-44 :—

	Sind <i>Sudhar</i>	M-4
Purity .. .. .	94%	94%
Soundness .. .. .	87%	91%

A notable feature of the year is reported to be the almost complete disappearance of the area under short-stapled *desi* varieties. Improved Sind-American cottons comprised 80% of the total American crop.

#### CENTRAL PROVINCES AND BERAR.

(a) *Verum* Seed Distribution and Marketing Scheme.—In November 1929, the Committee sanctioned, for a period of one year in the first instance, the Central Provinces *Verum* Seed Distribution and Extension Scheme. It started work in September 1930, and was extended annually up to the end of July 1934, when it was combined with the newly sanctioned scheme for the extension of long staple cottons in the Central Provinces. The combined scheme, known as "Scheme for Extension of Long Staple Cotton and Marketing of *Verum* cotton in the Central Provinces and Berar" was sanctioned for five years from June 1934. At the meeting of the Committee, held in July 1938,

it was extended up to the 31st May, 1941, the title being changed to "Scheme for the Extension and Marketing of V. 434 cotton." In January 1941, a further extension up to 29th February, 1944, was sanctioned. The scheme aims at the extension of area under V. 434 cotton in the seven *taluqs* where Verum has made most headway in the past, the ultimate object being to eliminate all other varieties as far as possible. During the extension period, the objective will be to raise the area in six of the seven *taluqs* (excluding Ellichpur) to 5 lakhs of acres.

During the year under report, the Agricultural Department distributed 29,325 *maunds* of seed through the agency of Government seed stores, *Taluq* Agricultural Associations and seed farmers. An area of 286,460 acres (107,590 acres under Departmental spread and 178,870 by natural spread) was covered against 256,293 acres last year. The falling short of the objective of raising the area under it to 500,000 acres in Berar and Nimar is attributed to the rapid expansion of *Jarila* in Berar and Buri 107 in Nimar. It is reported that, in addition to the above quantity, 16,615 *maunds* of seed were distributed outside the selected *taluqs*. The total amount of seed distributed in the Central Provinces and Berar was thus 45,940 *maunds*. 66,792 *maunds* of seed have been stocked for distribution in the next season.

The number of bales received through the Departmental pool was 12,871, of which 8,392 bales were V.434, the special areas contributing 5,124 bales. The average premium obtained for V.434 was Rs. 31-8-0. The total extra income derived by the growers of V. 434 in the year under report is estimated at about Rs. 63.84 lakhs.

(b) **Scheme for Distribution and Marketing of Buri 107 Cotton.**—This scheme was sanctioned by the Committee in July 1938, for a period of three years, and came into operation on the 1st March, 1939. In January 1941, it was extended up to the 29th February, 1944. The object of the scheme is to introduce Buri 107—a selection from acclimatised *Gossypium hirsutum* developed under the Central Provinces Botanical Research Scheme—in Burhanpur *Tahsil* of Nimar district, where the total area under cotton is about 75,000 acres. Commencing with an area of 2,000 acres in 1938-39, the programme was to raise the area under this cotton to 10,000 acres in 1939-40 and 30,000 acres in 1940-41. During the extension period, the aim will be to raise the area to 50,000 acres and to maintain it at that figure. The scheme terminated on the 29th February, 1944.

During the year under report, 2,931 *maunds* of seed were distributed by the Department over an area of 17,586 acres. In addition, 1,645 *maunds* of seed, obtained from *kapas* ginned under Departmental supervision were sown over an area of about 9,869 acres, bringing the total area under Departmental spread to 27,455 acres. In all, 45,000 acres were under Buri 107, against 49,409 acres last year. The reduction is attributed to the "Grow More food campaign." A significant achievement of the scheme is that local Buri is now practically non-existent.

The Department purchased 8,066 *maunds* of certifiable Buri 107 seed sufficient to cover the required 50,000 acres in the next year.

The gross extra income to the growers of this cotton during the year is estimated at 2.8 lakhs.

(c) **Scheme for distribution and marketing of Jarila cotton in Central Provinces and Berar.**—A small scheme for the distribution of *Jarila* seed, sufficient for 1,000 acres each in 17 *tahsils* and for roguing the area thoroughly, was sanctioned by the Committee in January 1943, for a period of one year. It came into operation in September 1943. The present scheme was sanctioned in January 1944, for a period of three years from the 1st March 1944. Its object is to arrange for the distribution of pure seed of *Jarila* in Berar, excluding the Pusad *talug*, covering an area of two lakhs acres.

During the year under report, a total area of 1,348,304 acres was grown with *Jarila*, of which 53,610 acres were covered with 8,571½ *mds.* of pure seed distributed by the Agricultural Department. 23,728 *maunds* of seed of different stages have been stocked for sowing in the ensuing season.

3,570 bales of *Jarila* cotton were pooled, of which 3,473 were sold at a premium of Rs. 35-8-0 per *khandi* over Bomay quotation for *Jarila*.

#### MADRAS.

(a) **Co. 3 Seed Distribution Scheme.**—This scheme, which replaced the Madras Co<sub>2</sub> seed distribution scheme, was sanctioned in January 1942, for a period of four years and five months. It came into operation in July 1942. Its object is to improve the present standard of Cambodia cotton in Salem district by replacing the existing Co<sub>1</sub> and Co<sub>2</sub> cotton strains with Co<sub>3</sub>.

During the year under report, 2,28,000 lbs. of seed were distributed to cover an area of some 9,280 acres. The area maintained under seed farm conditions by the Agricultural Department and the three Crop Marketing

Societies of Trichengode, Rasipuram and Salem, was 800 acres and 4,500 acres, respectively. It is stated that owing to fall in the price of cotton, many cultivators declined to part with their *kapas* with the result that only 927,800 lbs. of *kapas* were brought to the Co-operative Societies, of which 654,600 lbs. were sold to selected dealers. Out of the 324 *candies* of lint obtained, 230 *candies* were sold at a premium of Rs. 150 per *candy*. Owing to adverse seasonal conditions and low prices, only 440,000 lbs. of seed against 800,000 lbs. originally programmed were available for distribution in 1944-45, the area estimated to be covered being about 22,000 acres.

Premia ranging from Rs. 5 to Rs. 10 per *pothi* (305 lbs.) of *kapas*, over the local were obtained by the seed farm growers; in addition the cultivators are reported to have benefited to the extent of Rs. 18 per acre from the higher yield of Co.3. The total gain to the growers of Co.3 during the year under report is estimated at Rs. 2,50,000 which works out to Rs. 27 per acre approximately.

(b) **Scheme for Distribution of H1 Strain in the Westerns Area.**—This scheme, which was sanctioned by the Committēe in July 1941, started work in July 1942, in three selected centres, *viz.*, Bellary, Adoni and Guntakal. The object of the scheme is to organise the multiplication and distribution of H. 1 cotton seed over 2,00,000 acres in the 4th year, in the three areas of Adoni, Guntakal and Bellary of the Westerns tract of the Madras Province.

The Agricultural Department maintains an area of 3,000 acres for the multiplication of H. 1 seed and the seed obtained from it is utilised for sowing the outer seed farm area under the scheme. For purposes of large scale production and distribution of pure seed, the tract is divided into three convenient areas with centres at Adoni, Guntakal and Bellary. Under Departmental supervision, the seed-farms in the areas in question are sown, rogued, the produce collected and ginned, and the lint sold through the Co-operative Societies. The cleaned seed obtained from the produce is handed over to the societies for sale. During the year under review, seed farms covering over 15,338 acres were arranged for against 15,000 acres originally programmed for at the three centres. It is stated that owing to unusual rains during the flowering and picking period, the staple was short and weak to an unexpected degree. A total quantity of 690,300 lbs. of seed, sufficient to cover 69,030 acres, has been stocked with the Co-operative Societies for sale. Of the 656 dokras (Dokra=312 lbs.) of lint obtained in Bellary and Adoni

from the seed farm produce, 119 dokras were sold at a premium ranging from Rs. 7 to Rs. 30 per *Nag* of 312 lbs. The Co-operative Marketing Society at Guntakal handled only seed and the lint was handed over to the cultivators to be disposed of by them. In the ensuing season, it is proposed to arrange seed farms of 7,500 acres in each of the three areas.

(c) **Maintenance of Nucleus of pure seed of Improved Varieties of Cotton.**—This scheme was sanctioned by the Committee in January 1938, for a period of five years and came into operation in September 1938. In July 1943 it was extended for a further period of five years for the maintenance of nucleus of the four strains Co.2, Co.4, K1 and N14.

The area selfed and the quantity of selfed seed produced of each variety during the year are given below :—

Name of variety.	Area selfed.	Quantity of selfed seed produced.	How disposed of.
	Acres.	Lbs.	
Co.2	1	465	Sown in multiplication plot of Central Farm.
Co. 4	1	358	Reserved for sowing in inner area of seed farm in Ramnad District.
K. I	2	553	Reserved for sowing in seed multiplication plot in Agricultural Research Station, Koilpatti.
N.14	1.03	99	Reserved for sowing in seed multiplication plot in Agricultural Research Station, Nandyal.

#### UNITED PROVINCES.

**Scheme for Distribution and Extension and Marketing of Perso-American Cotton in Western United Provinces.**—This scheme was sanctioned in January 1942 for a period of four years. The agricultural and marketing part of the scheme came into operation on the 6th May, 1942.

The objects of the scheme are (i) to multiply pure seed of Perso-American cotton for large scale distribution and to extend its cultivation over suitable areas in the districts of Aligarh, Bulandshahr and parts of Meerut, Muttra and Etah and (ii) to organise the marketing and grading of Perso-American produce through co-operative sale societies and other agencies.

Notwithstanding unfavourable seasonal conditions, the yield of Perso-American, during the year, compared favourably with that of the varieties it is intended to replace. The average yield of Perso-American is estimated at 3 mds. against  $2\frac{1}{2}$  mds. of *desi*. The produce obtained from stages III and IV, worth over a lakh of rupees, was purchased by the Agricultural Department at a premium of Re. 1 per *maund* over the market rate. It is stated that the cultivator got Rs. 6 to Rs. 8 per *maund* of *kapas* over *desi* cotton. The quantity of 8,574 *maunds* of seed, secured in the fifth stage, will suffice for an area of 35,000 acres next year.

The Co-operative organisation is reported to have been started during the year. Two hundred and seventy two bales produced from the *kapas* of stages I to IV, purchased by the Department, were sold at a premium of Rs. 80 to Rs. 100 per *candy* over *Jarila*. Perso-American lint fetched Rs. 35 to Rs. 40 per *maund* more than *desi*. The gross extra income to the cultivators is estimated at Rs. 2,77,165 from an area of about 12,000 acres. Of the 750 bales pressed from stage V produce purchased by the Co-operative Societies, 630 were sold at a premium of Rs. 90 to Rs. 100 over *Jarila*. The Co-operative Societies are reported to have made a total profit of over Rs. 50,000 and a bonus of Rs. 1-8-0 to Rs. 2 per *maund* is proposed to be distributed to the growers.

#### BARODA STATE.

(a) **Baroda (Navsari) Seed Storage Scheme.**—This scheme is concerned with the spread of 1027 A. L. F. over an area of 2,10,000 acres in the Navsari district of the Baroda State. It was sanctioned in February 1933, for a period of five years, subject to the condition that the Baroda Government would arrange a seed multiplication area of 1,000 to 2,000 acres in that district. At the meeting of the Committee in July 1938, the scheme was extended for a period of five years and again in July 1943, for a further period of one year from the 16th April, 1944.

It is reported that the object of the scheme has been achieved since the enforcement of the Cotton Control Act in the district in 1941.

During the year under report, the total area under 1027 A. L. F. was estimated at about 1,65,000 acres, of which the controlled area was 14,112 acres, the corresponding figures for the previous year being 210,000 and 31,655 acres, respectively. An additional area of 3,200 acres, which was sown with Segregate 8-1, was also under Departmental control. The reduction in the area is attributed to the compulsory proportion of food to non-food crops required to be maintained in accordance with the State regulations. The total quantity of seed distributed was 22,66,758 lbs. against 26,56,500 lbs. in the previous year.

Certified cotton from the checked fields was pooled, ginned and baled under Departmental supervision, and given black 'Agmark' labels. The bales produced by the societies and groups from areas which were not of the requisite standard for seed supply were given 'green' labels. The bales from the other areas of the State, which fetched a premium of at least Rs. 5 over local, were given a stencil stamp of "1027 A.L.F. Baroda State Produce." The marketing of Agmark and labelled F.P. bales was done through the Marketing Officer at Surat. The gross extra income received by the cultivators of 1027 A.L.F. and Segregate 8-1 is estimated at Rs. 11,37,056 and Rs. 44,900 respectively. It is stated that Seg. 8-1 is likely to suit Navsari district and prove more profitable to the cultivators than 1027 A.L.F. The State Seed Organisation is considered capable of switching over successfully to Seg. 8-1 from 1027 A.L.F.

To meet the demand for seed in the ensuing year, about 23,10,000 lbs. of seed will be purchased and stored.

(b) **Baroda B. D. 8 Seed Distribution Scheme.**—This scheme, which has for its object the extension of B. D. 8 cotton in Baroda district, was sanctioned in July 1938, for a period of five years and came into operation on the 1st April, 1939. Its object is to popularise B. D. 8 cotton (which is wilt-resistant and superior in quality to the local cottons) over 60,000 acres of the Kahnām black soil area of the Baroda district, north of the river Nerbudda.

During the year under report, 1,824,000 lbs. of B. D. 8 seed of standard purity (8,588 lbs. A grade, 130,440 lbs. B grade and 602,520 C grade) were stocked, of which 1,134,640 lbs. were issued to the cultivators over an area of 109,993 acres (780 acres with A grade, 14,500 acres with B grade and 94,713 acres with C grade). In addition, 23,365 lbs. of seed of *Vijaya* and its constituents were distributed to cover 2,007 acres. With a view to providing

seed for the entire district, additional area was examined and 730 acres of A, 14,388 acres of B and 5,882 acres of C grades of B.D.8 and 1,969 acres under *Vijaya*, which came up to the requisite standard of purity, were accepted for seed supply organisation. The premium realised over *Jarila* by the certified B. D. 8 ranged from Rs. 120, at the beginning, to Rs. 20, at the close of the season. The demand for certified B. D. 8 was keen, the average difference between certified and uncertified cotton being Rs. 20 per *bhar*. The steady decline in the prices of B. D. 8 is attributed to less demand for this cotton by the mills, export restrictions, transport difficulties and greater production of cotton than required. The growers of certified B.D.8 and *Vijaya* cotton are reported to have realised an additional income of about Rs. 12,33,360 and Rs. 81,720, respectively. 3,715,200 lbs. of different grades of B.D.8 and *Vijaya* cotton seed have been stocked for sowing over an area of 22,905 acres during the 1944-45 season. In addition, 3,186,560 lbs. of C grade seed of B.D.8 has been stocked to cover an area of 120,000 acres in the attached areas of Baroda State.

During the year under review, owing to the enforcement of the Cotton Control Act in the State, no local cotton was grown in the tract except B.D.8.

The B. D. 8 scheme terminated on the 31st March, 1944, and is now replaced by the new scheme for the multiplication and distribution of *Vijaya* cotton. This is said to be the logical follow up of the corresponding scheme for Gujerat in the Bombay Province sanctioned by the Committee in July 1943. The new scheme, which came into operation on the 1st April, 1944, aims at covering approximately 300,000 acres in Baroda State.

(c) **B. 9 Seed Storage Scheme.**—This scheme was sanctioned in July 1941 for a period of five years. It came into operation on the 1st September, 1942. The object of the scheme is to introduce in the areas of Baroda district, not suited to B.D.8, a cotton superior both in staple and spinning value to the average Broach grown locally.

The Cotton Control Act was applied to Baroda district in April 1943, making the cultivation of B.9 compulsory in Waghodia and Savli talukas. During the year under review, the Department issued 8,48,000 lbs. of seed for sowing over 95,231 acres (2,080 acres of A grade, 15,490 acres of B grade and 77,661 acres of C grade) of which 2,060 acres of A grade and 13,710 acres of B grade were certified as being of the required purity standard.

4,696 *bhars* of seed cotton (700 of A grade and 3,996 of B grade) were pooled at different centres up to the 31st March, 1944. For 1,311 *bhars* of certified cotton, an average of about Rs. 3 more per *bhar* over uncertified cotton was realised, giving an additional income of Rs. 4,381 to certified growers. The gross extra income realised by the growers of B.9 is stated to be Rs. 13,50,000.

44,360 lbs. of A grade seed, sufficient for 4,400 acres, 3,20,680 lbs. of B grade, sufficient for 25,000 acres and 9,45,940 lbs. of C grade, sufficient for 66,000 acres have been stocked for sowing in 1944-45.

As it is intended to cover, if possible, the whole of Sabarmati-Narbudda Zone with *Vijaya*, comparative trials of B. 9 and *Vijaya* were undertaken in the area concerned, but the results were inconclusive. The trials will be repeated in the current year.

(d) **Scheme for creation of a pure Wagad Zone in Mehsana district in Baroda State.**—This scheme was sanctioned by the Committee in January 1943 for a period of two years and it came into operation on the 1st December, 1943.

Its object is to spread Wagad 8—a strain of *herbaceum* cotton developed by the Department of Agriculture, Bombay—in Mehsana district, over an area of one lakh acres. This variety is reported to be a valuable improvement on the ordinary mixed Wagad type of cotton grown in Mehsana. It was selected after several years' trials at Jagudan farm and its subsidiary district testing areas under farmers' conditions.

During the period under review, the total area rogued was estimated at 3,690 acres, of which 120 acres were of *Wagotar* and 3,570 acres of Wagad 8. The acreage under Wagad 8 consisted of nucleus, A and B grade areas which were rogued to cent percent, 99 and 98% purity, respectively.

## CHAPTER VI.

### COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

(1) **Planned production of cotton.**—As a sequel to the discussions at the United Nations Conference on Food and Agriculture, at Hot Springs, Virginia, in 1943, the planning of the production and distribution of agricultural products has come very much to the forefront. The Local Sub-Committee of the Indian Central Cotton Committee considered this subject at its meeting held on the 6th July, 1944, and unanimously expressed the view that the production of cotton, as of all other important agricultural commodities, should be regulated according to a definite plan on an all-India basis. In view of its importance, the Sub-Committee recommended that the matter should be discussed in all its aspects by the full Committee which should give due regard to the question of transport so as to ensure that, as far as possible, the acreage under a desirable cotton in a particular area is not unnecessarily curtailed and diverted to food grains if the requirements of food grains of that area can be met, without difficulty, by imports from a conveniently located surplus area. The subject was accordingly considered by the full Committee at its meeting held in July 1944. The Committee appointed a Cotton Planning Sub-Committee, consisting of the President, the Vice-President, Sir Purshotamdas Thakurdas, Sir Chunilal V. Mehta, Directors of Agriculture represented on the Committee, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Mr. Roger Thomas and the Secretary, to examine and report on the part which cotton should play in the planning of agricultural production and to work in close collaboration with the proposed Central Crop Planning Council.

(ii) **Deterioration in quality of Indian cotton crop.**—The Committee considered a letter from the East India Cotton Association, Ltd., Bombay, regarding the deterioration in the quality of the 1943-44 cotton crop. The Association attributed the observed deterioration to three factors (1) unseasonal weather, (2) mixing of undesirable cotton with better qualities and (3) natural crossing. They suggested that steps should be taken to improve the position by the adoption of a short term and a long term policy. The short term policy, which the Association suggested should be enforced immediately, would include (a) restriction of the area under short staple cotton, (b) issue

to agriculturists of suitable seed in the largest possible quantities and (c) roping off of areas producing a particular variety of cotton, thus ensuring that each strain is ginned and pressed separately and the application of stringent measures against mixing of *kapas* and of cotton, gin and pressowners being made strictly responsible for a breach of the rule. The long term policy, according to the Association, should aim at evolving, standardising and protecting a small number of suitable strains in each province with the more distant aim of further reducing the number of varieties grown until India can produce a minimum number of well-established and desirable strains. The points raised were very carefully considered by the Committee in the light of the views of the Directors of Agriculture of the major cotton growing provinces and States who were consulted in the matter. In the opinion of the Committee, the observed deterioration in the cotton crop in the season 1943-44 was due mainly to (a) adverse seasonal conditions during the period of crop growth and (b) continuance of the malpractice of mixing inferior with superior types of cotton in the districts. The Committee agreed with the view expressed by agricultural officers that natural hybridisation was a negligible factor in the deterioration brought to notice by the Association. As regards the short term policy suggested by the Association, the Committee had already made recommendations on several occasions regarding (a) the restriction of the area under short-stapled cottons and (b) the expansion of arrangements for the wide-spread multiplication of the seed of improved varieties of cotton under strict technical supervision and the issue of such pure seed to cotton growers on the widest possible scale. The Committee emphasised, however, that the fullest extension of pure seed is being seriously hampered and, in some areas, made impossible by the continuance of the malpractice of mixing. Provided that this malpractice could be eradicated, the Committee considered that the application of the Cotton Control Act to definite areas growing the same improved type of cotton immediately the seed of such types was available in sufficient quantity to meet in full the requirements of the cotton growers in such areas, was essential. In order to increase as rapidly as possible supplies of pure seed, the Committee advocated the multiplication of seed farms, the extension of co-operative ginning factories, the provision of adequate finance and the granting of premia to producers of pedigree seed.

With regard to the long term policy suggested in the Association's letter, the limitation of cotton varieties to three or four in India had already been

examined by the Committee in the past and on account of the varied conditions of soil, climate, environment, etc., in the areas in which cotton is grown, was decided to be impracticable.

(iii) **Cotton baling hoops.**—The scheme for the distribution of cotton baling hoops continued to be in operation during the year under review. Some 10,110 tons of new hoops imported under Lease/Lend and eight hundred tons of secondhand hoops were made available to cotton pressing factories through the agency of this office working in conjunction with the Iron and Steel Controller. These represented almost the entire requirements of the factories in the country for the season. The cotton baling hoops have been supplied to pressing factories subject to the condition that the factories concerned execute a bond in the prescribed form to the effect that they shall not, except with the prior permission of the Baling Hoops Advisory Committee, charge and recover in respect of any baling operation, baling charges exceeding the rates prescribed by the Government of India. On the recommendation of the Baling Hoops Advisory Committee, the maximum pressing rate was fixed at Rs. 10 per bale. Except in the case of two factories from Bezwada, Madras Province, no application for permission to charge a higher pressing rate was entertained. Under the Cotton Baling Hoops (Control of Movement) Order, 1943, recommendations were made for the issue of permits for the acquirement of some 1,200 tons secondhand hoops.

(iv) **Fuel requirements of ginning and pressing factories.**—The arrangements for the supply of coal, under priority, to cotton ginning and pressing factories on the recommendation of this office working in conjunction with the Textile Commissioner, Bombay, were continued during the season under report. Over 1,000 applications from factories were received and disposed of during the year. Considerable difficulty was experienced by the factories in obtaining coal owing to the acute coal and wagon position and the quantity actually delivered to the factories during the season amounted to about 98,800 tons out of 126,300 tons recommended by this office.

Recommendation for supply of diesel oil to cotton ginning and pressing factories is also made by this office. In addition, assistance is given to the factories in obtaining iron and steel required for maintenance and repairs.

(v) **Dismantling of cotton ginning and pressing factories.**—Applications under the Factories (Control of Dismantling) Ordinance, 1943, for the grant of permission for the dismantling of cotton ginning and pressing factories are referred to this office for opinion by the Textile Commissioner, Bombay.

(vi) **Supply of iron for agricultural purposes.**—The attention of the Committee was drawn to the difficulties being experienced by agriculturists in securing iron, at controlled rates, for agricultural purposes. The Committee recommended that immediate steps should be taken by the Provincial and State Governments for the supply, at controlled rates, of iron required for agricultural purposes and that, in the case of scrap iron available for disposal with the Supply Department, suitable for use in the manufacture of agricultural implements and machinery, priority should be given to the manufacturers of such implements and machinery. The Government of India and the Provincial Governments were addressed accordingly. In reply, the Committee was informed by the Government of India that the question of making suitable arrangements for placing at the disposal of Provincial and State Governments necessary quantities of defective as well as good iron and steel which they might distribute to various manufacturers, etc., at reasonable rates for the manufacture of agricultural implements, was already under their active consideration.

(vii) **Provision of improved implements, machinery and fertilisers.**—The question of the improvement of the general standard of cultivation and yield of the cotton crop by the introduction of mechanical devices for cultural and harvesting operations, was considered by the Committee and the following resolution passed by it has been communicated to the Government of India :—

“In view of the paramount importance and urgency of growing more food during the present emergency and in the interests of improvement of Indian cotton in future so as to make its production remunerative to the grower, the Committee is strongly of the opinion that concerted efforts should be made to develop the agricultural resources of the country to the fullest extent possible. The Committee is convinced that the object in view can be achieved by improved methods of farming, suitable rotation of crops, and, above all, where conditions are favourable, by the introduction of mechanical devices for cultural and harvesting operations. It accordingly requests the Government of India to give immediate facilities for manufacture in the country and import from abroad (to meet immediate requirements) of improved implements and machinery and fertilisers.”

(viii) **Regulated Cotton Markets.**—Investigation into the financing and marketing of cultivators' cotton having established beyond doubt that cultivators obtain better prices for their cotton in tracts where regulated markets exist, Provincial Governments were requested by the Committee to establish such markets in all the more important cotton growing areas. Accordingly, legislation for the establishment of regulated markets has been enacted in the Provinces of Bombay, Madras, the Punjab and the Central

Provinces, and the Hyderabad, Baroda, Indore and Sangli States. In the Province of Bombay, the Agricultural Produce Markets Act has been made applicable during the year to the cotton markets at Hubli, Gadag, Bavla, Sanand and Viramgam and, including these, there are now 12 such markets in the province. It is proposed to apply the Act to Nipani, Bagalkot, Ghoti, Lasalgaon, Barsi, Pachora, Shirpur, Shahada, Kopergaon and Chaliggaon markets in the near future. In the Punjab, the Punjab Agricultural Produce Markets Act is in force in 130 localities. In Madras three regulated markets continued to function at Tirupur, Adoni and Nandyal. In Hyderabad State, the Hyderabad Agricultural Produce Markets Act has been made applicable to 23 markets.

(ix) **Agmarking.**—During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Bijapur as a guarantee of purity of cotton by affixing Agmark labels to bales after supervision of ginning and pressing by the special staff. Agmarking has been made applicable to V. 434 on an experimental basis. It is also proposed to apply the Agmark to Perso-American cotton.

(x) **Universal Standards.**—As mentioned in previous reports, since 1934, with the co-operation of the East India Cotton Association and the Karachi Cotton Association, Universal Standards common to both the markets have been prepared by a Special Sub-Committee of the Indian Central Cotton Committee. At the instance of the Associations, however, it was decided, as mentioned in last year's report, to drop the preparation of Universal Standards for the period of the war.

In order to check the spread of undesirable or inferior types of cotton and insect pests and diseases and other malpractices, several legislative measures have been passed by the Central and Provincial Governments on the recommendation of the Indian Central Cotton Committee. These are dealt with below.

(xi) (a) **Cotton Transport Act.**—A brief account of the working of this Act is contained in previous reports. During the year, notification was issued by the Government of India under the Cotton Transport Act prohibiting the import by rail of all cotton into the protected areas of the Gwalior State except under licences issued by the State authorities.

(b) **Cotton Ginning and Pressing Factories Act.**—It will be recalled that, in view of certain complaints received regarding the presence of foreign matter

in Indian cotton bales, the Committee had recommended that the Cotton Ginning and Pressing Factories Act, 1925, in other Provinces and major Indian States should be amended on the lines of the Bombay or Central Provinces (Amendment) Act in order to provide for the licensing of ginning and pressing factories and for penalising the presence in cotton bales of cotton seed (in excess of a prescribed percentage), cotton waste and foreign matter. The Mysore Durbar passed the necessary legislation (The Mysore Amendment Act, 1943) which also provided penalties for watering of cotton. The Amendment Act, however, contained no provision similar to that in the Bombay Amendment Act, 1938, making the deliberate watering of cotton a penal offence, and the attention of the Durbar has been drawn to this omission.

The Committee noted with satisfaction the action of the Kolhapur Durbar in passing the Kolhapur Cotton Ginning and Pressing Factories (Amendment) Act, 1941, which, *inter alia*, includes provisions relating to the licensing of gins and presses, foreign matter and watering of cotton. The Committee agreed to the Durbar's request that the services of the Technological Laboratory may be made available to it for carrying out moisture tests on cotton samples on payment of fees and for issue of certificates.

The Dhar State Cotton Ginning and Pressing Factories (Amendment) Act, 1942-43, passed by the Dhar Durbar gives effect to the amendment dealing with the structural requirements of factories and the rejection of unmarked bales in fulfilment of contracts introduced by the Cotton Ginning and Pressing Factories (Amendment) Act, 1939, and also provides for the submission of monthly returns of cotton ginned by ginning factories in the State.

The Government of the Punjab intimated that consideration of the Punjab Cotton Ginning and Pressing Factories Bill, dealing with the control of (1) the mixing of different varieties of cotton, (2) the watering of cotton and (3) the adulteration of cotton with cotton seed, had been postponed for the period of the war. It was emphasised to the Punjab Government that, in the opinion of the Committee, the legislation suggested was a beneficial measure in the interests of the cotton growers of the Province and that the Provincial Government should reconsider their decision and give effect to the recommendation of the Committee as early as possible.

Arising out of a reference received in 1940, from the Director of Industries, Central Provinces and Berar, suggesting the amendment of the Cotton Ginning

and Pressing Factories Act to provide for penalties against watering of cotton by ginning factories, in certain cases not covered by the existing legislation in the Province, the Committee at its meeting in January 1943, after consulting the East India Cotton Association, Bombay, decided that Section 3A of the Cotton Ginning and Pressing Factories Act, 1925, in its application to the Central Provinces and Berar, should be amended to read as follows:—

“3A. Prohibition against watering etc., of cotton.

(1) The Provincial Government may, by notification, declare that in any area specified in such notification, no cotton which is ginned or pressed in a cotton ginning or cotton pressing factory shall contain any admixture of cotton.

(2) Any owner of a cotton ginning or cotton pressing factory or any person in charge of such factory—

(a) who knowing or having reason to believe that any cotton is watered or contains any foreign substance, or cotton waste, gins or presses or allows such cotton to be ginned or pressed in such factory, or

(b) who in any area specified in the notification under sub-section (1) gins or presses or allows to be ginned or pressed any cotton which he knows or has reason to believe to contain an admixture of cotton,

shall, on conviction, be punishable with fine which may extend to fifteen hundred rupees.

(3) Any owner of a cotton pressing factory who knowing or having reason to believe that any cotton contains seed in excess of the prescribed proportion, presses or allows such cotton to be pressed in such factory, shall, on conviction, be punishable with fine which may extend to fifteen hundred rupees.

*Explanation.*—For the purposes of this section, cotton shall not be deemed to be watered, unless such cotton contains moisture in excess of the normal quantity. The normal quantity of moisture in any given quantity of cotton is the amount of moisture that such cotton is reasonably expected to have, regard being had to the place or places at or to which, and the time or times of the year in which, such cotton has been picked, collected, stored, conveyed, left, ginned or pressed. A certificate

given by the prescribed authority as to the normal quantity of moisture that a given quantity of such cotton should have and the quantity of moisture that it possesses shall be evidence of such matters, until the contrary is proved ; and if the latter quantity exceeds the former it shall be evidence, until the contrary is proved, that the cotton is watered.

3AA. Any owner of cotton who knowingly makes or causes to be made any cotton which is ginned and which is being or is intended to be pressed in a cotton pressing factory, wet, or mixes or causes to be mixed seed, foreign substance or cotton waste with such cotton, or in any area specified in subsection (1) of section 3A makes any admixture of cotton, or abets or knowingly allows or connives at any such act shall, on conviction, be punishable with fine which may extend to fifteen hundred rupees."

The Central Provinces Government who were accordingly addressed replied to say that they did not consider it necessary to undertake legislation of this kind in the present circumstances caused by the war situation. The need for undertaking the amending legislation even during the period of war has been stressed to the Provincial Government.

Out of 67 Indian States which have enforced in their territories the main provisions of the Cotton Ginning and Pressing Factories Act as applied to British India, by legislation or executive orders, weekly returns of cotton pressed were received from 62 ; in the remaining States, pressing factories did not work during the year.

(c) **Prohibition of mixing of different varieties of cotton**—In connection with the question of expansion of seed distribution schemes, the Provinces and States were addressed for information regarding the localities for which improved cottons have been produced, the extent to which it is not possible to provide adequate seed supplies for each such area, the reasons concerned and the steps necessary to make adequate supplies available. The Committee considered the replies received from the Provinces and States. It had also before it the view expressed by its Agricultural Research Sub-Committee, after examining the replies, that the real obstacle in the way of extension of pure seed supply was mixing and that, until such time as this malpractice could be effectively stopped, the establishment of pure seed blocks would remain impossible of achievement. Further, in connection with the observed deterioration in the cotton crop of the 1943-44 season, the East India Cotton Association had recommended the application of stringent measures against

mixing of *kapas* and cotton, gin and pressowners being made strictly responsible for a breach of the rule.

The problem of mixing had been under consideration, in some way or other, for many years and no effective solution on an all-India basis had so far been found, but the point was that the matter had assumed serious aspect only in the last two or three years during which the character of the crop had undergone a remarkable change. The stage had now been reached when in the interests of Indian cotton as a whole, the question could no longer be shelved. Even from the point of view of ensuring export outlets for Indian cotton after the war, it was imperative that early action in the matter should be taken. There were four kinds of mixtures to be dealt with ; (1) field mixtures arising from mixed seed sown by the farmer, (2) deliberate mixing by the middleman or the merchant before cotton is brought to the market, (3) mixing in the ginneries and (4) mixing after ginning before cotton is pressed. It was suggested that the Central Government should be requested to amend the Cotton Ginning and Pressing Factories Act on the lines of the Bombay Amendment Acts, 1936 and 1938 so as to provide for the licensing of ginning and pressing factories and prohibition of mixing of different varieties of cotton. The Government of India should thereafter suggest to the Provincial Governments to give effect to the provisions of the Amended Act and commend its application also to Indian States. As regards the cotton grown mixed and cotton which is mixed by the middleman or the merchant before being brought to the market, it was suggested that a certain percentage of tolerance, say, 5%, might be allowed and anything above that should be marked as mixed cotton. After a lengthy debate, the Committee passed the following resolution which has been forwarded to the Government of India for necessary action :—

“The Indian Central Cotton Committee is convinced that the malpractice of mixing of different varieties of cotton is seriously hampering the work of cotton improvement in the country. It is the considered view of the Committee that until this malpractice is made a penal offence, it will be impossible to provide seed of improved varieties of cotton in quantities adequate to meet requirements. In the interests of Indian cotton as a whole, therefore, the Committee is unanimously of the opinion that, as a first step, the mixing of short staple with medium and long staple cotton and of medium with long staple cotton at the factories should be forthwith prohibited by the Government of India, by legislation. The Committee further recommends that steps be taken by the Government of India to ensure that the legislation is put into effect by the Provincial and State Governments as soon as possible and, in any case, well in advance of the cotton season commencing 1st September, 1945. The Committee has no doubt that the adoption of the measures

suggested by it will have a beneficial effect on the food position of the country for, if the utilisation of short staple cotton for mixing purposes is stopped, the production of such cotton would be automatically reduced to the minimum commensurate with requirements."

(d) **Prevention of Introduction of Foreign Cotton Pests.**—In order to prevent the introduction into India of the Mexican Boll-weevil (*Anthonomus grandis*) with imported American cotton, at the instance of the Committee, regulations have been imposed by the Government of India under which the import of American cotton into India is prohibited except through the port of Bombay where it must be fumigated with hydrocyanic acid gas before entry into the country. The work of fumigation is carried out under the technical supervision of the Secretary, and the cost involved is met by the levy of a small fee from importers on each bale of American cotton fumigated. Owing to the restrictions necessitated by the war, there were no imports of American cotton during the year under review.

(e) **The Red (Sudan) Bollworm (*Diperopsis castanea*) and other pests.**—The restriction on the import of foreign *kapas* (unginned cotton) and of foreign cotton seed remained in force throughout the year.

(f) **Cotton Control Acts.**—Cotton Control Acts are in operation in the Provinces of Madras, Bombay and the Central Provinces and in the Baroda and Bhopal States. The aims and objects of these Acts in the areas where they are in force are stated in previous years' reports.

In Bombay, the spread of Selection 1A in preference to 1027 A.L.F., in parts of Surat district where *Goghari* was formerly grown, is still going on. The new improved variety "Suyog" which is nearly as good as 1027 A.L.F. in staple and as Selection 1A in ginning, is being extended by the Agricultural Department. This is expected to solve the problem of the tract.

On account of the mixing of inferior cotton with superior types in the Southern Mahratta Country, a notification has been submitted to Government with a view to applying the Act to the tract in question. Government have notified the application of the Act to the whole of Khandesh.

In Baroda State, the Act worked very well during the year.

D. N. MAHTA

*Secretary.*

**APPENDIX I.**

**BALANCE SHEET AS ON 31st MARCH, 1944.**

RECEIPTS.	Rs. a. p.		Rs. a. p.		EXPENDITURE.	Rs. a. p.		Rs. a. p.	
Cotton Cess Receipts .. .. .	1,54,96,486	11 4			I. A. Administration .. .. .			24,62,481	2 6
Less.—Refunds of cess to Burma .. ..	42,869	10 9	1,54,54,067	0 7	B. Improvement of Cotton Marketing—				
Interest account.—					1. Cost of exhibits, travelling allow- ance of representatives on the Board of East India Cotton Association and members of Standards Sub-Committee and cost of Standards .. .. .	1,94,238	9 9		
Amount received on investments .. ..	22,76,750	3 7			2. Enquiry into cost of cotton pro- duction in India .. .. .	2,71,968	8 9	4,66,197	2 6
Add.—Refund of incometax from interest ..	26,949	15 0			C. Travelling allowance of Non-official members .. .. .			2,81,772	8 9
	28,03,680	2 7			D. Printing & Propaganda.—				
Less.—					1. Publicity & Propaganda .. .. .	1,50,555	15 0		
1. Interest paid in advance at the time of purchasing Government papers (since recovered) interest on temporary over- draft and Bank's commission for collec- tion of interest .. .. .	64,268	10 4			2. Printing & Distribution .. .. .	1,30,697	14 9	2,87,258	13 9
2. Interest credited to Provident Fund ..	4,836	6 2			E. Statistical Research.—				
3. Bank's withdrawal charges .. .. .	5,705	2 0			1. Studies of village consumption of Indian cotton .. .. .	23,913	5 8		
4. Incometax on interest on Government papers .. .. .	30,877	9 1			2. Improvement of Cotton Forecast. 3. Crop estimating survey on cotton in Central Provinces .. .. .	30,772	9 0		
5. Brokerage for securities sold .. .. .	828	10 0				13,682	9 0	68,868	7 8
6. Provision for Sinking Fund .. .. .	19,132	9 0			II. Agricultural Research grants.—				
	1,25,498	14 7	21,77,981	4 0	(1) RESEARCH SCHEMES.				
Profit on conversion and sale of securities ..			3,47,382	12 2	(i) Bombay.—				
Sinking Fund account .. .. .			19,132	9 0	(1) A. Surat Physiological .. .. .	2,45,139	11 3		
Miscellaneous Receipts .. .. .			1,45,468	11 11	B. Surat Physiological Writing- up .. .. .	5,814	7 8		
Refund from Provident Fund for contributions disallowed .. .. .			3,391	1 11	(2) A. Surat Bollworm .. .. .	1,14,509	9 7		
General Suspense account .. .. .			539	6 8	B. Surat Bollworm Propaganda; C. Surat Bollworm Writing-up.	91,468	9 2		
Carried over .. .. .			1,81,47,982	13 10	(3) A. Dharwar Wilt .. .. .	1,82,836	4 11		
					B. Dharwar Wilt Writing-up .. .. .	10,902	10 3		
					Carried over .. .. .	6,25,986	7 10	35,66,078	3 2

BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		1,81,47,982 18 10	Brought forward ..	6,52,986 7 10	85,66,073 3 2
Receipts from the Cotton Fund .. .. .		97,245 0 0	<i>Bombay—contd.</i>		
Amount received from the Iron and Steel Controller, Calcutta on account of the fee for distribution of baling hoops .. .. .	3,925 2 0		(4) Khandesh .. .. .	26,573 5 0	
<i>Less.—Expenditure incurred in 1942-48 ..</i>	3,719 6 0	205 12 0	(5) Co-ordination of Cotton Research .. .. .	1,749 7 6	
			(6) Jalgaon Cotton Breeding .. .. .	74,988 3 6	
			(7) Broach Cotton Breeding .. .. .	1,05,044 10 2	
			(8) Small Leaf Disease Survey .. .. .	3,938 9 6	
			(9) Survey of Goghari Cotton .. .. .	4,199 5 0	
			(10) Defibration of Cotton Seeds .. .. .	14,873 5 9	
			(11) Plant Pullar Propaganda .. .. .	21,940 1 3	
			(12) Breeding of Wilt Resistant Cotton for Surat Area .. .. .	19,008 4 0	
			(13) Model Projects for improvement of cotton cultivation of crops .. .. .	1,328 15 0	
			(14) Inclusion of Northerns & Westerns in Dry Farming Research at Bijapur .. .. .	6,953 12 7	
			(15) Poona Wilt Breeding .. .. .	57,759 2 6	
			(16) Improvement of Cotton Crop in Kalra District .. .. .	5,629 14 0	
			(17) Interspecific Hybridisation at Surat .. .. .	42,806 7 3	
			(18) Dholleras Wagad Cotton at Virangam .. .. .	88,163 14 2	
			(19) Improvement of Dharwar-American cotton .. .. .	5,671 1 6	
			Total .. .. .	10,73,679 15 0	
			(ii) <i>Madras.—</i>		
			(1) Herbaceum .. .. .	1,42,466 13 1	
			(2) Pempheres and Physiological .. .. .	2,01,057 10 3	
			(3) Fodder Cholam .. .. .	19,517 9 4	
			(4) Breeding of Nadam cotton .. .. .	17,727 2 6	
			(5) Improvement of Mungari cotton .. .. .	36,909 4 6	
			(6) Investigation of the possibilities for control of cotton stem weevil .. .. .	6,165 7 6	
			(7) Improvement of Cocanadas cotton .. .. .	32,354 11 3	
			Total .. .. .	4,56,198 10 5	
Carried over ..		1,82,45,433 9 10	Brought forward ..	15,29,878 9 5	85,66,073 3 2

BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,82,45,438	9 10	(iii) Punjab.— Brought forward ..	15,29,878	9 5	35,66,078	8 2
					(1) Botanical .. .. .	6,55,080	15 9		
					(2) Entomological .. .. .	2,25,808	7 11		
					(3) White Fly .. .. .	48,721	4 1		
					(4) Root Rot .. .. .	71,048	10 10		
					(5) Spraying Trials .. .. .	9,977	0 6		
					(6) Defibrating and Delinting .. .. .	6,112	8 9		
					(7) Survey of Disease of Malformation .. .. .	1,780	10 6		
					(8) Physiological .. .. .	4,09,580	0 7		
					(9) Clean-up Campaign of Spotted Bollworm .. .. .	60,025	9 8		
					(10) Jassid Investigation .. .. .	19,058	0 6		
					(11) Improvement of Punjab-American 230F .. .. .	16,216	5 8		
					Total ..	15,23,464	9 11		
					(iv) Central Provinces.—				
					(1) Botanical .. .. .	4,93,449	9 4		
					(2) Entomological .. .. .	12,844	18 6		
					(3) Investigation of Heliothis Obscurella .. .. .	1,672	9 9		
					(4) Central Provinces & Berar Cotton Breeding Scheme .. .. .	48,006	4 3		
					(5) Model Projects for extension of improvement in cultivation of crops .. .. .	1,127	1 0		
					Total ..	5,56,599	5 10		
					(v) United Provinces.—				
					(1) Pink Bollworm .. .. .	1,46,616	2 10		
					(2) Rohilkhand and Bundelkhand Survey .. .. .	18,061	14 4		
					(3) Botanical .. .. .	93,958	13 0		
					(4) Model Project for extension of improvement in cultivation of crops .. .. .	1,281	9 0		
					Total ..	2,59,868	7 2		
Carried over ..			1,82,45,438	9 10	Carried over ..	38,69,806	6 4	35,66,078	8 2

BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,82,45,433	9 10	Brought forward ..	38,69,806	0 4	35,66,073	3 2
					(vi) <i>Indore.</i> —				
					(1) Institute of Plant Industry ..	19,86,943	12 0		
					(2) Cotton Genetics Research Scheme ..	1,45,739	9 9		
					Total ..	21,32,683	5 9		
					(vii) <i>Sind.</i> —				
					(1) Physiological .. ..	2,63,945	12 10		
					(2) Jassid Investigation .. ..	16,471	15 1		
					(3) Black-headed Cricket .. ..	9,245	1 3		
					(4) Scheme for investigation for production of long staple cotton ..	1,02,147	14 5		
					(5) Bollworm Investigation and Clean-up Scheme .. ..	74,434	4 6		
					Total ..	4,65,245	0 1		
					(viii) <i>Burma.</i> —				
					(1) Capital Expenditure .. ..	2,906	15 5		
					(2) Cotton Improvement .. ..	47,790	3 9		
					Total ..	50,697	3 2		
					(ix) <i>Hyderabad.</i> —				
					(1) Botanical .. ..	4,21,773	13 5		
					(2) Cotton Survey .. ..	36,578	3 0		
					(3) Pink and Spotted Bollworm ..	83,973	10 4		
					(4) Improvement of Kumpta cotton ..	41,142	3 10		
					(5) Inclusion of Northern and Westerns in Dry Farming Scheme at Raichur .. ..	2,000	4 0		
					(6) Pink and Spotted Bollworm Clean-up Campaign .. ..	53,929	2 0		
					(7) Improvement of cottons of the Oomras tract .. ..	28,627	7 7		
					Total ..	6,68,027	12 2		
Carried over ..			1,82,45,433	9 10	Carried over ..	71,86,459	5 6	35,66,073	3 2

**BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)**

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,82,45,483	9 10	Brought forward ..	71,82,459	5 6	35,66,078	8 2
					(x) Bikaner.—				
					Bengals Cotton Improvement ..	70,877	10 11		
					(xi) Baroda.—				
					(1) Root Rot .. .. .	92,388	3 2		
					(2) Comparative Tests .. .. .	4,251	5 3		
					(3) Survey of Goghari cotton .. .. .	3,891	14 7		
					(4) Plant Puller Propaganda .. .. .	32,533	15 10		
					(5) Mathio cotton at Amreli and Jagudan .. .. .	20,378	14 9		
					Total .. .. .	1,62,944	5 7		
					(xii) Bengal.—				
					(1) Corolla Scheme .. .. .	43,019	14 9		
					(2) Cultivation of Long Staple cotton .. .. .	9,586	11 3		
					Total .. .. .	53,456	10 0		
					(xiii) Mysore.—				
					Doddabathi .. .. .	24,801	3 9		
					(xiv) Collection of Iran cottons .. .. .	3,121	12 0		
					(xv) Baluchistan.—				
					Co-ordination of research on Black-headed Cricket in Sind and Baluchistan .. .. .	33,871	8 5		
					(xvi) Preliminary Scheme at Nawanager ..	323	12 4		
					(xvii) Estimation of effects on cotton crop of the use of Plant Puller .. .. .	4,143	12 6		
								75,39,000	0 11
Carried over ..			1,82,45,483	9 10	Carried over ..			1,11,05,078	4 1

BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)

RECEIPTS.	Rs.	s.	p.	Rs.	s.	p.	EXPENDITURE.	Rs.	s.	p.	Rs.	s.	p.
Brought forward				1,82,45,438	9	10	Brought forward ..				1,11,05,078	4	1
							(2) SEED DISTRIBUTION & EXTENSION SCHEMES.						
							(i) <i>Bombay.</i> —						
							(1) Hubli .. .. .	44,048	8	3			
							(2) Gadag .. .. .	41,700	15	1			
							(3) Gadag (Supplementary) ..	20,167	11	4			
							(4) Surat .. .. .	92,095	2	4			
							(5) Athani .. .. .	18,086	1	7			
							(6) Khandesh (Banilla) .. ..	1,65,680	4	0			
							(7) Khandesh (Jarila) .. ..	1,39,786	5	9			
							(8) Deccan Canals (Banilla) ..	3,333	3	4			
							(9) B. D. S .. .. .	40,729	1	9			
							(10) Revised Jayawant and Gadag No. 1 .. .. .	2,08,094	6	7			
							(11) Maintenance of nucleus of pure seed of improved varieties of cotton .. .. .	9,364	6	3			
							(12) Scheme for control of Selection 1A .. .. .	4,584	6	0			
							(13) Collection of 1027 A. L. F. cot- ton in Navapur Taluka .. ..	2,940	1	0			
							(14) Scheme for Multiplication of Vijaya cotton .. .. .	81	1	0			
							Total ..	7,91,491	10	3			
							(ii) <i>Madras.</i> —						
							(1) Pay and allowance of Business Manager Tirpur .. .. .	24,079	13	0			
							(2) Co. 3 .. .. .	41,286	2	9			
							(3) H. 1 .. .. .	12,550	1	9			
							(4) Maintenance of nucleus of pure seed of improved varieties of cotton .. .. .	2,709	1	11			
							(5) Co. 3 in Salem District ..	7,284	15	0			
							Total ..	87,860	2	5			
Carried over ..				1,82,45,438	9	10	Carried over ..	8,79,351	12	8	1,11,05,078	4	1

BALANCE SHEET AS ON 31st MARCH, 1944.—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,82,45,438	9 10	Brought forward ..	8,79,951	12 8	1,11,05,078	4 1
					(iii) Sind.—				
					(1) Seed Distribution .. .. .	4,16,455	9 10		
					(2) Maintenance of nucleus of pure seed of improved varieties of cotton .. .. .	9,862	13 5		
					(3) Financing of seed distribution ..	82,556	12 0		
					Total ..	5,08,875	3 3		
					(iv) Hyderabad.—	51,807	13 8		
					(v) Central Provinces.—				
					(1) Maintenance of nucleus of pure seed of improved varieties of cotton .. .. .	3,260	7 6		
					(2) Jaria Seed Distribution Scheme.	6,228	15 0		
					Total ..	9,490	6 6		
					(vi) Baroda.—				
					(1) Navsari seed Storage .. .. .	35,304	4 4		
					(2) B. D. S .. .. .	17,830	11 9		
					(3) B. P .. .. .	4,952	4 7		
					(4) Scheme for creation of pure Wagad Cotton Zone in Meh- sana District .. .. .	2,580	0 0		
					Total ..	60,167	4 8		
					(vii) Lyallpur ginnery .. .. .	16,038	3 3		
					(viii) United Provinces.—				
					(1) Co. 4 .. .. .	18,616	11 6		
					(2) Perso-American Cotton in Wes- tern Districts .. .. .	24,808	15 0		
					Total ..	42,920	10 6	15,68,151	6 1
Carried over ..			1,82,45,438	9 10	Carried over ..			1,26,73,224	10 2

BALANCE SHEET AS ON 31st MARCH, 1944—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
			1,82,45,433	9 10	Brought forward ..			1,26,73,224	10 2
					(3) MARKETING SCHEMES.—				
					(1) Grading and Marking of 1027 A. L. F. in Surat area .. ..	5,300	10 9		
					(2) Punjab Cotton Marketing Survey	7,214	1 6		
					(3) Baroda Better Marketing of 1027 A. L. F. .. ..	18,693	6 3		
					(4) Extension and Marketing of V. 434 C. P. .. ..	3,63,821	5 4		
					(5) Distribution and Marketing of Buri 107 cotton in Burhanpur Tahsil .. ..	24,492	0 0	4,14,521	7 10
					Total ..				
					(4) MISCELLANEOUS SCHEMES.—				
					(1) Compilation of Manurial Trials ..	719	15 0		
					(2) Compilation of Hand-book deal- ing with pests and diseases of cotton in the Empire .. ..	2,975	5 0		
					(3) Survey of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds .. ..	20,554	14 0		
					(4) Scheme for Research on Chemi- cal finishes .. ..	1,600	0 0	25,850	2 0
					Total ..				
Carried over ..			1,82,45,433	9 10	Carried over ..			1,31,13,596	4 0

**BALANCE SHEET AS ON 31st MARCH, 1944.(concl'd.)**

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURES.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,82,45,433	9 10	Brought forward			1,31,13,596	4 0
					<b>III. Technological Research.—</b>				
					<b>1. Technological Laboratory.—</b>				
					<b>A. Capital Expenditure—</b>				
					(1) Land & Buildings .. ..	4,07,988	14 6		
					(2) Machinery .. ..	1,28,212	1 2		
					(3) Freight .. ..	7,502	2 8		
					(4) Apparatus & Equipment ..	41,668	5 7		
					(5) Machinery & Workshop ..	6,789	8 3		
					<b>B. Working Expenses.— .. ..</b>	30,30,074	5 4		
					<b>2. Provincial .. ..</b>	2,87,799	12 8		
					<b>3. Development of alternative uses of Indian cotton.—</b>				
					(a) Capital Expenditure ..	20,006	7 9		
					(b) Working Expenditure ..	49,699	3 5		
					<b>4. Investigation for Improvement in the ginning of Indian cotton.—</b>				
					(i) Capital Expenditure .. ..	34,072	13 9		
					(ii) Working Expenditure ..	15,806	10 0		
								39,82,620	5 1
					<b>IV. Research Studentships .. ..</b>	2,82,566	1 4		
					<b>Less.—Refund from Dr. Taskhir Ahmad.</b>	3,036	12 0		
								2,79,479	5 4
					By Suspense account .. ..			4,540	6 8
					<b>BY BALANCE .. ..</b>			8,65,197	4 9
<b>GRAND TOTAL ..</b>			<b>1,82,45,433</b>	<b>9 10</b>	<b>GRAND TOTAL ..</b>			<b>1,82,45,433</b>	<b>9 10</b>

## INDIAN CENTRAL COTTON COMMITTEE.

### PROVIDENT FUND ACCOUNT.

*Balance Sheet as on 31st March, 1944.*

RECEIPTS.	Rs.   a.   p.	Rs.   a.   p.	EXPENDITURE.	Rs.   a.   p.	Rs.   a.   p.
Subscribers' contribution account .. ..	4,90,383   2   10		Advance to Subscribers .. .. .	1,13,279   6   0	
<i>Less.</i> —Payment made to subscribers resigned..	1,64,283   6   7		<i>Less.</i> —Recoveries made up to 31-3-1944 ..	92,584   14   0	20,694   8   0
		3,26,069   12   3			
Committee's contribution account .. ..	4,80,078   4   0		Accrued interest on Government paper credited to subscribers for distribution up to 31-3-44.		5,961   8   4
<i>Less.</i> —Payment made to subscribers resigned and forfeitures for Committee's contributions disallowed .. .. .	1,58,973   8   6		By Balance as per details attached .. ..		6,78,240   0   4
		3,21,104   11   6			
Lapse and Forfeiture account .. .. .		15,282   5   11			
Net interest received on investments .. ..		17,406   14   6			
Investment and fluctuation account .. ..		18,209   5   5			
<i>Suspense receipts.</i> —					
Amount due to subscriber deceased—Mr. N. Sreenivas .. .. .	500   0   0				
Suspense deposit of Mr. Dutt's own contribution .. .. .	1,342   10   1	1,342   10   1			
Total ..		6,99,895   11   8	Total ..		6,99,895   11   8

**STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1944.**

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	PAYMENTS.	Rs.	a.	p.	Rs.	a.	p.
Opening Balance as on 1st April 1943 .. .. .	11,40,344	5	6				<i>Administration of the Committee.—</i>						
Sinking Fund .. .. .	17,517	8	0	11,63,861	18	6	(Including Improvement of Cotton Marketing, Printing, Publicity and Distribution and Travelling Allowance of Non-Official Members) .. .. .				1,72,404	8	3
<i>Less.—</i> Adjustments of Suspense Receipts received during 1942-43. .. .. .				212	14	3	<i>Agricultural Research Grants-in-Aid.</i>						
Receipts under Section 12 of the Indian Cotton Cess Act, 1923. .. .. .							(Including Research, Seed Marketing and Miscellaneous Schemes) .. .. .				5,02,017	0	9
<i>Other Receipts.—</i>							<i>Technological Research</i> .. .. .				2,08,215	11	4
Sale of Publications, sale of cotton, Miscellaneous Receipts, Test Fees, etc.	15,659	3	7				<i>Closing Balance.—</i>				9,37,726	15	4
Suspense Receipts .. .. .	539	6	3				(Government Paper at cost).						
Sinking Fund provision for 1943-44 .. .. .	1,615	1	0	17,818	10	10	3% Government of India Defence Bonds, 1946, of the face value of Rs. 97,500 .. .. .	86,287	18	0			
Interest on Investments .. .. .				44,422	9	3	3½% Government of India Loan, 1947-50, of the face value of Rs. 4,50,000 .. .. .	3,93,314	1	0			
Amount received from the Cotton Fund at the disposal of the Government of India .. .. .							4½% Government of India Loan, 1955-60, of the face value of Rs. 28,600 .. .. .	25,004	0	0			
Fees at 1 anna per cwt. received from the Iron and Steel Controller, Calcutta, for distribution of Baling Hoops .. .. .							6% Bombay Municipal Debentures, 1954, of the face value of Rs. 10,000 .. .. .	3,950	0	0			
<i>Less.—</i> Expenditure incurred under Suspense in 1942-43.							6% Rangoon Municipal Debentures, 1955, of the face value of Rs. 3,83,500 .. .. .	4,15,328	2	0			
Carried over .. .. .							(Market Value on 31st March 1944, Rs. 10,21,456-11-0, inclusive of Rangoon Municipal Debentures taken at cost) .. .. .	9,23,884	0	0			
							* An overdraft of Rs. 63,261-11-3 with the Imperial Bank of India, Bombay, has been secured against the Hypothecation of 3½% Government of India Loan, 1947-50 of the face value of Rs. 1,50,000.						
							Carried over .. .. .				9,37,726	15	4

**STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1944.—(concl'd).**

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	PAYMENTS	Rs.	a. p.	Rs.	a. p.
Brought forward ..			18,07,464	10 9	Brought forward ..			9,37,726	15 4
					<i>Imprests.—</i>				
					Rs.				
					(1) Secretary's Office .. .. .	1,500			
					(2) Director, Technological Labora- tory, Matunga .. .. .	500			
					(3) Director of Agriculture, Bombay.	1,270			
					(4) Director of Agriculture, Sind ..	725			
					(5) Cotton Research Botanist, Lyall- pur .. .. .	150			
					(6) Plant Physiologist, Punjab ..	100			
					(7) Geneticist and Botanist, Indore ..	300			
					(8) Agricultural Chemist, Lyallpur ..	30			
							4,575	0 0	
					Suspense (Recoverable) .. .. .		4,540	6 8	
							9,32,999	6 8	
					<i>Less.—Overdraft Account with the Imperial Bank of India, Bombay, (against hypotheca- tion of 3½% Government of India Loan, 1947-50, of the face value of Rs. 1,50,000) ..</i>		63,261	11 8	
					@ Total Closing Balance .. .. .			8,69,737	11 5
					Total ..			18,07,464	10 9
Total ..			18,07,464	10 9	@ Includes Rs. 19,182-9-0 on account of Sinking Fund.				

We have examined the above Statement of Receipts and Payments of Indian Central Cotton Committee with the Books, Vouchers and Certified Returns of the Committee, have obtained all the information and explanations we have required, and certify that to the best of our information and explanations received, the above Statement is a correct abstract of the figures appearing in the Books and is drawn up in conformity with the Rules under the Indian Cotton Cess Act, 1923.

BOMBAY, 26th June, 1944.

(Sd.) S. B. BELLIMORIA & CO.,  
Registered Accountants, Auditors.

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1944.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Opening Balance as on 1st April, 1943 .. ..	6,07,094 13 10			<i>Balances.—</i>		
<i>Less.—</i> Adjustment of Suspense Receipts .. ..	87 8 0	6,07,007 5 10		(Government Securities at Market Value).		
Subscribers' Contributions ..	29,440 6 0			3½% Government Promissory Notes of the face value of Rs. 3,68,500 .. ..	3,61,590 10 0	
<i>Add.—</i> Recoveries against Advances .. ..	13,865 11 0	43,806 1 0		3% Government of India Loan, 1951-54, of the face value of Rs. 32,000 .. ..	31,980 0 0	
		6,50,918 6 10		3½% Government of India Loan, 1947-50, of the face value of Rs. 1,20,000 .. ..	1,23,450 0 0	
<i>Less.—</i> Refunds to Subscribers who have resigned ..	9,958 11 5			4% Government of India Loan, 1960-70, of Rs. 12,600 .. ..	14,167 2 0	
Advances to Subscribers ..	11,228 5 0	21,187 0 5		2½% Government of India Loan, 1948-52, of the face value of Rs. 70,000 .. ..	69,737 8 0	
		6,29,126 6 5		3% Government of India Loan, 1949-52, of the face value of Rs. 85,000 .. ..	35,196 14 0	
<i>Committee's Contribution</i> received from Indian Central Cotton Committee.. ..		29,440 6 0		<i>Savings Bank Account</i> with the Imperial Bank of India, Bombay .. ..	6,36,122 2 0	
		6,58,566 12 5		<i>Current Account</i> with the Imperial Bank of India, Bombay .. ..	491 14 0	
<i>Less.—</i> Payments made to Subscribers who have resigned, including transfers to "Lapse and Forfeiture Account" for contributions disallowed .. ..		9,697 12 6	6,48,868 15 11		36,626 0 4	6,78,240 0 4
Interest received on Investments .. ..	20,807 4 0					
Interest received on Advances to Subscribers .. ..	481 13 8	21,289 1 8				
Carried over ..		21,289 1 8	6,48,868 15 11	Carried over ..		6,78,240 0 4

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1944.—(conold).

RECEIPTS.	Rs. a. p.		Rs. a. p.		EXPENDITURE.	Rs. a. p.		Rs. a. p.		
Brought forward ..			21,289	1 8	6,48,868	15 11			6,78,240	0 4
<i>Less.</i> —Interest paid during the year to subscribers who have resigned :—										
On their own Contributions.	83	4 0								
On Committee's Contributions .. .. .	75	7 8								
Interest paid in advance at the time of purchase of (since received) Govt. Securities .. .. .	3,357	4 7								
Income-tax deducted from interest on Government Securities .. .. .	2,309	6 10								
Withdrawal charges .. .. .	188	15 0								
Bank's commission for collection of interest and stamp charges .. .. .	19	11 0	6,084	1 10	15,254	15 10				
<i>Investments Fluctuation Account.</i> —Net appreciation in market value of securities.			9,208	18 4						
<i>Less.</i> —Net Profit realised on sale of 3% Defence Bonds, 1946, transferred to "Lapses and Forfeiture Account" as per Provident Fund Rule No. 13 .. .. .			8,237	14 0	970	15 4				
<i>Lapses and Forfeitures Account</i> .. .. .					8,145	1 8				
<b>Total ..</b>					<b>6,78,240</b>	<b>0 4</b>	<b>Total ..</b>		<b>6,78,240</b>	<b>0 4</b>

B OMBAY, 20th June, 1944.

52

Examined and found correct.  
(Sd.) S. B. BILLIMORIA & Co.  
Registered Accountants, Auditors.

## APPENDIX II.

## MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

## 1) PRESIDENT—

Mr. H. R. Stewart, C.I.E., I.A.S., Vice-Chairman, Imperial Council of Agricultural Research, *ex-officio*.

(a) The Agricultural Commissioner with the Government of India, *ex-officio*.

## (2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS—

<i>Madras</i> .. .. .	Rao Bahadur Dr. B. Viswanath, C.I.E., F.I.C., Director of Agriculture.
<i>Bombay</i> .. .. .	Mr. W. J. Jenkins, C.I.E., I.A.S., Director of Agriculture.
<i>United Provinces</i> .. .. .	Mr. C. Maya Das, I.A.S., Director of Agriculture.
<i>Punjab</i> .. .. .	Malik Sultan Ali Noon I.A.S., Director of Agriculture.
<i>Central Provinces and Berar</i> ..	Mr. R. H. Hill, I.A.S., Director of Agri- culture.
<i>Sind</i> .. .. .	Mr. V. Isvaran I.C.S., Director of Agri- culture.

(3) THE DIRECTOR OF COMMERCIAL INTELLIGENCE, *ex-officio*.

## (4) REPRESENTATIVES OF CHAMBERS OF COMMERCE AND ASSOCIATIONS—

The East India Cotton Association ..	Sir Purshotamdas Thakurdas, K.B.E., C.I.E.,
The Bombay Millowners' Association ..	Sir Sorab Saklatvala, M.L.A.
The Bombay Chamber of Commerce ..	Mr. C. P. Bramble, M.L.A.
The Indian Merchants' Chamber ..	Sir Chunilal B. Mehta. ( <i>Vice-President</i> .)
The Karachi Chamber of Commerce ..	Mr. A. P. Darlow.
The Ahmedabad Millowners' Association	Mr. Ramanlal Lallubhai.
The Tuticorin Chamber of Commerce ..	Mr. J. L. Hurschler.
The Upper India Chamber of Commerce	Major S. R. Pocock, M.C., M.L.A.
The Empire Cotton Growing Corporation	Sir William Roberts, C.I.E.

## (5) COMMERCIAL REPRESENTATIVES NOMINATED BY CENTRAL GOVERNMENT—

<i>Central Provinces and Berar</i> .. .. .	{ Rao Saheb P.V. Deshmukh. Mr. Y. G. Deshpande.
<i>Madras</i> .. .. .	Mr. J. R. Marshall.
<i>Punjab</i> .. .. .	Sardar Bahadur Sardar Ujjal Singh, M.L.A.

(6) BENGAL REPRESENTATIVE .. .. . Mr. Suryya Kumar Basu.

(7) CO-OPERATIVE BANKING REPRESENTATIVE—Sir Chunilal V. Mehta, K.C.S.I.

## (8) REPRESENTATIVES OF COTTON GROWING INDUSTRY—

<i>Madras</i> .. .. .	{ Mr. K. V. Odhumalsi Gounder. Mr. L. Madhava Reddi.
-----------------------	---------------------------------------------------------

<i>Bombay</i> .. .. .	{ Mr. S. T. More, Mr. B. K. Patel.
<i>United Provinces</i> .. .. .	{ Major Nawab Mohd. Jamshed Ali Khan, M.B.E., M.L.A. Rai Bahadur Kunwar Laxmi Raj Singh, M.L.C.
<i>Punjab</i> .. .. .	{ Chaudhri Ram Sarup, M.L.A. Major T. G. M. Harris, O.B.E.
<i>Central Provinces and Berar</i> .. .. .	{ Rao Bahadur Sir Madharao G. Deshpande, K.B.E., Rao Bahadur Uttamrao Patil.
<i>Sind</i> .. .. .	Mr. Roger Thomas, C.I.E.

## (9) AND (10) REPRESENTATIVES OF INDIAN STATES.—

<i>Hyderabad State</i> .. .. .	Rai Sahab Kalidas Sawhney, Director of Agriculture (Research.)
<i>Baroda State</i> .. .. .	Mr. R. G. Allan, C.I.E., Commissioner of Agriculture.
<i>Gwalior State</i> .. .. .	Mr. N. M. Deshmukh, Director of Agri- culture.
<i>Rajputana and Central India States</i> ..	Rao Bahadur V. A. Tamhane.

## (11) ADDITIONAL MEMBERS NOMINATED BY THE GOVERNOR-GENERAL IN COUNCIL :—

1. Rao Bahadur S. S. Salimath, Headquarters Deputy Director of Agriculture, Poona.
2. Mr. M. J. Narasimhan, Director of Agriculture in Mysore, Bangalore.
3. Rao Bahadur V. Ramanatha Ayyar Avl., Headquarters Deputy Director of Agriculture, Madras.
4. Musahib-i-khas Bahadur Capt. H. C. Dhanda, Commerce Minister, Holkar State, Representative of the Holkar State.
5. Representative of the Karachi Indian Merchants' Association.—Vacant.
6. Dr. B. L. Sethi, Deputy Director of Agriculture Western Circle, Aligarh.
7. Sardar Bahadur Sardar Beant Singh.
8. Sir Shri Ram, Representative of the Cotton Millowners of Delhi.
9. Representative of the Karachi Cotton Association Ltd.—Vacant.
10. Dewan Bahadur Sir T. Vijayaraghavacharya, K. B. E.
11. Dr. P. J. Gregory, Second Economic Botanist, Bengal.
12. Dr. V. K. R. V. Rao, Director of Statistics, Food Department, Govt. of India.
13. Mr. Camar Tyabjee, Managing Agent, Osman Shahi and Azamjahi Mills, Hyderabad (Deccan).
14. Sir Padampat Singhania, Senior Proprietor, Messrs. Jugilal Kamlapat, Cawnpore.
15. Mr. R. G. Saraiya, O.B.E., Messrs. Narandas Rajaram & Co., Bombay.

## APPENDIX III.

## SUB-COMMITTEES.

*Standing Finance Sub-Committee.*—Sir Chunilal B. Mehta (Vice-President), Chairman, Mr. H. R. Stewart (President); (*ex-officio*); Sir Purshotamdas Thakurdas; Sir Sorab Saklatvala; Sir Chunilal V. Mehta; Mr. J. L. Hirschler; Mr. W. J. Jenkins; Rao Bahadur Sir Madhavrao Deshpande and Mr. R. G. Saraiya.

*Local Sub-Committee.*—President (Mr. H. R. Stewart); the Vice-President (Sir Chunilal B. Mehta); Sir Purshotamdas Thakurdas; Sir Sorab Saklatvala; Sir Chunilal V. Mehta. Mr. J. L. Hirschler; Mr. C. P. Bramble; Mr. R. G. Saraiya; Mr. W. J. Jenkins; Mr. A. P. Darlow; Rao Bahadur Sir Madhavrao Deshpande and Mr. S. T. More.

*Agricultural Research Sub-Committee.*—

- I. *The President*—Mr. H. R. Stewart (*ex-officio*),
- II. *The Vice-President*—Sir Chunilal B. Mehta (*ex-officio*),
- III. *The Co-operative Banking Representative*—Sir Chunilal V. Mehta (*ex-officio*),
- IV. *Cotton Growers' Representatives*—Sir William Roberts, Mr. Roger Thomas, Rao Bahadur Sir Madhavrao Deshpande, Rao Bahadur Uttamrao Patil,
- V. *Cotton Trade Representatives*—Sir Purshotamdas Thakurdas, Mr. R. G. Saraiya Mr. J. L. Hirschler, Mr. C. P. Bramble, Mr. Y. G. Deshpande.
- VI. *Agricultural Officers*—The Agricultural Commissioner with the Government of India (*ex-officio*), Mr. W. J. Jenkins, Mr. Malik Sultan Ali Noon, Mr. C. Maya Das, Mr. R. G. Allan, Rai Saheb Kalidas Sawhney, Mr. N. M. Deshmukh, Mr. R. H. Hill, Mr. V. Isvaran, Mr. M. J. Narasimhan, Rao Bahadur S. S. Salimath, Rao Bahadur V. A. Tamhane.
- VII. *Additional Members*—Dewan Bahadur Sir T. Vijayaraghavacharya, Mr. Mohammad Afzal, Mr. K. Ramiah, Professor R. H. Dastur, Rao Bahadur V. Ramanath Ayyar, Dr. B. L. Sethi, Dr. R. Sankaran, Mr. S. S. Pande, Dr. V. G. Panse, Dr. B. N. Uppal, Dr. P. J. Gregory, Dr. H. K. Nandi, Dr. Nazir Ahmad, Mr. P. D. Gadkari, Dr. B. S. Kadam, Mr. L. Madhava Reddi, Mr. R. Balasubramaniam.
- VIII. *The Secretary.*

*Technological Research Sub Committee.*—The President—Mr. H. R. Stewart (*ex-officio*), The Vice-President—Sir Chunilal B. Mehta (*ex-officio*), The Agricultural Commissioner with the Government of India (*ex-officio*), Sir Purshotamdas Thakurdas, Dewan Bahadur Sir T. Vijayaraghavacharya, Sir Sorab Saklatvala, Sir Chunilal V. Mehta, Sir William Roberts, Sir Shri Ram, Sir Padampat Singhania, Mr. W. J. Jenkins, Mr. R. H. Hill, Mr. C. P. Bramble, Major S. R. Pocock, Mr. J. L. Hirschler, Mr. R. G. Saraiya, Rao Saheb P. V. Deshmukh, Malik Sultan Ali Noon, Dr. Nazir Ahmad, Rao Bahadur V. Ramanatha Ayyar, Rai Saheb Kalidas Sawhney, Mr. Y. G. Deshpande, Mr. K. Ramiah, Mr. Roger Thomas, Dr. R. Sankaran, Dr. B. L. Sethi, Mr. Mohammad Afzal, Dr. K. Venkataraman, Rao Bahadur Uttamrao Patil, the Director of Industries, Bombay, The Principal, Victoria

Jubilee Technical Institute, Bombay, Mr. A. D. Walwyn and Mr. G. C. Abbott (Representing the Bombay Millowners' Association), Mr. Narottam P. Hutheesing and Mr. Rasiklal C. Nagri (Representing the Ahmedabad Millowners' Association) and Mr. Gatulal Rangildas and Mr. Jamnadas Ramdas (Representing the East India Cotton Association, Ltd.)

*Cotton Forecast Sub-Committee*—The President (*ex-officio*), The Vice-President, the Agricultural Commissioner with the Government of India (*ex-officio*), The Director of Commercial Intelligence, the Director of Agriculture, Bombay Province, the Director of Agriculture, Punjab, the Director of Agriculture, Madras, The Director of Agriculture, United Provinces, the Director of Agriculture, Central Provinces and Berar, the Director of Agriculture, Sind, the Director of Agriculture (Research), H.E.H. the Nizam's Government, the Commissioner of Agriculture, Baroda, the Director of Statistics, H. E. H. the Nizam's Government, the Director of Land Records, Central Provinces and Berar, the Director of Statistics, Calcutta, the Statistical Officer, Department of Industries and Commerce, Madras, Mr. J. L. Hurschler, C. P. Bramble, Sir William Roberts, Sir Chunilal V. Mehta, Mr. Roger Thomas and Dr. V. G. Panse.

*Cotton Ginning and Pressing Factories Sub-Committee*—The President—Mr. H. R. Stewart, the Vice-President—Sir Chunilal B. Mehta (*ex-officio*), the Co-operative Banking Representative—Sir Chunilal V. Mehta (*ex-officio*), Sir Purshotamdas Thakurdas, Sir Sorab Saklatvala, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Sir William Roberts, Mr. W. J. Jenkins, Rao Saheb P. V. Deshmukh, Major S. R. Pocock, Mr. C. P. Bramble, Mr. J. R. Marshall, Mr. R. H. Hill and Dr. Nazir Ahmad.

*Standards Sub-Committee*.—This Sub-Committee was not constituted as the preparation of Universal Standards has been held in abeyance for the duration of the war.

---

## APPENDIX IV

### STOCKS OF INDIAN COTTON ON 31st JANUARY, 1944, HELD BY THE MILLS AND THE TRADE IN MADRAS PROVINCE.

(In thousand bales of 400 lbs. each.)

Trade Descriptions of Cotton.	MILL STOCKS ON 31st JANUARY					TRADE STOCKS ON 31st JANUARY					TOTAL STOCKS ON 31st JANUARY				
	1940.	1941.	1942.	1943.	1944.	1940.	1941.	1942.	1943.	1944.	1940.	1941.	1942.	1943.	1944.
Tinnevelles .. ..	20	18	27	31	17	2	14	17	15	18	22	32	44	46	35
Salems.. .. .	4	9	10	20	19	3	2	6	5	4	7	11	16	25	23
Cambodias .. ..	33	34	66	99	83	5	21	38	39	49	38	55	104	138	132
Northerns & Westerns	15	23	25	27	15	2	16	10	32	26	17	39	35	59	41
Cocanadas .. ..	1	1	4	3	3	8	9	19	5	19	9	10	23	8	22
Outside Cottons ..	49	56	61	55	84	..	..	4	1	5	49	56	65	56	89
Total ..	122	141	193	235	221	20	62	94	97	121	142	203	287	332	342

## APPENDIX V

### INDIAN RAW COTTON CONSUMED IN INDIAN MILLS.

(Based on returns made under the Indian Cotton Cess Act, 1923, by mills in British India, and on voluntary returns from mills in Indian States).

*Cotton Year: 1st September to 31st August.*

(In Bales of 400 lbs. nett.)

—	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	†1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.
Bombay Island ..	766,375	664,546	611,608	565,084	491,709	687,287	664,199	636,720	782,815	750,317	634,149	982,084	1,057,745	1,270,766	1,199,172
Ahmedabad .. ..	344,021	321,508	322,257	348,009	373,345	326,558	320,982	304,398	346,269	346,375	305,459	341,800	414,870	384,699	428,677
Bombay Province ..	1,300,859	1,178,659	1,132,645	1,116,297	1,069,549	1,280,616	1,189,310	1,128,744	1,353,998	1,316,313	1,172,285	1,580,079	1,764,339	1,939,423	1,906,006
Madras Province ..	211,488	214,759	260,707	292,013	278,060	312,164	365,423	412,268	422,573	480,839	507,391	525,611	594,054	647,407	596,585
United Provinces ..	234,205	235,623	256,820	273,573	277,230	292,424	317,011	299,073	288,320	356,331	349,340	381,025	427,805	437,441	414,210
Central Provinces and Berar .. ..	123,146	118,492	116,018	111,208	112,660	125,014	130,298	122,987	146,587	164,616	142,868	159,825	178,791	174,385	148,020
Bengal.. .. .	99,075	91,993	102,390	103,784	107,633	101,101	99,892	79,944	92,546	90,611	111,383	135,227	125,740	136,096	138,208
The Punjab and Delhi.	64,464	73,736	89,681	80,854	71,939	83,897	89,430	93,886	94,742	133,347	165,274	171,652	179,987	182,104	184,950
Rest of British India .	24,456	27,101	30,342	31,935	35,139	38,575	38,010	35,823	40,840	49,306	44,867	47,316	64,804	59,008	52,242
Total—British India..	2,057,695	1,935,863	1,937,603	2,009,664	1,946,210	2,183,791	2,223,374	2,172,725	2,445,806	2,591,863	2,493,408	2,994,735	3,335,020	3,575,861	3,440,816
Total—Indian States.*	315,399	333,906	358,793	351,260	390,116	423,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375	730,970	678,645
<b>TOTAL—INDIA ..</b>	<b>2,373,094</b>	<b>2,269,769</b>	<b>2,346,396</b>	<b>2,360,924</b>	<b>2,336,326</b>	<b>2,612,132</b>	<b>2,677,688</b>	<b>2,632,785</b>	<b>2,999,809</b>	<b>3,151,065</b>	<b>3,050,106</b>	<b>3,617,147</b>	<b>4,025,395</b>	<b>4,306,831</b>	<b>4,119,461</b>

\* Figures for Indian States up to and including 1930-31, being based on yarn production returns, include foreign cotton also.

† From April 1937, figures for Burma have been excluded.

## INDIAN RAW COTTON CONSUMED IN MILLS IN INDIAN STATES.

(Based on voluntary returns from mills in Indian States).

*N.B.*—Figures up to and including 1930-31, being based on yarn production returns, include foreign cotton also.

*Cotton Year : 1st September to 31st August.*

(In Bales of 400 lbs. nett.)

	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	
Hyderabad .. ..	20,823	23,074	31,290	33,488	33,231	45,588	51,771	49,981	63,093	68,156	67,095	72,860	83,725	83,639	78,204	
Mysore .. ..	46,590	43,326	49,293	50,596	47,168	51,196	50,324	53,236	55,244	53,853	67,851	65,062	74,966	77,734	57,718	
Baroda .. ..	59,043	62,578	58,534	50,587	53,612	57,146	51,963	51,761	70,686	73,278	65,573	91,519	90,642	87,542	88,623	
Gwalior .. ..	41,468	45,207	45,892	48,806	49,362	56,318	72,163	79,079	89,243	94,090	88,638	95,517	94,300	90,025	98,152	
Indore .. ..	83,026	88,620	95,296	91,086	111,430	114,229	113,379	106,454	147,766	140,792	120,186	138,795	143,367	149,914	144,147	
Kathiawar States .. ..	}	20,283	18,849	18,868	26,506	35,433	37,397	42,717	48,545	44,109	43,703	50,479	60,623	72,857	70,577	
Other Indian States .. ..		32,558	39,382	40,209	45,197	45,735	51,462	57,767	57,119	58,444	}	102,702	103,180	137,247	169,209	146,219
Pondicherry .. ..		13,850	20,257	28,170	23,610	22,691	20,355	19,065	22,307	26,475						
<b>Total—Indian States.</b>	<b>315,899</b>	<b>333,996</b>	<b>358,793</b>	<b>351,260</b>	<b>390,116</b>	<b>423,341</b>	<b>449,314</b>	<b>460,060</b>	<b>554,003</b>	<b>559,202</b>	<b>556,693</b>	<b>622,412</b>	<b>690,375</b>	<b>730,970</b>	<b>678,645</b>	

## LOOSE (UNPRESSED) INDIAN RAW COTTON RECEIVED IN MILLS IN BRITISH INDIA.

(Based on voluntary returns furnished by mills.)

*Cotton Year : 1st September to 31st August.*

(In Bales of 400 lbs. nett.)

	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.
Bombay Province .. ..	24,361	54,409	74,979	80,092	74,868	58,855	75,617	67,219	74,750	80,164	86,687	96,215	102,965	81,643	54,415
Madras Province .. ..	46,582	55,717	99,389	96,340	110,875	123,260	147,044	173,102	156,675	162,489	175,540	189,257	230,691	241,751	202,405
United Provinces .. ..	20,441	18,496	14,367	19,236	17,371	10,090	10,405	10,659	15,719	17,532	20,279	29,127	26,293	5,024	4,037
Central Provinces and Berar .. ..	16,243	15,771	20,743	17,462	18,382	20,544	27,502	26,321	32,860	26,980	29,052	32,539	31,173	19,153	7,366
Bengal* .. ..	..	..	..	..	..	..	90	..	..	..	3	..	..	433	5,000
The Punjab & Delhi .. ..	4,361	4,307	2,317	2,149	..	5,535	3,110	28,385	23,873	25,960	33,079	28,627	30,986	22,638	15,319
Rest of British India* .. ..	..	..	..	..	..	..	..	19,282	17,160	22,916	12,734	15,529	21,230	6,804	4,942
<b>Total—British India..</b>	<b>111,988</b>	<b>148,700</b>	<b>211,795</b>	<b>215,279</b>	<b>221,996</b>	<b>217,734</b>	<b>263,673</b>	<b>325,058</b>	<b>321,037</b>	<b>336,041</b>	<b>357,374</b>	<b>391,344</b>	<b>443,393</b>	<b>377,496</b>	<b>293,534</b>
Indian States* .. ..	..	..	..	..	..	..	..	131,149	109,003	122,078	116,962	131,657	118,660	83,372	78,882
<b>Total—INDIA*</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>456,207</b>	<b>430,040</b>	<b>458,119</b>	<b>474,336</b>	<b>523,001</b>	<b>562,053</b>	<b>460,868</b>	<b>372,416</b>

\* Figures up to 1935-36 not compiled.

† Figures up to 1935-36 exclude Delhi.

‡ From 1936-37 the figures refer to consumption and not receipts and are based on returns furnished under the Indian Cotton Cess Act, 1923, by mills in British India and on voluntary returns from mills in Indian States. From April 1937, figures for Burma have been excluded.