



**INDIAN  
CENTRAL COTTON  
COMMITTEE**

**TWENTY-FOURTH  
ANNUAL  
REPORT**

**1945**

**TWENTY-FOURTH**  
**ANNUAL REPORT**  
**OF THE**  
**INDIAN**  
**CENTRAL COTTON COMMITTEE**

for the year ended  
31st AUGUST,  
**1945**

**PRICE, Rs. 2.**

# CONTENTS

	PAGE
<b>CHAPTER I.</b>	
Constitution, Aims and Objects .. .. .	1
<b>CHAPTER II.</b>	
Meetings .. .. .	4
<b>CHAPTER III.</b>	
<i>Cotton Statistics</i> .. .. .	11-21
Indian cotton situation—1944-45 .. .. .	11
Report on the staple length of Indian cotton crop .. .. .	13
Demand for various types of Indian cotton .. .. .	14
Stocks .. .. .	15
Indian mill consumption .. .. .	16
Exports .. .. .	16
Statistics of cotton pressed .. .. .	16
Unpressed (loose) cotton statistics .. .. .	16
Statistics of cotton ginned .. .. .	17
Improvement of cotton forecasts .. .. .	18
Scheme for crop estimating survey on cotton in the Central Provinces and Berar.	18
Revision of classification of Indian cotton .. .. .	20
Accuracy of the all-India cotton forecasts .. .. .	20
Publications .. .. .	21
<b>CHAPTER IV.</b>	
<i>Research</i> .. .. .	22-66
Research on Cotton Technology .. .. .	22
Fundamental Research .. .. .	25
Cotton Research in Provinces and States .. .. .	32
(i) <i>Bombay.</i> —	
(a) Broach Cotton Breeding Scheme .. .. .	32
(b) Jalgaon Cotton Breeding Scheme .. .. .	33
(c) Scheme for breeding wilt-resistant cottons in Surat area .. .. .	34
(d) Scheme for improvement of Wagad cotton at Virangam and Jagudan .. .. .	34
(e) Scheme for improvement of cotton crop in Kaira district .. .. .	36
(f) Scheme for interspecific hybridisation in cottons at Surat .. .. .	37
(g) Scheme for improvement of Dharwar-American cotton .. .. .	38
(h) Scheme for investigation of 'small-leaf' disease of cotton .. .. .	39
(ii) <i>Sind.</i> —	
(a) Scheme for production of long staple cottons in Sind .. .. .	40
(b) Scheme for Cotton Jassid Investigation .. .. .	41

	PAGE
(c) Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan .. .. .	42
(d) Scheme for bollworm investigation and clean-up campaign in Sind .. .. .	44
<b>(iii) Punjab.—</b>	
(a) Punjab Botanical Scheme .. .. .	45
(b) Scheme for improvement of Punjab-American 289 F/K. 25 cotton ..	47
(c) Physiological Scheme .. .. .	48
(d) Cotton Jassid Investigation in the Punjab .. .. .	51
<b>(iv) Central Provinces and Berar.—</b>	
Central Provinces and Berar Cotton Breeding Scheme .. ..	52
<b>(v) Madras.—</b>	
(a) Scheme for Improvement of Mungari cotton in Madras Province ..	54
(b) Scheme for Improvement of Cocanadas cotton in Madras Province .. .. .	55
<b>(vi) United Provinces.—</b>	
United Provinces Botanical Scheme .. .. .	57
<b>(vii) Bengal.—</b>	
Scheme for cultivation of long staple cotton in Bengal .. ..	58
<b>(viii) Baluchistan.—</b>	
Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan .. .. .	59
<b>(ix) Hyderabad State.—</b>	
(a) Gaorani Cotton Improvement Scheme .. .. .	60
(b) Scheme for Improvement of cotton of Oomras tract in Hyderabad State .. .. .	62
(c) Scheme for improvement of Kumpta cotton .. .. .	63
<b>(x) Baroda.—</b>	
Scheme for improvement of Mathio cotton at Amreli .. ..	65
<b>(xi) Mysore State.—</b>	
Scheme for breeding Sea Island & Egyptian cottons in Mysore ..	65

## CHAPTER V.

Extension Work in Provinces and States .. .. .	67-84
<b>Bombay.—</b>	
(a) Surat Seed Distribution Scheme .. .. .	67
(b) Scheme for Selection IA cotton .. .. .	68
(c) Jarila Seed Distribution and Extension Scheme .. .. .	69
(d) Deccan Canals (Jarila) Seed Distribution Scheme .. .. .	70

	PAGE
(e) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme ..	71
(f) Scheme for cultivation of 1027 A.L.F. cotton in Nawapur Taluka ..	72
(g) Scheme for Multiplication and Distribution of 'Vijaya' cotton in Middle Gujerat .. .. .	73
(h) Scheme for Multiplication and Distribution of 'Wagotar' cotton in Ahmedabad District .. .. .	73
<i>Sind.—</i>	
(a) Seed Distribution and Extension Scheme .. .. .	74
(b) Financing of Seed Distribution .. .. .	75
<i>Central Provinces and Berar.—</i>	
(a) Verum Seed Distribution and Marketing Scheme .. .. .	77
(b) Scheme for Distribution and Marketing of Jarila cotton in Central Provinces and Berar .. .. .	78
<i>Madras—</i>	
(a) Co. 3 Seed Distribution Scheme .. .. .	78
(b) Scheme for Distribution of H. 1 strain in the Westerns area ..	79
(c) Maintenance of nucleus of pure seed of improved varieties of cotton.	80
<i>United Provinces.—</i>	
Scheme for Distribution and Extension and Marketing of Perso-American cotton in Western United Provinces .. .. .	80
<i>Baroda State.—</i>	
(a) Baroda (Navsari) Seed Distribution Scheme .. .. .	81
(b) B. 9 Seed Distribution Scheme .. .. .	82
(c) Scheme for creation of a pure Wagad Zone in Mehsana District in Baroda State .. .. .	83
(d) Scheme for distribution & multiplication of Vijaya cotton .. .. .	84

## CHAPTER VI.

<i>Progress in the Introduction of Improved Varieties of Cotton</i> .. .. .	85-107
(i) Bombay .. .. .	88
(ii) Sind .. .. .	94
(iii) Punjab .. .. .	95
(iv) Central Provinces and Berar .. .. .	97
(v) Madras .. .. .	97
(vi) United Provinces .. .. .	102
(vii) Hyderabad State .. .. .	103
(viii) Baroda State .. .. .	105
(ix) Rajpipla State .. .. .	106
(x) Mysore State .. .. .	107
(xi) Gwalior State .. .. .	107

## CHAPTER VII.

	Page
<i>Cotton Marketing, Legislation and other Protective Measures</i> .. .. .	108-116
(i) Increased use of Indian cotton in mills in India .. .. .	108
(ii) Inclusion of Indian Cotton in the proposed post-war Universal Contract .. .. .	108
(iii) Cotton baling hoops .. .. .	109
(iv) Reversion to pre-war lashings of cotton bales .. .. .	110
(v) Fuel requirements of ginning and pressing factories .. .. .	110
(vi) Dismantling of cotton ginning and pressing factories .. .. .	111
(vii) Fixation of separate floor and ceiling prices for Co. <sub>3</sub> & Co. <sub>4</sub> cottons	111
(viii) Supply of iron for agricultural purposes .. .. .	112
(ix) Regulated cotton markets .. .. .	112
(x) Agmarking .. .. .	113
(xi) Universal standards .. .. .	113
(xii) Legislation to maintain the purity of cotton and other protective measures .. .. .	113
(a) Cotton Transport Act .. .. .	114
(b) Cotton Ginning and Pressing Factories Act .. .. .	114
(c) Prevention of introduction of foreign cotton pests .. .. .	115
(d) The Red (Sudan) Bollworm ( <i>Diperopsis castanea</i> ) and other pests .. .. .	116
(e) Cotton Control Act .. .. .	116

## APPENDICES

I. Members of the Indian Central Cotton Committee .. .. .	117
II. Sub-Committees .. .. .	119
III. Statement of receipts and payments for the year ended 31st March, 1945, Balance Sheet as at 31st March, 1945 .. .. .	121
IV. Stock of Indian cotton on 31st January, 1945, held by the mills and the trade in Madras Province .. .. .	137
V. Indian raw cotton consumed in Indian mills .. .. .	138

# INDIAN CENTRAL COTTON COMMITTEE

## ANNUAL REPORT

---

### CHAPTER I.

#### CONSTITUTION, AIMS AND OBJECTS

The Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18. At first, the Committee was purely an advisory body but, with its incorporation under the Indian Cotton Cess Act in 1923, it became an administrative body having at its disposal funds for the improvement and development of the growing, marketing and manufacture of cotton in India. These funds are derived from the cess of 2 annas (4 annas for the first three years) levied on every bale of Indian cotton exported from or consumed in mills in British India, the underlying principle being that special expenditure for the benefit of a particular industry should be borne by that industry. Of the total receipts of the Committee up to the 31st March, 1945, amounting to Rs. 1,96,22,249-15-6 Rs. 1,59,26,017-12-11 represent collections from the cotton cess. The funds at the disposal of the Committee are allotted for research into cotton problems mainly of all-India importance and for the development, extension and marketing of improved varieties of cotton. The policy followed in this regard is to supplement and not supplant the work of the Agricultural Departments in the cotton growing provinces and States, and, though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, as a general rule assistance is given in the directions where it is most needed in the carrying out of a co-ordinated policy of cotton improvement. Until 1937, the entire expenditure on the various schemes was borne by the Committee but, in view of the gradual depletion of its reserves owing to annual expenditure exceeding income, it was decided that the Provincial Governments and States, in future, should accept increasing responsibility for such of the schemes financ-

ed by the Committee as, at the end of their sanctioned period, were found to have produced results of definite value, in order that the savings thus effected may be utilised by the Committee for extending its activities in other useful directions. The Provincial Governments and States have since borne an increasing share of expenditure on the schemes of the Committee. Touch is maintained with the work done under the various schemes by means of annual progress reports submitted by the officers in charge of schemes. These reports are critically examined by the appropriate Sub-Committees which make suggestions regarding the future conduct of the work on the schemes. While the Committee's constitution ensures a broad outlook on all matters falling within its purview, its primary concern is the interest and welfare of the cotton grower. In this connection, it should be mentioned that the Committee's work is greatly facilitated by the co-operation it always receives from the various trade associations and by the readiness with which they respond in the matter of giving effect to recommendations designed to benefit the cotton growers. 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, 1945, is given in Appendix I. The composition of the Sub-Committees as on 31st August, 1945, is given in Appendix II. The functions of the various Sub-Committees have been detailed in previous reports and it is not proposed to repeat them here beyond stating that the day to day administration of the Committee is carried on in consultation with the Standing Finance Sub-Committee which exercises its power under Rule 11 of the Rules under Section 16 of the Indian Cotton Cess Act, and is the principal executive body of the Committee.

The present is the twenty-fourth Annual Report of the Committee, covering the period 1st September, 1944, to 31st August, 1945. Despite all the difficulties arising from the war, good progress was maintained in each sphere of the Committee's activities. There was no change in the administration; Mr. D. N. Mahta continued



as Secretary of the Committee and Dr. Nazir Ahmad as Director of the Committee's Technological Laboratory. The receipts during the year amounted to Rs. 13,77,562/- and the total expenditure to Rs. 9,45,331/-. A statement of the receipts and expenditure as well as the Balance Sheet for the year as at 31st March, 1945, are contained in Appendix III. The Committee was represented on the Board of Governors of the Institute of Plant Industry, Indore, by Mr. H. R. Stewart, President, Sir Chunilal B. Mehta, Vice-President, Sir William Jenkins, Rai Saheb Kalidas Sawhney and Mr. D. N. Mahta (Secretary) during the financial year ending 31st March, 1945. During the same period, 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 Indian Central Cotton 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 1944-45.

## CHAPTER II

### MEETINGS

The full Committee usually meets twice a year, but most of the detailed work is carried on with the help of Sub-Committees appointed annually which hold office from the 1st April. This arrangement is necessary for the disposal of business which, otherwise, would remain pending till one of the half-yearly meetings of the full Committee, and it also lightens considerably the task of the main Committee. Two meetings of the Indian Central Cotton Committee were held in the year that has elapsed since the last report was issued. The first meeting was held at Bombay on the 26th and 27th January, 1945, Mr. H. R. Stewart presiding. At this meeting, the most important subject considered was that relating to planned production of cotton on an all-India basis. At the previous meeting of the Committee a Planning Sub-Committee had been appointed to examine this subject in detail and report on the part which cotton should play in the planning of agricultural production in the country and to work in close collaboration with the proposed Central Crop Planning Council. The Planning Sub-Committee had met on the 16th and 17th November, 1944, and again on the 23rd January, 1945, and the Committee thus had before it the report and recommendations of the Sub-Committee. The report revealed that Provincial Governments and Indian States had already reduced or were proposing to reduce in the 1944-45 season the acreage under cotton by 2 million acres as against 3,100,000 acres (2 million acres under short staple cotton and 1,100,000 acres under low-grade medium staple cotton) recommended by the Planning Sub-Committee. After extended discussion, the Committee accepted the recommendations of the Planning Sub-Committee in full. These recommendations were accordingly forwarded to the Government of India who were requested to take early steps to give effect to the short-term proposals for 1945-46. Briefly, the Committee recommended that for the 1945-46 and 1946-47 seasons

- (a) the 1942-43 all-India cotton area of 19.2 million acres should be reduced by about 3.0 million acres, thus providing for a maximum cotton area of 16.2 million acres in each of

these two years, the plan for 1946-47 to be revised, if necessary, in the light of the circumstances that may prevail at the end of 1945-46 season,

(b) as between the different classes of cotton, the total reduction of 3.0 million acres should be apportioned as follows:—

2.0 million acres in short staple cottons,

1.0 million acres in low-grade medium staple cottons.

The varieties of cotton proposed for reduction, the Provinces and States affected and the extent of the reduction proposed for each are shown below:—

Style of cotton	Provinces or States.	1942-43 area	Extent of reduction proposed by the Committee	Maximum area proposed for 1945-46 and 1946-47 (Col. 3— Col. 4).
1	2	3	4	5
<i>In lakhs of acres.</i>				
<b>SHORT STAPLE.</b>				
Bengals.	United Provinces .. .. .	3.11	1.08	2.03
	Rampur State .. .. .	.06	.02	.04
	Punjab (British districts) .. .. .	7.35	3.01	4.34
	Bahawalpur State .. .. .	.37*	.14	.23
	Patiala State .. .. .	1.43*	.59	.84
	Jind State .. .. .	.19	.07	.12
	Nabha State .. .. .	.19	.04	.15
	Faridkot State .. .. .	.13	.06	.07
	Kapurthala State .. .. .	.08	.04	.04
	Malerkotla State .. .. .	.04	.02	.02
	Sind (British districts) .. .. .	.64	.04	.60
	Khairpur State .. .. .	.04	.01	.03
	Rajputana States .. .. .	2.40	.76	1.64
Ajmer-Merwara .. .. .	.10	.04	.06	
		16.13	5.92	10.21
Oomras	Hyderabad State .. .. .	14.40	5.20	9.20
	Central Provinces and Berar .. .. .	6.90	2.50	4.40
	Holkar State .. .. .	4.57	1.64	2.93
	Gwalior State .. .. .	.03	Nil	.03
	Rajputana and other Central India States .. .. .	1.80	.65	1.15
	Bombay Province .. .. .	2.30	.80	1.50
		30.00	10.79	19.21

\*Estimated. Exact figure not available in this office.

Style of cotton	Provinces or States.	1942-43 area	Extent of reduction proposed by the Committee	Maximum area proposed for 1945-46 and 1946-47 (Col. 3— Col. 4).
1	2	3	4	5
Westerns	{ Hyderabad State .. .. .	3.30	.60	2.70
	{ Madras Province .. .. .	†..	.60	†..
		<u>3.30</u>	<u>1.20</u>	<u>2.10</u>
Kathiawar short staple (Mathio)	{ Western India States Agency ..	2.20	.98	1.22
	{ Baroda State .. .. .	0.50	.22	.28
		<u>2.70</u>	<u>1.20</u>	<u>1.50</u>
Warangal and Cocanadas	{ Madras Province .. .. .	1.10	.50	.60
	{ Hyderabad State .. .. .	1.00	.30	.70
		<u>2.10</u>	<u>.80</u>	<u>1.30</u>
	Total Short Staple .. .. .		<u>19.91</u>	
† Included under medium staple.				
<b>LOW-GRADE MEDIUM STAPLE</b>				
Dholleras	{ Bombay Province .. .. .	4.40	1.25	3.15
	{ Western India States Agency and Cutch .. .. .	5.39	1.05	4.34
	{ Baroda State .. .. .	1.01	.20	.81
		<u>10.80</u>	<u>2.50</u>	<u>8.30</u>
Malvi.	{ Holkar State .. .. .	1.05	.14	.91
	{ Gwalior State .. .. .	4.44	Nil	4.44
	{ Rajputana and other Central India States .. .. .	2.21	.29	1.92
		<u>7.70</u>	<u>0.43</u>	<u>7.27</u>
C. P. & Berar Verum	{ Central Provinces and Berar ..	20.80	3.00	17.80
Khandesh Oomras (Medium).	{ Bombay Province .. .. .	8.00	1.00	7.00
Broach	{ Bombay Province .. .. .	2.87	.20	2.67
	{ Baroda State .. .. .	3.41	Nil	3.41
	{ Gujerat States .. .. .	.88	.06	.82
		<u>7.16</u>	<u>.26</u>	<u>6.90</u>
Bijapur and Bagalkot Jowari	{ Bombay Province .. .. .	3.60	1.00	2.60
Westerns (Medium)	{ Madras Province .. .. .	7.20*	2.00	5.02*
			<u>10.19</u>	
Total Low-Grade Medium Staple .. .. .			<u>10.19</u>	
<b>GRAND TOTAL</b> .. .. .			<u>30.10</u>	

\*Includes short staple.

In distributing the reductions between the different styles and regions, the following principles were laid down by the Committee as essential:—

- (i) There should be no increase in areas under styles not proposed for reduction over the area in 1942-43 or 1943-44, whichever is less. As regards American cotton in Sind, the Committee agreed that no limitation need be imposed.
- (ii) Irrigation water should not be supplied for the production of short staple cotton in canal irrigated tracts.
- (iii) The reduction proposed in the different administrations should be enforced compulsorily.
- (iv) Provinces and States which are compelled to reduce the area under cotton and which, as a consequence, will not produce sufficient cotton seed for cattle feed should be allowed to import cotton seed freely from surplus cotton seed areas.
- (v) In order further to make the growing of short and low-grade medium staple cottons less profitable, the mixing of cotton should be prohibited immediately by central legislation which should be strictly enforced.

The position arising from the proposed grant of a subsidy on American cotton exports was also considered at the same meeting, and, after prolonged discussion, the following resolution was unanimously passed:—

“The Indian Central Cotton Committee notes with grave concern that the U.S. cotton export programme providing for the grant of a subsidy of 4 cents per pound on exports of American cotton has been put into operation. In its opinion, this action of the U.S. Government is against the spirit of the resolutions passed by the United Nations Conference on Food and Agriculture, held at Hotsprings in 1943 and at the International Business Conference held in New York in November 1944. The subsidy has affected and will continue to affect adversely the prices of Indian cotton and consequently the interests of the cotton growers of this country. The Committee, therefore, requests the Government of India to take up the matter with the Government of the U.S.A. with a view to securing the abolition of the subsidy at an early date. The Commit-

tee suggests further that should any International Cotton Conference be held, India should be represented on it and that in the selection of India's representatives as well as in giving them any instructions in the matter, the Indian Central Cotton Committee should be consulted."

The question of placing the finances of the Committee on a sound basis was another subject which received considerable attention at this meeting, and the following resolution was unanimously passed:—

"In view of the fact that the income of the Committee is insufficient to cover even its existing normal yearly expenditure, let alone expenditure which increase in research, seed distribution, ginning experiments and other activities would involve, rather than depend on Government meeting the deficit from time to time or giving a grant from the Cotton Fund, this Committee recommends that from the 1st September, 1945, the Cotton Cess should be raised from 2 annas to 4 annas per bale."

After considerable discussion, it was further agreed that steps should be devised for collecting the cess also from mills situated in Indian States which hitherto were exempt from such payment.

Another resolution passed at this meeting recommended that steps should be taken for the early import of new or reconditioned textile machinery from the U.S.A. or the United Kingdom in order to solve the twin problems of reducing the large surplus of short-staple cotton and relieving general shortage of cloth and yarn in the country. The resolution further urged that concessions in the matter of taxation should be afforded to mills.

The second meeting of the year was held in July 1945, again at Bombay, and was presided over by Mr. H. R. Stewart, C.I.E., Vice-Chairman of the Imperial Council of Agricultural Research. The most important subject affecting the interests of cotton growers which came up for consideration at this meeting was that relating to the question of floor and ceiling prices of cotton for the 1945-46 season. In the course of the debate, the Government of India's approach to the problem was criticised and the view was expressed that unless and until the cost of living and the cost of production were materially lowered, there was absolutely no justification for reducing the floor prices further by Rs. 50/-, i.e., from Rs. 350/- to

Rs. 300/-. It was argued that even in the previous year the Committee had given it as its considered opinion that the view that cotton floors should provide no more than a very small margin of profit to cotton cultivators was not consonant with providing a reasonable living to the cultivator. It was pointed out that the price of raw cotton was disproportionately low compared with the prices of textiles, piecegoods and yarn and that, in any case, nothing had happened since July 1944, when the floor was reduced from Rs. 400/- to Rs. 350/-, to warrant any further reduction; on the other hand, production costs, particularly labour wages, prices of fertilisers, implements and plough-cattle had risen appreciably and there was thus a strong case for raising the floor prices by Rs. 50/- to help the growers to balance their budget. It was urged that the Committee should not be a party to any scheme which prevented the destitutes from improving their position. After extended discussion, in which representatives of cotton growers, millowners and the trade took part, the following resolution was unanimously passed:—

“The Indian Central Cotton Committee is of the opinion that during the season 1944-45 cotton cultivators have suffered heavy losses owing to:

- (1) substantial reductions of premiums for 1944-45 in a number of varieties compared with 1943-44,
- (2) short crop resulting from heavy reduction in cotton acreage as per Government plan in order to carry out the “Grow More Food” campaign,
- (3) average prices realised this season since 1st September, 1944, to 30th June, 1945, being below the average for the same period for the season 1943-44, and
- (4) no reduction in the cost of living or in the cost of production.

The Committee, therefore, urges the Government of India that it is essential that the floor prices for all varieties of cotton for the 1945-46 season should be raised by Rs. 50/- per candy from the 1944-45 floor levels.”

Another matter which received the attention of the Committee at this meeting was that relating to the question of the proposed international agreement for the production and export of cotton. The consensus of opinion was that in any such agreement India

should have her quota of cotton exports on the basis of such pre-war *pro-rata* percentages as may be given to other more important cotton exporting countries and that her production should be determined on the basis of such export quotas plus internal requirements. Arising out of the discussion on this subject, the question of Indian representation at International Cotton Conferences was also considered and it was resolved to recommend to the Government of India that at all future International Cotton Advisory Committees and Conferences the Indian delegation should include at least one non-official member of the Indian Central Cotton Committee and that in the matter of giving directions to the delegation the Indian Central Cotton Committee should be duly consulted.

The probable competition between cotton and synthetic fibres in the post-war years also engaged the attention of the Committee at this meeting. After much discussion it was agreed that the problem was one that demanded the earnest consideration of all cotton growing countries. It was accordingly decided that all available information should be collected and placed before the Committee, particularly regarding the position in America which, in this respect, was considered similar to India, both being cotton growing countries.

The Committee was informed at this meeting that the Government of India had accepted its recommendations regarding planned production of cotton and that these had been passed on by them with their support to the Provincial and State Governments concerned. This led to a prolonged discussion on the position of cotton seed and its reaction on the food situation and other relevant interests in the country. It was revealed that Sind was the only province which had a surplus of cotton seed which was of the order of 60,000 tons and that the other provinces were all deficit provinces in this respect except the Hyderabad State which considered that its requirements just balanced production. The Committee was informed further that with the exception of two provinces, *viz.*, Madras and Sind, export of cotton seed had been prohibited in all other provinces. In view of the importance of the subject, it was decided that the matter should come up for detailed examination when the question of planning cotton production for the 1945-46 season is considered.



## CHAPTER III

### COTTON STATISTICS

The work of collection, compilation, analysis and comparative study of cotton statistics was continued along the lines of the past year. The total area under cotton in India during the year under review was 14,839,000 acres, showing a decrease of 6,24,700 acres or 29.6 per cent as compared with the previous year. The acreage during the season was the lowest on record due mainly to the "Grow More Food" campaign. The Bombay Province, where reduction of the area under cotton in certain tracts was made compulsory under the "Bombay Growth of Food Crops Act," and Hyderabad State accounted for a decrease of 2,029,000 acres or 32.5 per cent and 2,148,000 acres or 34.4 per cent respectively of the total all-India reduction. The balance of the reduction was distributed amongst all the other cotton growing Provinces and States. The total estimated outturn for 1944-45 was 3,542,000 bales, against 5,258,000 bales in 1943-44 and was the smallest on record since 1911-12 when the production was 3,288,000 bales.

#### INDIAN COTTON SITUATION—1944-45

The weakness displayed by the market during the close of the last season when cotton prices touched the floor level continued during the first three weeks of September, 1944. Thereafter, consequent on the satisfactory progress of the war in Europe, the market passed through a sudden wave of optimism which, however, was short-lived. Following the reports about U.S. plans for providing full parity price for its cotton growers and for the disposal at the same time of 10 to 15 million bales in the world markets at competitive prices, Jarila (March) rapidly declined from Rs. 442/- on the 23rd September to Rs. 419/- on the 29th September. During the following month, the market ruled easy on account of the announcement of the grant by the U.S. Government of a subsidy on cotton exports. The market opened at Rs. 421/- on the 3rd October and closed at Rs. 410/- towards the end of the month, after touching the lowest level of the month at Rs. 393/- on the 14th October. Prices during November were on the whole steady around the level

of the closing quotation of the previous month. The quotation during December showed a definite upward trend which took Jarila (March) to Rs. 449/- on the 9th December. After a temporary reaction, prices again recovered and closed at Rs. 443/- on the 30th December. The quotation was marked up to Rs. 463/- on the 27th January owing to a steady improvement in ready and upcountry markets, the holding movement in the interior and the prospects of early peace in Europe. In the absence of fresh support, the bullish fervour subsided towards the end of January with Jarila (March) dropping to Rs. 444/- on the 31st January. In sympathy with the improvement in the spot market, futures prices in February were steady, the quotation on the 28th February being Rs. 444/-, the same as at the end of the previous month. The steady tone continued during the next month, aided by mill buying of staple varieties. The quotation for Jarila (March) opened at Rs. 448/- on the 1st March and after advancing to Rs. 453/- on the 5th, sharply dropped to Rs. 438/- on the 12th March. Thereafter, the market firmed up with good support at lower levels and March delivery prices recovered to Rs. 457/- on the 23rd to mature steady at Rs. 450/- on the next day. The end of March witnessed the quotation for Jarila (May) standing at Rs. 448/-. In spite of favourable war news and foreign enquiries, the market displayed a sagging tendency during the first half of April which took the quotation to Rs. 409/- on the 12th April. With the publication of the Third All-India Cotton Forecast which confirmed the smallness of the crop, the price of Jarila (May) advanced to Rs. 417/- on the 13th April. During the latter half of April, prices sagged and Jarila (May) came down to Rs. 397/- on the 27th April. Further downward tilt was checked by fair all-round support and Jarila (May) steadied to Rs. 409/- on the 30th April. During May, persistent peace rumours imparted a bullish feeling but reports of the U.S. Government's offer for sale of about one million bales of cotton had a depressing effect on the market. The price of Jarila (May) matured on the 25th May at Rs. 412/-. The market ruled steady during June, under the influence of continuing mill interest in staple varieties, encouraging export demand for medium and staple varieties and the smallness of the crop as confirmed by the Fourth All-India Cotton Crop Forecast. Prices of raw cotton in June were generally on a higher level than in the

preceding month. The quotation for Jarila (July) stood at Rs. 421/- on the 30th June. During the greater part of July, prices were depressed by persistent rumours regarding the possibility of the floor prices being reduced for the 1945-46 season, the quotation on the 23rd July standing at Rs. 413/-. A steadier tone prevailed thereafter and on the 25th of that month, July delivery matured at Rs. 419/-. The quotation for September delivery stood at Rs. 430/- on the 25th July. The fixation of floor and ceiling prices for Jarila for the 1945-46 season at Rs. 350/- and Rs. 530/-, respectively, lent considerable strength to the market, resulting in a further rise in the quotation for September delivery at Rs. 433/- on the 7th August. With the sudden termination of hostilities in the Far East, however, the rising trend was reversed and the quotation dropped eventually to the floor level towards the close of the season.

Turning to the statistical position of Indian cotton, the season started with an estimated carry-over of 34.4 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 1944-45 is estimated at about 40.5 lakhs bales (excluding extra-factory consumption of 4.5 lakhs bales), of which 30.8 lakhs bales are estimated to have been of staple length 7/8" and above. The receipts at mills of Indian cotton during the season amounted to 39.8 lakhs bales (400 lbs. net each), of which 27.6 lakhs bales were of staple length 7/8" and above. The total exports amounted to 4.1 lakhs bales, of which it is estimated 1.3 lakhs bales were of staple length 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 30.5 lakhs bales as shown below:—

	In lakhs of bales of 400 lbs. net (excludes extra-factory consumption).		
	Total	7/8" and above.	Below 7/8".
Estimated stocks held by the trade (excluding spinning mills) on 31st August, 1944 .. .. .	33.9	10.8	23.1
Probable production in 1944-45 .. .. .	40.5	30.8	9.7
Total supply .. .. .	74.4	41.6	32.8
Receipts at mills in 1944-45 .. .. .	39.8	27.6	12.2
Exports during 1944-45 .. .. .	4.1	1.3	2.8
Total distribution .. .. .	43.9	28.9	15.0
Estimated stocks held by the trade on 31st August, 1945	30.5	12.7	17.8

## STAPLE LENGTH OF INDIAN COTTON CROP

A report on the estimated production of cotton according to staple length for the 1944-45 season was issued as usual. Of the official estimate of 3,542,000 bales (compared with the trade estimate of 3,714,000 bales), cotton of staple length 7/8" and above formed about 66 per cent against 60 per cent in the previous year. There was a drop in the production of cotton of staple length over 1" owing to the poor yield of 289F types in the Punjab due to adverse seasonal conditions.

## DEMAND FOR VARIOUS TYPES OF INDIAN COTTON

Statistics relating to internal and export demand for various types of Indian cotton compiled from the information collected on a voluntary basis were published in Statistical Leaflet Nos. 3 and 4 (1944-45). The importance of such statistics to the trade and industry and to those entrusted with the responsibility of shaping and directing the cotton policy of the country has been stressed in previous reports. Receipts at mills of Indian cotton, during the season, were lower than those of the previous year by 130,000 bales, while exports were practically the same as last year. Mill receipts of Indian cotton of staple length "7/8 inch and above" dropped by 172,000 bales during the year, the offtake of short staple cotton (below 7/8") being higher by nearly 42,000 bales as compared with the previous year. "Long and medium staple" and "short staple" cottons formed 29 and 71 per cent, respectively, of the total exports during the season, as compared with 57 and 43 per cent in the previous year.

In this connection it may be mentioned that the Committee have strongly recommended to the Government of India that the compilation from compulsory returns of monthly figures covering Indian mill consumption, stocks and receipts of the various descriptions of Indian and foreign cotton which is at present undertaken by the Cotton Movements Committee should be continued after the war as a permanent feature of cotton statistics.

## STOCKS OF COTTON HELD IN THE COUNTRY

Concerted attempts were made during the year to collect the fullest information in respect of stocks of cotton held in the country on the 31st August, 1945, and the results were published in Statistical Leaflet No. 2 (1944-45). Trade associations, market committees and other authorities gave valuable assistance in the collection of this information and to them the thanks of the Committee are due. Stocks of Indian cotton held in India by the trade at the end of the season 1944-45 on the basis of voluntary returns, amounted to 30.7 lakhs bales. This figure is less than the corresponding estimate of a prominent cotton firm by some 2.4 lakhs bales whereas our figure for the 31st August, 1944, was lower than the trade estimate by some 12 lakhs bales. As compared with the estimated carry-over based on the figures of actual crop, exports, mill receipts, etc., the figure as collected by the Committee for the 31st August, 1945, shows a deficit of only 2.6 lakhs bales. This improvement in the position has been possible by the co-operation extended by almost all the major cotton growing Provinces and States in collecting the required statistics through local official channels. In view, however, of the importance of ensuring that these statistics are as complete as possible, the Provinces and States concerned have been urged to introduce legislation for the collection of the required information on a compulsory basis. In this connection, the Committee approved, with certain modifications, the draft Bill received from the Government of Sind for the collection of the statistics in question. A copy of the draft Bill together with the comments thereon of the Committee has been forwarded to other Provincial and State Governments with a request to introduce similar legislation in their territories as early as possible.

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, 1945, 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 1930-31 to 1944-45 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., 4,158,664 bales, showed an increase of 39,203 bales as compared with the previous season. Out of this increase, mills in British India and Indian States accounted for 59 per cent and 41 per cent, respectively. Mills in Bombay Island, Madras Province and the Central Provinces and Berar and the Indian States of Mysore and Indore mainly contributed to the increased consumption. Among the areas recording reduced consumption, Ahmedabad accounted for the largest decrease.

### EXPORTS

The exports of Indian cotton from British India during the season totalled 406,000 bales against 362,000 bales in 1943-44. On the average of the three financial years ending 1944-45, the value of cotton (including waste) exported from British India formed 20 per cent of the total value of export of "Raw materials and produce and articles mainly unmanufactured" and 5 per cent of the total value of all merchandise exported.

### STATISTICS OF COTTON PRESSED

During the season under review, 2,703,161 bales of cotton were pressed in British India and 1,104,830 bales in Indian States, making a total of 3,807,991 bales for all-India; the corresponding figures for 1943-44 were 3,365,056, 1,608,078 and 4,973,134 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 390 lbs., against 392 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 near cotton growing areas often use considerable quantities of ginned, unpressed cotton. During the year, 336,230 bales of unpressed cotton were consumed in mills in India against 372,416 bales during the preceding year. The relevant figures for the years 1930-31 to 1944-45 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 ginning returns were instituted, all that would be required for arriving at the actual crop is a reliable estimate of 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 Governments of the Punjab and Madras have, by notification, brought into force the provisions of Section 5A of the Cotton Ginning and Pressing Factories Act, 1925, making it obligatory on all ginning factories in the respective provinces to submit weekly returns of cotton ginned in the prescribed form. For purposes of ginning as well as pressing returns in the Madras Province, the information would be required to be furnished under eight heads, viz., (1) Tinnevellies, (2) Nadam, Bourbon and Uppam, (3) Cambodia, (4) Karunganni, (5) Northern, (6) Western, (7) Mungari and (8) Cocanadas. The form of return also provides for the collection of information regarding the quantity (by weight) of cotton ginned in terms of *kapas* as well as lint. As this would give valuable data regarding ginning percentage of the different varieties which would be helpful in estimating yields, the Committee recommended that the Madras form should be adopted by other provinces also when provision is made for obtaining details of the varieties of cotton ginned.

## **IMPROVEMENT OF COTTON FORECASTS**

The all-India cotton forecasts of the 1943-44 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 1943-44 was estimated at 57.2 lakhs bales against 5,094,000 bales forecasted in April 1944. The discrepancy lay mainly in the forecast estimates of the United Provinces, the Punjab, the Central Provinces and Berar, Bombay Province, Rajputana and Mysore. The cotton forecast of the Hyderabad State was found to be an overestimate by 46 per cent of the actual. 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.

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 OF 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 being to determine accurately the average 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. At the same time it was intended to train the staff of the Land Records and Revenue 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. The survey was carried out in all the four districts of Berar and in Nimar, Wardha and Nagpur districts of Central Provinces, Harda tahsil of Hoshangabad district, Warora tahsil of Chanda district and Sausar tahsil of Chhindwara district. In all, 34 tahsils covering 99½ per cent of the cotton acreage in the Province were included in the scheme. Some 204 villages were selected at random ranging from 4 to 9 in each tahsil. In each village, 4 fields were selected and in each field, a plot of 1/10 acre in size (132' x 33') was located by a random procedure for harvest. The results of the survey indicated that the departmental estimate of 192.6 lbs. per acre over the whole province, according to the final forecast for the season was 11 per cent higher than the survey estimate and that the total forecasted production for the whole province was definitely an over-estimate. In the course of the survey, opportunity was taken to record the plant number, boll number and weight of *kapas* per boll in one of the 4 plots selected in each village, in order to study the problem of obtaining reliable forecasts from the standing crop. The practicability of the survey method and trustworthiness of the results having been demonstrated by the work done during the past 3 years, it is now proposed to take the experiment to the final stage in 1945-46 in which the field-work would be organised to fit in with the administrative arrangements of the Revenue and Land Records Departments who are primarily responsible for the work, and entrusted completely to the staff of these Departments. Special attention would be given to two aspects, viz., (1) smooth and efficient

working of the organisation by noting and remedying any difficulties that might arise and (2) training of the departmental staff in the various details relating to the conduct of the survey. This would enable the Provincial Government to take up the crop-cutting survey as an annual routine. The most important modification proposed for 1945-46 is that the Revenue Inspector's circle, which is the administrative unit for area and yield statistics and of which there are 3 or 4 per tahsil, would form the ultimate sub-division for selection of random villages. So far, the tahsil has been treated as the stratum and villages were randomly scattered over the whole tahsil but, since in 1945-46, the Revenue Inspectors would be entrusted with the conduct of the crop-cutting experiments, it is necessary to distribute the villages evenly among the different revenue circles in order to make a convenient and equitable division of the field-work. The precise plan of the survey would thus be that 2 or 3 villages would be randomly selected in each Revenue Inspector's circle according to the cotton area in the circle. In each village 3 cotton growing fields would be selected and in each field a plot of 1/10 acre size (132' long and 33' broad) would be located in a random position for harvest.

### **REVISION OF CLASSIFICATION OF INDIAN COTTON**

A draft scheme of classification of Indian cotton was drawn up during the year in consultation with the major cotton growing Provinces. The revised classification as approved by the Committee has now been referred to the Provinces and Indian States concerned for their concurrence and for defining, where more than one variety is grown, the exact delimitation of the areas under each variety. The Director of Statistics, Calcutta, has, at the same time, been requested by the Committee to prepare and publish, on the basis of the revised classification, a new varietal cotton map of India in consultation with this office.

### **ACCURACY OF ALL-INDIA COTTON FORECASTS**

The publication of Statistical Leaflet No. 5 relating to the above has been suspended for the duration of the war, commencing with the issue for the 1941-42 season.

**PUBLICATIONS**

The following statistical publications were issued during the year under review:—

- (1) Statistical Leaflet No. 2—Tenth Issue (1943-44), “Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1944.”
- (2) Statistical Leaflet No. 3—Tenth Issue (1943-44), “Receipts at mills in India of raw cotton classified by varieties—1943-44 season.”
- (3) Statistical Leaflet No. 4—Tenth Issue (1943-44), “Exports by sea of Indian raw cotton classified by varieties—1943-44 season.”
- (4) Statistical Bulletin No. 13—“Supply and distribution of the various types of Indian cotton during the 1942-43 season.”

## CHAPTER IV

### RESEARCH

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. The Committee also makes grants to Departments of Agriculture in the various cotton growing Provinces and States for specific investigations on cotton, not necessarily confined to breeding new varieties. The aim is to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India. 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 and 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, ginning and the testing of cotton fibres, yarns and cloth are carried on at the Technological Laboratory at Matunga. 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 research and testing activities of the Laboratory were maintained at the levels attained in the previous years. Valuable

assistance was rendered to cotton breeders by helping them to select types which would bring higher monetary return to the cultivator and prove more acceptable to the trade and the industry. Similarly, the interests of the latter were served by carrying out tests for them on trade varieties and Standard Indian cottons and by giving them technical advice. Tests were also made on samples received from foreign countries like Uganda, Belgian Congo, etc., whose cottons are used in Indian mills. Several *ad hoc* investigations relating to the processing of cottons were carried out on behalf of the mills. The total number of samples received for tests rose from 1,514 in the last year to 1,685 in the current year, on which 330 reports were issued. Several Indian States, in which cotton is grown on a large scale took advantage of the facilities offered by the Laboratory.

Among tests carried out on agricultural samples, mention might be made of a new selection M5A, at Nagpur distinctly superior to V. 434 or Jarila, progenies evolved at Mirpurkhas with staple length of 1-1/16", Malvi Upland 4, irradiated with X-rays resulting in longer staple and better spinning performance, S31 (now called Praptap) which is found specially suitable for the Kathiawar States. Tests were also made on Vijaya cotton grown at different centres in Baroda district and Middle Gujarat, and on samples of Jarila cotton grown from the seeds of irrigated and dry crops which did not confirm the general impression among the cultivators in Deccan that seeds from irrigated crop do not give as good yield as those from the dry crop.

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

The Testing House section rendered valuable service by carrying out tests on 523 samples of cotton, yarn and cloth for cotton firms and mills. These included spinning tests on 68 samples, fibre tests on 172 samples, yarn tests on 133 samples and cloth tests on 149 samples. Among the *ad hoc* investigations mention might be made of tracing the defects in the weaving of certain cloths, causes of poor performance in the processing of cottons, causes of stains in mill products and means for removing them. In one such investi-

gation fibre tests on flat strips and fly obtained by placing the stripping comb on the licker-in side showed that they have higher percentage of short and lower percentage of long fibres than when the comb is placed as in the ordinary process.

With a view to improving the pre-cleaning and ginning of Indian cottons experiments were carried out to study the effect of saw-speed in the saw gin and overlap settings in roller gins on the ginning percentage, output, quality of ginned lint, etc., and leaflets were published on each variety. Since some difficulty had been experienced by ginners with Buri cotton, experiments were made with different sizes of grid, and it was found that a grid of either 6/16" or 7/16" with an overlap of 3/16" in a single roller gin would yield the best results. An investigation on the causes of difference, if any, between the spinning performance of saw-ginned and roller-ginned samples of the same cottons is also under progress.

Good progress was made in the technological investigations, some of which are of fundamental nature while others are of direct practical value to the trade and the industry. Tests on combing of good quality Indian cottons showed that after combing to the extent of 16-18 per cent, some of the good quality Indian cottons yielded yarns which are comparable in strength to Kampala carded yarns. It was found that 60 to 70 per cent of the improvement in quality on combing was due to improvement in mean length and length regularity of the combed stock. Experiments with different front roller speeds of the draw frame showed that the highest speed (525 r.p.m.) gave the best for long staple cottons, intermediate speed (475 r.p.m.) for medium staple cottons and the lowest speed (375 f.p.m.) gave the best test for long staple cottons, intermediate speed been developed by means of which a 2 lb. sample can be spun, yielding results which are comparable with the normal samples. New formulae have been evolved which give a better prediction of the spinning value of Indian cottons from fibre-properties. Tests on *arboreum* cottons showed that swollen diameter or fibre-weight may be used with equal advantage in predicting their spinning value. Experiments with different speeds of beater and fan in the crighton opener gave the optimum conditions for working this machine with good quality Indian cottons. The investigation in connection with the determination of maturity coefficients for Indian

cottons was completed. A new apparatus useful for measuring the diameter of fine wires, hair, wool fibres, artificial silk filaments; cotton lint, etc., was designed and fabricated. Bulletins, on the bleaching of cellulose in linters and the analysis, grading and utilisation of Indian linters were published.

In addition to the above investigations, work is in progress on the causes of neppiness in cotton yarns, spinning quality of mixings of Indian cottons with special reference to fibre-properties, influence of different fibre-length groups on yarn-strength, comparison of different methods of measuring halo-length, prediction of strength of yarn spun with different twist multipliers, effect of different agronomical factors on fineness of cotton, size absorption capacity of different Indian cottons, preparation of tyre cards from Indian cottons, effect of storage on Jarila, V. 434 and Vijaya cotton, etc.

### 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 reorganised 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:—

#### 1. (a) Genetics

Genetical studies on fuzz grades in *G. hirsutum* have confirmed the simple dominance of tufted over fuzzy condition only when the parents belong to the same variety. It has been demonstrated

for the first time that even varieties of the same species can differ in their modifier background with regard to fuzz genes. It has also been shown that the dominance of tufted condition can be reversed and fuzz grades even beyond 10 can be obtained by the action of modifiers.

The repetition of X-ray experiment with M.U.4 has confirmed the previous results, namely, that by exposing the seed to X-rays and selecting from the  $X_2$  progeny, individuals with high means for ginning percentage and halo-lengths new varieties can be built up which are an improvement over the untreated seed. The repeat consisted of selfed seed from a single plant of which 1/3 was treated with X-rays for 10 minutes, another 1/3 treated for 20 minutes, and the balance kept as control. Equal number of progenies from the control and from the  $X_2$  of the 10 minutes and 20 minutes treated seed were grown in a replicated experiment and it was found that while the general means of the three groups did not show any appreciable difference either in ginning percentage or halo length one or two individual progenies in the treated seed gave very much higher values for these characters. A replicated experiment with  $X_3$  progenies has again shown that the progenies with the highest values for ginning percentage and halo-length come out of the  $X_2$  progenies that showed such high values.

The simple recessive nature of the 5 lock condition in *G. arboreum* has been confirmed and the gene is found to be independent in inheritance of several other known genes. This economically useful character cannot, however, be exploited straightway as several of the families pure for 5 lock condition show different degrees of fasciation, lateness and partial sterility.

A cross between Bishnoor and Malvi to study the inheritance of boll size shows that the large boll size is nearly dominant. The boll size, length and diameter, is closely related to leaf shape since the classification of the boll size in the  $F_2$  according to leaf shape gives two groups one with the narrow leaf corresponding to the Bishnoor parent and the other with broad leaf corresponding to the Malvi parent.

While previous work had shown that the genetic red leaf in *G. hirsutum* is different from the red leaf caused by the attack of



Jassids, it has become clear that this is also different from the red leaf under investigation by the Cotton Physiologist and which is caused by either nitrogen deficiency or water logging in the soils. Transverse section of the leaf examined under the microscope shows that in the Jassid red and in the red due to nitrogen deficiency the pigment is mostly confined to the epidermal cells while in the genetic red such pigment is mainly to be found in the palisade parenchyma cells. The expression of the genetic red is considerably influenced by environmental conditions such as time of sowing, fertility of the soil. It has now been possible to isolate types breeding pure either for the presence or for the absence of genetic red and suitable crossings will now be undertaken.

Progenies selected as Jassid susceptible and Jassid resistant on the basis of leaf crumpling were sown in four batches, 5th June, 16th June, 4th July and 7th July. Out of the 36 families studied, 6 were found resistant in all sowings and 14 susceptible in all the sowings. Among the rest some were free in the earlier sowings but got attacked in later sowings while others got attacked in the earlier sowings and became free in the later sowings. It is clear that to get a really Jassid resistant type sowings at different dates will have to be undertaken as otherwise we might be dealing only with Jassid escapes. A cross between a completely resistant and a completely susceptible type gave 102 free plants and 17 susceptibles when sown on 19th June and 93 free and 225 susceptibles when sown on 4th July. Observations on boll production over the 4 sowings in 2 families, one resistant and the other susceptible, show that the resistant family produces in the 1st sowing nearly three times the number of bolls produced by the susceptible family and the total boll production falls rapidly in both the families as the sowing is delayed and in the sowing on 7th July there is no boll production at all in the susceptible family.

(b) An apparently homozygous strain for wilt-resistance out of Dhar 43 was grown under controlled conditions inside the glass house which produced only 8 per cent mortality. An  $F_2$  of a cross between Dhar 43 and Chinese red spotless grown in pots with plenty of wilt compost gave 29 per cent mortality due to wilt. But classifying the  $F_2$ s according to pigment, three groups are obtained, two like the two parents and one like the  $F_1$  in the proportion of

1:2:1. Classifying the wilt mortality along with the three pigment groups, it is found there is no mortality at all in the group corresponding to the Chinese parent, 20 per cent mortality in the other parent and 46 per cent mortality in the heterozygous group. It is interesting to find that the whole complex of characters of the Chinese parent including its wilt resisting character go together in  $F_2$ . There also appears to be a time sequence for the invasion of the fungus according to the varieties. While the mortality is greatest in the early stages and gradually slows down in the later stages when plants are grown inside the glass house, one particular set of crosses where one of the *anomalum* derivatives figured as the parent, the mortality is low in the early stages and it suddenly shoots up after the seedlings are transplanted out of the glass house.

Breeding for wilt resistance has been taken a step further. In a small bulk trial of selected families of hybrid origin more than half a dozen are observed to have as low a wilt mortality under field conditions as V. 434 and Jarila, but definitely better than both Malvi 9 and Dhar 43 in yield, ginning percentage and halo-length. A further large-scale field-trial should decide the best of these to take the place of Malvi 9. When it is remembered that this hybridisation programme was started only in 1938-39, the progress made should be considered satisfactory.

(c) Four hundred  $F_2$  progenies from randomly selected  $F_2$  plants belonging to 16 crosses between 4 Bengals strains and 4 superior quality *arboreums* were grown in a replicated trial in 1943-44. The genetic fraction of the total variability in  $F_2$  was estimated by the regression of  $F_2$  progeny means on their  $F_2$  parental values. The majority of these regression co-efficients are significant and range between 0.3 and 0.7. Though the  $F_2$  variability does not differ appreciably among different crosses, the genetic variability does, and roughly follows the order of the regression co-efficients. The effectiveness of selection in a cross in raising the mean values of selected progenies above the average in the cross depends upon two factors, the initial average of the  $F_2$  and the amount of genetic variability. For any given cross on the basis of normal distribution, the average excess of the selected genotypes over the cross average can be calculated for different levels of selection, viz., the highest 10% or 5% of the genotypes. Such a calculation made for halo-length

shows that the expected values of selected genotypes are mainly governed by the initial average of the  $F_2$  from which they are selected. This means that in making selections attention should be concentrated on mean values. Since there is a high correlation between  $F_1$  and  $F_2$  it should be sufficient to grow  $F_1$  s of crosses in replication in order to pick out those with the highest mean values and confine selection to these in later generations.

## 2. Interspecific hybridisation

This work is concentrated with two species *G. thurberii* and *G. raimondii*. Of the large number of plants from (*G. arboreum*  $\times$  *G. thurberii*) doubled  $\times$  *G. hirsutum*, several died in the early stages due to Jassid while some have given bolls and seed but the seed setting is still very low as in the original doubled hybrid between *arboreum* and *thurberii*. Selection for increased seed number per boll is being done. The triple hybrid has also been crossed reciprocally with the two parents using the triple hybrid as the female.

The original hybrid, *G. arboreum*  $\times$  *G. thurberii* which was sterile due to defective anthers became fertile during the monsoon period giving bolls and seed reverting to sterility again during the winter and summer months, thus showing a seasonal rhythm in fertility. As the triple hybrid is quite susceptible to boll worm, work is in progress to see if the boll worm immunity of *G. thurberii* could be first transferred to Asiatic cottons and thence to the cultivated tetraploids. So far crossing between *G. thurberii* and *G. herbaceum* and between *arboreum*  $\times$  *thurberii* undoubled hybrid and other *herbaceum* or *arboreum* types have proved a failure. One serious drawback against using *thurberii* as a female parent is the extreme susceptibility of the flower to injury.

The undoubled hybrid *G. hirsutum*  $\times$  *G. raimondii* was backcrossed to *hirsutum* without any success. The doubled hybrid has given some bolls and seeds. While backcrossing the  $C_1$  reciprocally to *hirsutum* did not give any bolls some of the  $C_2$  plants produced bolls and these, unlike the  $C_1$ , cross successfully with *hirsutum* using the former as the female parent. The hybrids show the same nature of susceptibility to Jassid as the *raimondii* parent.

Since there was a very high incidence of wilt in the hybrid *G. arboreum* (K1)  $\times$  *G. anomalum* doubled  $\times$  *G. hirsutum* the cross

*G. arboreum* × *G. anomalum* has been repeated using the N. M. D. the 100% wilt resistant strain of Poona as the *arboreum* parent. The hybrid plants are now in the field for further work this season.

### 3. Physiology

While seed selected from a bulk sample for high density gives a large increase in yield over the unselected or the seed with a low density, such selected seed forms only a small fraction and is not of any practical utility. Large seed separated from small by mere sieving and where this fraction forms 1/3 to 1/2 of the bulk-sample does not, however, consistently give an yield increase and even where the increase is present it cannot be considered sufficient to recommend such separation as an agronomic practice. Some easier method of separating seed of high density has to be evolved.

An experiment with different placements of fertilisers, groundnut cake and ammonium sulphate showed that they all affect germination to a greater or less extent. The most unusual result of the year was the absence of response to manures in the case of the *desi* cotton. There was an indication that drilling is comparatively better than broadcasting in the case of groundnut cake whereas the reverse is the case with ammonium sulphate.

A small-scale field-trial with 4 varieties of cotton, 2 American and 2 *desi* and seed vernalised for different periods of cold treatment was conducted. It is found that only American seed shows the effect of vernalisation. There was evidence of the treatment inducing earliness in the American while the treatment appears to make the crop late in the *desi*. A large increase in yield of the order of 30-50 per cent over control is obtained in seeds subjected to cold treatment for 10-15 days in the case of one American variety.

Pure Jarila seed from three different sources, Indore, Akola, and Jalgaon was grown in a replicated experiment of the same design at the three centres. Seed source does produce large differences in various characters, the most definite of them being the increase in seed weight, lint length and reduction in ginning percentage and seed number per boll for the Indore seed as compared to the seed from the other two sources between which there are no large differences.

#### (4) Statistics

The use of the discriminant function as a means of selecting phenotypes on the basis of numerical scores assigned to individual plants was reported last year and the discriminant co-efficients of characters like boll number per plant, seed number per boll, weight of seed cotton per seed and ginning percentage for random progenies from local Malvi were reported. The discriminant coefficients obtained in still another experiment with different *arboreum* strains are now given. It is seen that the formulae are quite similar in the two cases except that a slightly higher relative weightage is given to the components, boll number and seed number in the case of *arboreum* strains. As before the coefficient for ginning percentage does not have any appreciable effect on the formula for yield of seed cotton. Its negative sign in both cases indicates that high ginning might be of slight disadvantage in selecting for high yield. The weight of seed cotton per seed has the highest coefficient and the coefficients for boll number per plant and seed number per boll though comparatively smaller have to be taken into consideration while selecting for high yield in *arboreum* strains.

The results of a uniformity trial with cotton have now been analysed to study the optimum size and shape of plots, the number and arrangement of plots in blocks and the most efficient layouts for replicated progeny row trials. Some of the main conclusions arising out of this analysis are (1) the standard error per plot does not increase appreciably by increasing the number of plots per block with a given plot size, (2) The standard error steadily decreased accompanied by an increase in block efficiency as plot size is increased, (3) Block efficiency is extremely low for all plot sizes when 120 or more plots are included in the block and (4) with a limited quantity of seed say 150 seeds to the plant it appears impossible to obtain a significant difference of 10 per cent between two progenies.

The analysis has also shown that the commonly adopted method of growing progeny rows in long continuous strips with controls at regular intervals is of no use and that an arrangement in compact block is definitely more efficient.

## 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 *Goghari*, 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, Segregates 1-2, 1-6, *Vijaya*, 3-50 and P.G.L. 7-29 derived from the back-cross (B.D.8×G.A.26)×B.D.8 were tested *in wilt-free soil* against B.D.8 and Broach Local. None of the strains was superior at 1% level to the local control which gave the highest yield, (559 lbs. per acre). '*Vijaya*' yielded 550 lbs. per acre. The yield of the remaining strains, though significantly less than that of the local, was statistically better than that of B.D.8. All the strains combined high ginning character of the local with the long staple of B.D.8. *In wilt-infected soil*, the Segregates, along with B.D.8, recorded, as in the past, nil mortality against 13.2% of the local. In respect of yield, all the Segregates were on a par with

B.D.8; in comparison, however, with the local, the yields of 'Vijaya', 1-6, 3-50 and P.G.L.7-29 were significantly higher. The spinning test results of the last season (1943-44) show that the segregates are capable of spinning from 35s to 39s highest standard warp counts against 41s of B.D.8 and 11s of local. Three hundred hybrid selections, with the combination of 33-45 ginning percentage, 20-26 mm. staple and soft to silky feel, from the  $F_2$  and  $F_3$  generations of the straight and back-crosses of 1027 A.L.F. with 1-2, 1-6 and 5-18 were studied during the season. It is expected that about 150 plants with a ginning percentage of 38-42, staple of 21 to 23 mm. from some of the promising families, would be available for further study. In a comparison of the district and Farm growths of 'Vijaya', it was found that there was no deterioration in the district 'Vijaya' of stage A. Under the wilt breeding part of this scheme, the object of which is to evolve a cent per cent wilt-resistant type, from the material available at Broach, testing was confined to 33 progenies in pot culture at Poona, comprising 5 cultures each of Segs. 1-2 and 1-6 and 3 of Seg. 5-18. In all, 3,070 plants were under observation and 142 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. Some of the progenies in both the cultures were completely free from wilt attack.

(b) **Jalgaon Cotton Breeding Scheme.**—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridisation, 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, seven cultures derived from Jarilla  $\times$  N.R.5 cross were tested at the Government farms at Jalgaon, Dhulia and Mahadi. Of these, three cultures, viz., 197-3, 403-5 and 670-4 proved their superiority in yield, ginning and wilt-resistance over Jarila at all the three farms, for the fourth year in succession.

Under the wilt-breeding part of the scheme, three families of cross (Jarila  $\times$  N.R.5)  $F_6$  and a Dokras selection were tested in pot cultures at Poona. One of the families of the above cross and the Dokras selection were found to be promising as regards wilt-resistance.

(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  $\times$  K.F.).
- (2) (8-1  $\times$  B.C. 1-6)  $F_6$ .
- (3) (1027 A.L.F.  $\times$  B.C. 1-6)  $F_6$ .
- (4) (Seg. 22-3-2-8  $\times$  B.C. 1-6)  $F_6$ .

A few cultures possessing the desirable combination of ginning percentage, staple length and high wilt-resistance have been obtained from cross No. 1 above. The material from the second cross has yielded the most promising results as some of the derivatives, besides being very highly resistant to wilt under field conditions, possess higher ginning percentage than 8-1 and approximate to 1027 A.L.F. in staple. Only one derivative from the third cross appeared promising. The cultures from the fourth cross have been found to combine all the desirable agricultural characters including spinning and they are being studied further with a view to isolating highly wilt-resistant types.

(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.

During the year under review, 9 close boll types were tested against *wagotar* and local *Wagad* in replicated trials at Viramgam, Jagudan and Dholka. At Jagudan, the crop was seriously affected in patches by frost and the results obtained there are, therefore, not strictly comparable. It is stated that at Dholka, owing to the peculiar nature of the sub-soil, the crop prematurely withered and the yields obtained were very poor. The data revealed that no strain gave significantly better yield of *kapas* than the controls at any of the three centres. The lint yields, however, of the two types—K 61-8-2 and K.72-2- were slightly superior to that of *Wagotar* at Viramgam and Jagudan. In respect of ginning outturn, none of the types was equal to *Wagotar* at any centre, but all (excepting three strains at Jagudan) were either equal or superior to local *Wagad* at all the centres. All the strains (except one) were found to be better than *Wagotar* and local *Wagad* as regards mean fibre length at all the three centres and five of them have been adjudged suitable for spinning from 26s to 32s H.S.W.C. against 23s of *Wagotar* and 16s of the local *Wagad*. With a spinning value of 32s and consistently promising performance during the past two years,

K.72-2 is considered a particularly desirable type and it is proposed to test it along with two other strains in district trials in the ensuing year.

In a similar trial, six other close-boll types were tested for earliness. None was found to be early enough to escape frost. It is stated that further trials of early types will be dropped in accordance with the recommendations of the Agricultural Research Sub-Committee at its meeting in July 1944, and future work will be concentrated on the improvement of yield.

The progeny of three crosses, (1) (7-1×Seg.47A), (2) [1-6×(1027 × R.5) F<sup>s</sup> 1] and (3) [7-1 × (7-1 P.210)F, ] was studied for the desired combination of characters. 93 plants were selected from the population of the first cross for further study. The material from the other two did not prove of avail.

**(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 report, the second series of the rotational-varietal trial was laid out with the object of studying the economics and the possibility of replacing the perennial *Rozi* with the annual 'Vijaya'. The results of the first series in the previous season showed that the monetary return from the combination of Vijaya with *Kodra* was greater than that from *Rozi* with *Kodra*. These results were confirmed by the trials conducted in the season under review. In addition, it was found that the cash return from ratooned *Rozi* with Bajri was better than from Vijaya with Bajri. This is explained as being due to the fact that perennial *Rozi* grows better in the second season and escapes the shading effect of the cereal inter-crop, whereas Vijaya suffers under the shading effect of inter-crops, especially Bajri. The results of the experiment were, however, vitiated by the susceptibility of the ratooned *Rozi* to 'small leaf' disease and of Vijaya to root rot.

The testing of the exotic and indigenous perennial and annual varieties was repeated during the year, but as Nadam and Baluchistan 3 succumbed to the continuous rains experienced in the season, it is proposed, in the coming season, to study these types together with some more types from the different stations.

**(f) Scheme for interspecific hybridisation 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 hardiness 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. In January 1940, the Committee sanctioned in view of the rapid strides that the scheme had made an expansion of the scheme so as to include cytological studies during the remaining period of its continuance. In July 1943, the scheme was extended for a further period of five years from the 1st November, 1943.

During the year under review, 13 families derived from five back crosses, viz., B.C. Nos. 68, 117, 125, 134 and 170, were tested in replicated randomised blocks with 1027 A.L.F. and Co.2 as controls. The analysis of the yield data showed that only one culture, No. 6, gave significantly higher yield than 1027 A.L.F., while, six others—Nos. 4, 7, 8, 11, 12 and 13 were on a par with 1027 A.L.F. in this respect. Family 6 further combined higher ginning outturn and better staple than 1027 A.L.F. In comparison with Co.2, however, it was found that none of the cultures was significantly superior in yield, but ten families were as good. Of these ten cultures, six—Nos. 2, 3, 6, 9, 10 and 12—were superior to Co.2 in respect of ginning % and lint length and the remaining four proved to be better in staple length.

One hundred and seventeen plants from the  $F_2$  of 9 fertile back crosses and 54 plants from 5  $F_1$  cultures of the *inter-se* cross—(BC.68  $F_2 \times$  BC. 22  $F_1$ )—were selected for study in the ensuing season. It is reported that with the object of producing new hybrids between the cultivated American and Asiatic cottons, 2232 flowers were crossed and eleven seeds combining the characteristics of *G. hirsutum*  $\times$  *G. arboreum* were obtained.

The  $F_2$  material derived from the synthetic tetraploids obtained by crossing the hexaploid 28-1 ( $Co_2 \times$  1027 ALF  $F_1$  doubled) with the American wild cotton—*G. armourianum* and twice back crossed to cultivated American, was under observation, and 47 plants have been selected for further study in the coming season.

Reports of the preliminary trials of the interspecific material at various places in India, indicated that the performance of some of the types was encouraging under rainfed conditions at Gadag and Jalgaon and irrigated conditions at Coimbatore and Siruguppa.

(g) **Scheme for improvement of Dharwar-American Cotton.**—This scheme was sanctioned by the Committee in July 1941 for a period of five years, 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.

As in previous years, the two strains—9766 and 4411—were tested against Gadag 1 in a large-scale replicated trial; the results showed that these strains are significantly superior to the control in respect of yield; they also have better ginning percentage and longer staple than the control. In respect of spinning capacity, they are slightly inferior to Gadag 1, being adjudged suitable for 28s warp counts against 32s of G. 1. This is, however, attributed to the adverse effect of an inclement season. During the year, ten promising families derived from the cross (Gadag 1  $\times$  Co.2) were tried against G. 1 in replicated progeny rows. Families 9-3 and 9-10 were found to record consistently the highest yields. With a ginning percentage of 37, staple length of 24.4 mm. and a high degree of resistance to red leaf blight, family 9-3 is distinctly superior to G. 1 which is only partially resistant to red leaf, has a staple of 21 mm. and gins 33.8%. In addition, 9-3 is said to mature earlier than Gadag 1. The trials will be repeated in the coming season. Nine improved exotic types, obtained from various places, were once again tested against G. 1, 9766 and 4411, for yield and other economic characters. Unlike last year, M.4 was found to be equal to G. 1 and 9766 in respect of yield, though, inferior to both of them in ginning outturn. The rest of the varieties also are stated to be superior to G. 1 in one respect or another. L.S.S. once again proved to be the earliest to mature.

(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 some cotton growing areas in the Bombay Province and the Central Provinces and Berar. It has now been confirmed that 'small leaf' disease can be successfully transmitted by grafting. Transmission of the disease by sap or by insect vectors has not so far been successful. 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. In July 1944, the Committee sanctioned an extension of the scheme for a period of five years from the 19th April, 1945. 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.

During the year under review, a good number of single plants combining the desirable characters from a large  $F_2$  population of the hybrid material raised in 1942-43 season was selected and their progenies of the  $F_3$  generation tested under replicated trials during the 1943-44 season. Progenies which in addition to maintaining the same yield and ginning outturn as the Sind-American control strains (Sind Sudhar and M.4) possessed an extra staple length of 1/8 inch and more, were carried forward to the  $F_4$  generation in 1944-45, in replicated tests. Out of a large number of such  $F_4$  progenies the following strains hold out great promise. These strains have been introduced into replicated varietal test in 1945-46 season.

Parentage.	Strain No.	Yield in		Staple m.m.	Ginning percent-age.
		oz. per plot.	mds. per acre (calculated)		
(M4 × Wilds) M4 .. ..	45/2	25	18.4	28	32
Wilds × S. S. .. ..	7b/4	24	17.7	28	33
M4 control .. ..		26	19.2	24	33
S. S. control .. ..		22	16.2	23	32
D. T. Webber × M4 .. ..	41/4	32	23.6	29	32
Wilds × M4 .. ..	32/4	31	22.9	28	32
do. .. ..	33a/2	30	22.1	28	32
do. .. ..	33b/5	30	22.1	28	32
M4 control .. ..		39	28.7	23	31
S. S. control .. ..		20	14.8	23	29'

(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:—

It is reported that observations on the relative infestation of jassids on 6 varieties of cotton, viz., Sind Sudhar, M.4, 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 cultural practices, such as, manuring, watering, spacing, and drilling *versus* broadcasting, on the density of jassid population has 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 combined scheme was sanctioned for a period of three years from the 1st April, 1941. In January 1944, an extension of the scheme was sanctioned for a further period of one year. The scheme terminated on the 31st March, 1945.

The objects of the co-ordinated scheme were (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.

The studies undertaken have revealed that the black-headed cricket *Gryllulus domesticus*, Linn, feeds on cotton seed as is sown in the field, the young seedlings and the harvested grain of rape seed and wheat from the threshing yards during April, May, and June in Upper Sind and adjoining parts of Baluchistan. It breeds extensively during March and April in the soil of fields with standing *rabi* crops of wheat and rape seed and then becomes a pest. Hot and dry climate favours its mass multiplication and by the middle of June, the pest declines, when the humidity in the air increases. The cracking of clayey soil in the infected area offers a good breeding ground to the pest. In a non-pest farm, it keeps on breeding throughout the year. The life cycle of an adult has been found to vary from 22 to 44 days in the case of a female and from 20 to 33 days in the case of a male. The Cricket has no fixed number of generations in a year, but, under laboratory conditions, it has been observed to pass three to four generations. The intensity of pest infestation is found in the months of April, May and June and by mid-June there is a decline in the pest. A shower of rain in early June proves destructive to the pest, in the absence of rain, however, the insect continues in a mild form during June and early July. The pest is nocturnal in habit.

Attention was directed towards its control by chemical (poison bait) methods and seed treatment and agricultural measures. The proportion of the ingredients of the bait, which proved successful is as follows:—

(1) Sodium fluosilicate (poison)	1 part
(2) Molasses (attractant)	1 part
(3) Rice or wheat bran (carrier)	20 parts
(4) Water	12 1/2 parts.

Among the carriers tested, rice bran was found to be the best, chopped guar standing second. For making an efficacious poison bait, experiments showed that the bran ought to contain more of powdery flour and less of coarse husk or broken rice. Soaked cotton seed sown in the fields proved to be the best attractant than any other material.

In view of the futility of the poison bait in the presence of growing cotton seedlings, the destruction of the pest was undertaken before the commencement of the sowing season. Fruit juices and amyl acetate make the bait more attractive, the latter, however, appears to act as a repellent. Orange and lime juices appear to increase attraction; common salt acts as a better attractant than molasses and on a field scale the former was found preferable to the latter on account of its portability. So far as the agricultural measures of control are concerned, ridge *versus* broadcasting of cotton gave evidence to the effect that the former was more expensive than the latter and the latter method though practised generally could not offer means of control. Observations on the effect of early and late sowing showed that the early sown cotton which has reached the two leaf stage escaped the damage from the pest. Sowings from mid-April to mid-June were observed to be liable to damage. Results of sowing 4F-98, Sind-Sudhar and M.4 showed that the early sown gave the best results. In late sown, the plants remained dwarf, but the method of control has only a limited application in view of the inability of the former to complete all sowings. Early and late sowings to be successful require heavy manuring and close spacing. To bring the poison bait method to fruition, large scale baiting over fallow land and co-operative effort by all zamindars is essential.

**(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.

In July 1943, the scheme was extended for a period of three years, with effect from 1st March, 1944. During the extension it is proposed (1) to survey all the cotton growing tracts of Sind to study the status, distribution and the various host plants of the pest, and to determine the time suitable for carrying out control measures,

(2) to carry out control measures in a compact area of 1200 square miles in the rice tract of Tharparkar district and to extend them to the Hyderabad district during 1946-47.

It is reported that the incidence of Pink boll-worm which was practically negligible throughout the cotton area till the last season, assumed serious proportions in most of the talukas of Hyderabad and Tharparkar, during October-November 1944. This is attributed to the mild and humid climate of the two districts and to the heavy summer rains during the year. The attack of pink boll-worm in other districts remained very low.

The clean-up operations were carried out on an area of 1200 square miles, comprising 180 *dehs* mostly confined to the rice tract where the spotted boll-worm attack was very serious. It is stated that the commencement of the operations was delayed till January as owing to scarcity of labour the pickings were postponed, but through vigorous efforts the cleaning-up was completed by the middle of March.

## 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.

The scheme terminated on the 28th February, 1945, and was replaced by four new schemes, viz., (1) Scheme for improvement of cotton in Jhang district, (2) Scheme for improvement of cotton of south-eastern districts of the Punjab, (3) Scheme for improvement of cotton in Lower Bari Doab Colony and (4) Scheme for improvement of cotton in south-western tract.

During the year under review, the total area under cotton in the British districts was 2,457,600 acres, of which 1,753,600 acres were under Punjab-American and 704,000 acres under *desi*. medium and long staple American varieties constituted 71.3% of the total Punjab cotton crop. Large-scale tests with re-selections from 289F/43 and L.S.S. conducted during the year under review indicated that selection 238F, besides retaining the good qualities of its parent 289F/43 possesses 3% higher ginning outturn and superior technological properties. Three selections from L.S.S., viz., 265F, 318F and 320F, appear to satisfy the aim underlying the investigation of production of an early maturing form of L.S.S. to escape frost. All the three are reported to have longer staple than their parent L.S.S.

The breeding of jassid-resistant American varieties was carried out by crossing the Punjab-American varieties with the Cambodia strains from Madras, viz., 920, Co.3 and Co.4. The crosses with the latter two types are still in their early stages, and those obtained with 920 have yielded progenies which have shown complete immunity to the pest. The work on the improvement of *desi* cottons by crossing Jubilee with the Wi'd Nigerian cotton, *G. anomalum*, a set of five new strains possessing lint strength greater than even Punjab-American L.S.S. have been obtained. Their yield is nearly equal to that of Mollisoni and their ginning outturn varies from 36 to 38%. It is claimed that these new strains will, in due course, completely revolutionise the *desi* cotton industry of the province. The work at the Multan sub-station has resulted in the evolution of three improved strains, one *desi*, 119 Sanguinum and two American,

124F and 199F. The *desi* strain is being distributed since 1940 in the three south-western districts. Strain 124F has been approved for distribution in the south-western tract. It has already spread on its own merit over an area of about one lakh acres. 199F, which is under test for the last four years, has combined good yield with high ginning outturn, 35-36% and lint length of a full 1". The technological properties of this strain have already attracted the attention of some leading ginners of the Punjab and due to the high premium that was offered for its *kapas* during the season, a very keen demand for its seed is said to have been created. It is expected that the area under this strain will run into a few thousand acres during the next cotton season.

At the Jhang sub-station, which has been concentrating work since 1941 and the production of American cottons, three new strains, viz., 244F, 268F and A.C.71, superior to 4F in yield, staple length, ginning outturn and technological properties, are reported to have been evolved.

The sub-station at Hansi was originally started with the object of improving the *desi* cottons of the south-eastern Punjab, but as the conditions created by the war necessitated curtailment of area under short stapled cottons, the work was switched on to breeding suitable American varieties for this region. Amongst the *desi* strains evolved so far, 231 Rosea and 258 Mollisoni appear promising and both have given significantly higher yield than the present strain, Mollisoni 60A2. Amongst the American strains selected, 216F, by virtue of its extreme earliness and yielding capacity equal to that of Mollisoni, holds out promise of successful cultivation in the tract and the prospects of converting a predominantly *desi* tract into an American cotton tract seem to be bright.

(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.

It is reported that the season under review proved to be one of the worst for the cotton crop in the Punjab; owing to the early onset of the monsoon and excessive precipitation throughout the growing period, jassid infestation was very severe. In addition, towards the commencement of the picking season, *tirak* also made its appearance; these two factors together, it is stated, depressed the yields to a level never experienced before. The average yield of 289F/K.25 on the B.C.G.A. farm during the year was only 4.65 mds. per acre, against 8.5 mds. in 1943-44 and 16.17 mds. in 1942-43.

Three selections from 289F/K.25, viz., 279F, 280F and 282F, and three derivatives of the cross between 289F/K.25 and 289F/43, viz., A.C.83, A.C.84 and A.C.85, were tested against 289F/K.25 for the second time in a replicated trial. The results revealed that A.C.84 and A.C.85 are superior to the control both as regards yield of *kapas* and ginning outturn. They further combine desirable technological properties with marked jassid resistance and are said to be comparatively more remunerative to the grower. All the available seed of these strains was placed at the disposal of the B.C.G.A. for large scale trial in the coming year. In another trial with 12 new selections—eight of which are re-selections from 289F/K.25 and four derived from the back cross 289F/K.25 (289F/K.25 × 289F/43)—it was found that, with the exception of two, the rest outyielded the control significantly. Apart from high yield, several of these strains possess 2 to 3% higher ginning outturn, appreciably longer lint and high jassid resistance. It is stated that very varied and promising material is now on hand at Khanewal and further sifting is expected to yield strains far superior to the commercial 289F/K.25.

(c) **Physiological Scheme.**—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.

The object of the scheme is to obtain, as far as possible, precise knowledge of the inter-relationship between the soil and climatic factors and the growth of different varieties of cotton and to endeavour to utilise the knowledge thus gained for improving the quality and yield of cottons in general.

During the year under review, further experimental evidence has been produced to show that the yellowing-reddening in Sind-American cottons was caused by nitrogen deficiency and that the yellowing-reddening was associated with a low nitrogen content. When the cotton plants on light sandy soils were manured with the sulphate of ammonia, the leaves remained green in colour and their nitrogen concentration was also much higher than that of the leaves of the control plants which had turned yellow and red. Similarly the nitrogen content of the leaves of the late sown crop was higher than that of the leaves of the early sown plants. The former remained quite green while the latter turned yellow-red at the fruiting stage. Closely spaced plants turned yellow-red much earlier than the widely spaced plants sown on the same date and this difference between the two was similarly associated with their nitrogen contents. The leaves of M4 plants retained their green colour for a longer period than the leaves of either the L.S.S. or Sind-Sudhar grown side by side on the same date. It was found on chemical analysis that the nitrogen concentration of the leaves of M4 was much higher than the nitrogen concentration of the leaves of the other two varieties at the corresponding stages of growth. The greater concentration of nitrogen in the leaves of M4 was found to be associated with the lesser leaf matter produced by this variety. The total dry weight of the leaves per plant of M4 was nearly half of the total dry weight of the leaves per plant of the other varieties. The manuring of cottons in Sind where yellowing-reddening occurs has been found to give substantial increases in yield. The mean response to manuring with 3 maunds of the sulphate of ammonia in a common experiment conducted at three centres in Sind was 4 maunds per acre.

80% of the red leaf trouble in Sind cottons was of the yellow-red type and if it could be remedied by the application of the fertilizer, the cotton growers will be greatly profited. As there was another type of reddening where the change was from green to red and where the application of the fertilizer was found to be of no benefit, it would be difficult for a zamindar to apply the remedy at the right place. A practical method for giving guidance to zamindars is now being worked out.

It has been demonstrated for the second year in succession that *tirak* in Sind-American cottons can be ameliorated by adopting later sowings. It is also shown that by adopting close spacing for later sowings this measure of late sowings for remedying *tirak* can be adopted with advantage. In majority of experiments late sowings with close spacing have given higher yields than the normal sowings.

The experiments so far conducted have shown that the optimum sowing periods of cottons can be shifted forwards with great advantage if close spacing is adopted. The extent to which cotton sowings can be delayed in Sind is found to vary in different tracts. As 1944-45 proved to be an abnormal season, it was considered necessary to repeat the experiments for another season for finally adjusting the optimum sowing periods for cottons in different parts of Sind.

The investigations conducted in Sind have revealed some very important physiological characters of the Sind-American variety of M4. They are (1) Earliest of all varieties; (2) Very low sympodial; (3) Lowest leaf dry matter; (4) More resistant to yellowing-reddening than other varieties; (5) Higher boll weight; (6) Higher yielder and (7) More responsive to late sowing than other varieties.

A study of the effect of spacing in the presence and the absence of manuring on the growth and the yields of cotton in the black cotton soils of Gujarat has disclosed some important features. A closely spaced crop gave nearly the same yield as a widely spaced crop in the absence of manuring while when the manure in the form of groundnut cake was applied there was a progressive increase in yield as the crop was spaced wider and wider and the highest yield of 5.7 maunds per acre was obtained when the crop was spaced



the widest, i.e., at one plant per 16 sq. ft. It was thus found more profitable to manure a widely spaced crop than a closely spaced crop. The increase in yield due to manuring for a closely spaced crop was small and unprofitable.

A study of the growth and yields of cotton under different spacings revealed that even though the yields of closely and widely spaced plant in the absence of manuring were equal, the efficiency of the crop, i.e., weight of *kapas* produced per 100 grams of the whole plant increased as the spacing became wider. Thus the operation of some factor other than nitrogen is suspected when the crop is widely spaced. This factor by itself in the absence of manuring is not able to produce any increase in yield but when manuring is done it probably comes into operation. The yields therefore progressively increase as the spacing becomes wider when the crop is manured and the increase in yield is expected to be partly caused by nitrogen and partly by the other factor unknown at present. The investigation is being followed up.

The application of the groundnut cake has been found in the same experiment to make the crop definitely early under Gujarat conditions while the reverse was the case in the Punjab. Similarly the closely spaced crop matured earlier than the widely spaced crop.

No difference in the response on yields of composted and uncomposted oil cakes has been found in the Punjab conditions. This is however the finding of one year trial only.

(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. The scheme terminated on the 31st March 1945.

It is reported that the observations on the relative importance of the three species of jassid—*E. minor*, *E. Kerri* var *motti* and *E. devastans*—have shown that *devastans* is the only species which infests cotton seriously in the Punjab. As regards the comparative incidence of the pest on different commercial strains of the Punjab-American cottons, 289F/K.25 and "Victory" have been found to be susceptible, while 199F, 4F, 289F/43 and L.S.S. have proved to be

resistant to the pest. The work on the nature of resistance has shown that jassid females do not oviposit freely on resistant varieties but that if the eggs are laid in the leaf veins of even the most highly resistant types, there is no difficulty in their hatching and the nymphs reaching maturity. Of the different characters of the leaf veins studied, hairiness has been found to be the most important; plants possessing 95 or more hairs per centimeter length of the leaf vein have been usually found to be resistant. As regards the age of leaf in relation to jassid oviposition, the jassids prefer 35 to 46 days old leaves for egg-laying and avoid very old and very young leaves for this purpose. Observations made on the effect of the several agronomic factors and seasonal conditions on the incidence of infestation and population of jassids have shown that the intensity of jassid attack is positively correlated with high rainfall and high relative humidity and that jassid population is influenced by date of sowing, spacing and frequency of irrigation; late sowing, wide spacing and frequent irrigations have been found to be conducive to increase in jassid numbers.

The scheme has shown that the evolution of resistant strains is the only means of controlling the pest. In this connection, it is claimed that the close association of leaf hairiness with resistance has simplified the task of obtaining resistant varieties.

### **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  $\frac{3}{4}$ "", 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.

During the year under review, V. 434 was cultivated over an area of 3,99,156 acres in the Central Provinces and Berar against 5,32,564 acres in the preceding year. The area under Jarila was 1,379,847 acres, compared with 1,348,304 acres in 1943-44; Buri occupied some 1,11,543 acres in different parts of the province, of which 94,000 acres were in the Nimar district. As in the past, yield trials were carried out with the promising strains and the results showed that strain No. 091 and M. 5A are the best; the former gave significantly the highest yield of all the strains, including local Jadi, tested in the experiment. Jarila is stated to have continued to be promising in respect of yield as well as other economic characters. Strain No. 091 is reported to have a staple of 21 mm. and a ginning percentage of 37.5, while M. 5A, it is stated, possesses a fine staple length of  $31\frac{1}{2}$ ", capable of spinning up to 40s highest standard warp counts. It is, therefore, considered to be distinctly superior to V. 434 and Jarila.

Field tests of H. 420 against Verum 434, Jarila and local Jadi were carried out in representative localities of the Central Provinces. Owing, however, to unfavourable weather conditions, particularly in the early part of the season, several of the trials were spoiled. In the Nagpur-Wardha tract, H. 420 maintained its high level of yield over V. 434 and Jarila. This is confirmed also by large-scale trials on the cultivators' fields. H. 420, which covered some 5,000 acres in the Nimar district, is reported to have withstood heavy and late rains better than V. 434 and Jarila.

New selections were made in Buri with the object of isolating a high ginning strain to replace the existing type, Buri 107, which is a low ginner. These selections will be tested in the coming season. In the varietal trials, four improved strains of Buri were compared

with Buri 103, Buri 107 and Local Buri. The results were statistically significant and two strains, 0396 and 0394, gave higher yields than Buri 103 and 107 but were on a par with the local bulk Buri. Another strain 0382 was also found to be superior to Buri 107; the three strains will be tested again in the coming year. On the Akola Farm, Buri 107 was grown on an area of over 27 acres and gave an average yield of 343 lbs. per acre against 711 lbs. in the previous year.

## MADRAS

(a) **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 Northernns 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, the sowings were done in proper season but the prolonged drought that followed them affected both the growth and yield of the Mungari cotton in general. The yield tests arranged at Adoni and on the cultivators' lands consisted of nine and seven varieties, respectively. Of these, six were common to all centres of trial. Jarila, Umri bani, V. 434 and H. 1 failed at Adoni but were on a par with local in most of other trials in the districts. Strain 1595 was late for a Mungari variety. Strain 881 F was the most consistent and cosmopolitan of all the variants. It is reported to be a warp variety with a staple of 0.95 inch and a yarn strength of 100 lb. for 19s. X7682 was the only American variety

which equalled the local in the Mungari trials at Adoni in both types of soil.

There were seventeen families and two hundred and sixty-four hybrid progenies under yield tests during the year. The progeny row tests had to be resown with the reserve material as the germination, stand and growth were poor. Thirteen families were found to be either better than or equal to local in yield and earliness. Of these only two, viz., 2093 F1 and 2643 C contained residual variability for further reselection. Four families, viz., 2069 A1, 2069 A5 2093 F1 and 2093 F6 representing reselections for early habit from 6145 were among the promising group awaiting bigger yield tests. They have been uniformly consistent in yield and fibre characters in both compact family block and small bulk tests. The yields of progeny row tests were not statistically analysed on account of poor yields. Forty fresh second generation crosses and twenty new first generation hybrids with early varieties were raised. Fifty-nine F. 2 derivatives mostly from K. 1 x *anomalum*, K. 1 x *Rozi*, K. 1 x Burma C. 19 and K. 1 x *Changfeng* were found on examination to satisfy the staple and ginning standards of the tract.

Three varieties proved to be resistant to stenosis over three seasons. The best and earliest of them, viz., G. 4, M. 11 will be used as a parent in hybridisation with prolific, early, medium staple, susceptible types.

The red hairy caterpillar evinced a distinct preference to cucumber seedling but they were so gregarious that unless a thick intercrop was raised, the insect always moved on to cotton when the whole of cucumber was eaten.

**(b) 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., X20 with higher grades up to 5. Besides, a Cambodia strain having lint of grade 1 was crossed with cotton 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 review the seasonal conditions at Narasaraopet were such as to bring about a marked dilution in lint colour.

Ten progenies at Narasaraopet and six at Gurzala yielded more than their respective controls. Nine others at Gurzala were equal to X20. Among these, 1395 C1 and 1395 C2 combined productivity, colour, staple and ginning. Polur 6 appeared to be an improvement over X20 in all respects except colour. One of the hybrid derivatives

of G. 1037, viz., X2220 though segregating for colour possessed high means for staple and ginning. In bigger trials families 123 and 129 proved suitable for the July-August sowing which would represent the major season in the Cocanada tract. The same trend was noticed in smaller bulk tests conducted with the sibs of the three coloured families, viz., 123, 129 and 130. Of these, 129 would appear to be the best judged from staple, ginning, fibre weight and spinning performance.

The variability for staple and ginning was very limited in the several village bulks of *chinnapathi* cotton and early Hyderabad strains. Evolution of a coloured early type would need hybridisation and two second generation crosses, viz., C. 6-3 × Cutchica and C. 7 × Mahaling Burma, were under study during the year.

The trends of association between deep colour and high fibre weight noticed in the preliminary experiment at Coimbatore were not borne out in the tests communicated by the Technological Laboratory, Bombay. Fineness as judged by the standards of fibre weight was closely associated with high dye absorption but this property bore no relation to the ultimate tint. The performance of X20 and 129 in yield and dye absorption tests as well as in staple and fibre weight determinations compared well with the unselected Gurzala local. Further they recorded a high tintometer reading than local in the matter of basic lint colour. The spinning properties too, were in favour of these two. Some of the mills which were consulted, appreciated X20 but not 129. An ideal biotype would be an improved X20 with the colour of 129.

## UNITED PROVINCES

**The United Provinces Botanical Scheme.**—This scheme was sanctioned by the Committee in 1938. The object of the scheme was (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 scheme was operated at four centres, viz., Cawnpore, Raya, Nagina and Belatal, representing the Central, Western, Rohilkhand and Bundelkhand cotton tracts, respectively. It is stated that detailed examination, purification and replicated tests of the material derived from the 27,000 single plants selections made in the different cotton areas and from the strains, C.520 and C.402, has yielded 8 strains, viz., C.520/2, D, A, 34/4, 35/1, 35/3, 35/6 and 36/5b which are superior to C.520 in respect of yield, ginning outturn, spinning value and acre cash return. In addition, a few wilt-resistant strains have been isolated; these combine better yield with longer lint and greater resistance than C.520, but require to be further tested before they can be given out.

The outstanding result of the scheme is the isolation of Perso-American cotton, which is now under distribution. Field trials carried out on Government Farms during the past four years have shown that this variety may fetch as much as Rs. 5/- and Rs. 18/8 more per acre than C.520 and local *desi*, respectively. Perso-American is now grown over an area of 22,000 acres and about 1,022 bales of it were sold in 1943-44 at a premium of Rs. 80/- to Rs. 100/- per candy over Jarila. Several strains of American cotton imported from the Punjab, Parbhani and Sind are being tested against it and C.520, under local conditions. In these trials, L.S.S. and 100F have out-yielded Perso-American for 3 years. Both these cottons are said to be promising as regards spinning value which ranges from 31 to 38s in the case of L.S.S. and 41 to 47s in the case of 100F, against 32s of Perso-American.

The Provincial Government have now taken over the work of the United Provinces Botanical Scheme and trials with all the promising strains are being continued by the Agricultural Department.

## BENGAL

**Scheme for cultivation of long staple cotton in Bengal.**—The object of this scheme was 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. In January 1943, the scheme was extended for a period of three years, but it was closed down on the 30th September 1945, as it did not give indication of any useful results emerging out of it.

The work carried out under the scheme has indicated that the highland areas of the districts of Midnapore, Bankura, Nadia, Jessore, Murshidabad and Rangpur of West Bengal, are suitable for cultivation of long staple cottons, whilst East and North Bengal, which are low lying and receive a high rainfall, are not. Of the different varieties of cottons tried, Parbhani-American, Co.3 and Co.4 are said to have appeared promising even under adverse seasonal conditions. The cultivators of Bengal are reported to be taking increasing interest in cotton growing.

## 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 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 were: (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 scheme terminated on the 31st March 1945.

The study in Baluchistan of the life history and seasonal behaviour of the cricket is stated to have shown that the insect passes through one generation only during the course of a year; the eggs

are laid in cracks of dry and barren soil in September and the nymphs hatch out by the end of March; they become adults by about the end of June and are rarely seen in winter.

The cotton crop in the Usta tahsil is attacked by the regular migration of the *tid* from the Kachhi district of Kalat State through the seven bridges spanning the Khirtar Canal which separates the two areas. Control work in Baluchistan consisted of the following:—

- (1) Checking and destroying the insects at the Khirtar Canal bridges, and
- (2) Controlling the pest in the tahsil itself.

The control measures were carried out every year from April to July or until the strip of land known as 'pat' along the Khirtar Canal was flooded. These measures consisted in placing baits and barriers in the way of the migrating pest. The 'pat' side of each canal bridge was blocked by digging trenches and keeping them filled with water with a layer of kerosene oil floating over it. The undermentioned bait was found effective against the pest:—

Sodium fluosilicate	—	1 Seer
Rice bran	—	20 Seers
Molasses	—	1 Seer

with enough water to make it crumbly.

The control work was co-ordinated and conducted in identical lines in Sind and Baluchistan.

### HYDERABAD STATE

(a) **Gaorani cotton improvement scheme.**—This scheme, which is an off-shoot of the Hyderabad Botanical Scheme was sanctioned by the Committee in July 1943, for a period of 5 years from the 1st April, 1944.

The objects of the scheme are:—(1) production of suitable, fine quality, wilt-resistant strains of *bani* cotton for the three different zones, viz., North-East, Central and South-West portions of the Gaorani protected area and (2) evolution of a suitable upland strain for the highlands of Adilabad. Work in connection with the production of wilt-resistant types of Gaorani is being conducted at Parbhani, as part of the newly sanctioned scheme for the improvement of Oomras cotton. During the year under review, G.6 covered

some 3,61,121 acres in Nanded district. Two other improved strains—G.12F-2 and G.6E-3—are also being multiplied up in Latur taluq and Wadi Buzrug in Nanded taluq, respectively. As in previous years, three or four improved Gaorani strains were tested against G.6 and the Local in varietal trials at Nanded, Madhol and Latur. None of the strains proved to be better than the controls in respect of yield at Nanded and Madhol. At Latur, however, 990A outyielded the local significantly. It is hoped to select from the material on hand a strain of cotton superior to Gaorani 6 in ginning outturn, spinning performance and wilt-resistance. The experiments at Latur indicate that G.12F-2 is likely to solve the immediate needs of that zone. Further work at the Latur centre is proposed to be concentrated on the isolation of a high ginning type from G.12F-2 and an early maturing selection form G.4M-11.

Of the one hundred and ninety-five single plant selections of upland cotton tested against the local American bulk at Adilabad, ten promising progenies were retained for further study. District trials were conducted with three or four improved varieties of cotton at 18 centres in the Gaorani Protected area and three places on the Adilabad plateau. The trials at six places in the Gaorani tract failed totally and those at the remaining centres gave no conclusive results. Manurial trials were laid out at Nanded, Latur and Madhol with the object of testing the efficiency of groundnut cake as a source of Nitrogen for improving the yield of cotton. Groundnut cake and Ammonium sulphate were the two forms of Nitrogen applied at 20, 40 and 60 lbs. per acre. The results revealed that the differences in yield of *kapas* due to the two sources of Nitrogen were not significant at Nanded and Latur; at Madhol, however, the plots that received Ammonium sulphate gave significantly higher yield than those manured with groundnut cake, confirming the results obtained in the previous year at this station. The effect of different Nitrogen doses at all the three centres was significant. At Madhol and Latur, it was observed that, with increasing doses of Nitrogen progressively, increasing yields were obtained. In another manurial experiment laid out on the farmers' fields at Deglur, Ahmadpur and Hingoli, where groundnut cake alone was applied in two doses at 20 and 40 lbs. of Nitrogen per acre, it was found that 20 lbs. of Nitrogen in the form of groundnut cake was

a suitable dose for cotton grown under monsoon conditions in black soil tracts.

(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.

As in the previous season, the work in connection with the production of wilt-resistant types of Gaorani was carried out at the Cotton Research Station, Parbhani, in conjunction with the above scheme.

During the year under report, some 721 selections were tested in the preliminary wilt experiment in single rows in wilt-infected plots using Gaorani 6, as the control. Six progenies, three of which are selections from Hyderabad Gaorani, one from Gaorani 12F-2 and two from Gaorani 167, recorded nil mortality against 38-77 per cent of the control. Two of the selections—II-42-7199 and II-44-933—recorded nil mortality in the previous season also. The mortality of ten selections ranged from 1 to 5 per cent and that of 19 selections from 6 to 10 per cent.

The varietal test was conducted at three sites with three improved strains, viz., II 41-6919, Indicum 17, Gaorani 12F-2 against Jarila and the local. Strain II-41-6719 (a sib of Gaorani 160) was

very promising in respect of yield and ginning percentage. Gaorani 12F-2, an early maturing strain, with yield as good as Parbhani local or Jarila, maintained its superiority in respect of spinning performance over both these varieties. It is stated that if some of the higher ginning sub-strains of this culture maintained their ginning character from season to season and proved to be as good as the parent in other economic characters, the problem of improving the cotton of the Oomras tract would be nearer solution. In another trial, five improved strains of Hyderabad Gaorani were tested against Parbhani local, Gaorani 12F-2 and Jarila. The results indicated that the yields of strains Gaorani 12F-2 and II-41-6919 were better than those of Parbhani local or Jarila.

Of the six early maturing American strains tested, two strains—II-43-8348 and II-43-8380 (a segregate from Parbhani-American 1 x Co.2, backcrossed to Parbhani-American 1) gave significantly higher yields than Parbhani-American 1. Both are reported to be earlier maturing than Parbhani-American 1, with a ginning percentage of 33.4 and 35.4 and a mean fibre length of 1.04" and 0.99" against 29.2 per cent ginning and 0.94" fibre length of Parbhani-American 1, respectively.

In the District trials conducted at nine centres in Parbhani, Bhir and Aurangabad districts, with three or four improved strains, it is reported that the yield of Gaorani 12F-2 was the highest at all centres except one in the Parbhani district. Strain II-41-7040 is reported to have given significantly higher yield than the local at two centres at which it was tried. Indicum 17 excelled the local at five centres, but the difference in yield was significant at two centres only.

Parbhani-American is reported to have given significantly higher yield than the remaining American strains at Silod on heavy soil. On light soil at the same centre, all the *arboreum* strains gave significantly higher yield than the American strain included in the trial.

(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.

During the year under review, 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 (R.II-38-673), which significantly outyielded all other types last year, failed to keep up its previous level of yield of seed cotton. Besides, its lint was found to be coarse and of low spinning quality. On the other hand the performance of R.K. 19 in respect of yield of *kapas* and quality of lint was consistently uniform. Of the 17 single plant progenies tested in another replicated trial six were retained for further study. Of these, the most important is R.II-43-2472, a sib of R.K. 19, which combines a white creamy and silky lint with other desirable characters.

As in the past, the wilt test was conducted at Hunsihalhuda and 25 resistant, high yielding progenies were selected for testing in the ensuing season. District trials were conducted at seven centres, of which those at two centres were failures and those at four other centres did not reveal any significant differences in yield between the varieties tested. At the seventh centre, viz., Kopbal, Jayawant, significantly outyielded the R.K. strains and Hagari.

At Poona progenies of three families of the back-cross (R.K. 19  $\times$  N.S. 12)  $\times$  R.K. 19 were tested in pot culture, and only one family was found promising as regards wilt-resistance.

Material of a number of new Kumpta strains received for pot culture tests, proved highly susceptible to wilt.

## BARODA STATE

**(a) 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, large-scale varietal trials were conducted with two types—S.24-2 and S.31 at five centres in Kathiawar, viz., Amreli, Ingorala, Damnagar, Palitana and Jamnagar using C. 520 and Mathio as controls. The yield data showed that S. 31 was on a par with the controls at four out of the five centres, while S. 24-2 equalled the checks at all the five localities. Both of them, however, were superior to the local Mathio in respect of ginning outturn, fibre properties and spinning capacity. S. 24-2 was adjudged suitable for spinning 19s and S.31 for 30s, H.S.W.C. against 13s and 14s of Mathio and C.520, respectively. It is stated that S.31 is an outstanding selection which is likely to alter entirely the general level of Mathio cotton if widely extended. The Department of Agriculture, Baroda, therefore, proposes to recommend a large-scale extension scheme to cover the whole of the general Mathio area of Kathiawar, after obtaining in 1945-46 further confirmatory evidence as to its superior performance.

Fourteen families, one selected from Mathio and 13 derived from the  $F_4$  progenies of two crosses— $S_5 \times$  Jarila and  $S_6 \times$  Jarila were tested against C. 520 in replicated trials. Eight families which appeared promising have been retained for further study.

## MYSORE STATE

**Scheme for breeding Sea Island and Egyptian cottons in Mysore.**

—This scheme, which is an off-shoot of the Mysore (Doddahathi) cotton scheme, was sanctioned by the Committee in January, 1944, for a period of three years from 1st November, 1944.

It is concerned with (1) the acclimatisation and breeding of Egyptian and Sea Island cottons and (2) the testing, in large-scale trials, of Mysore-American strains evolved under the Doddahathi scheme.

During the year under review, two new homozygous Mysore-American strains—M.A.X. and M.A.XI—were tested on the Irwin

Canal farm in a seasonal-varietal test along with Co. 4 and other Mysore-American strains, M.A.V, VI, VII and IX. The results showed that M.A.V. was the best, having recorded significantly better yield than all other M.A. types; M.A.X was equal to Co. 4 in the February sowing. In a similar experiment at the Babbur farm, M.A.VI proved to be the best yielding type, thus confirming the previous observation about its being the most suitable strain for the tract. In the district trials, M.A.V. is reported to have done very well compared to Co. 4 or the local. It gave, on an average, an outturn of 600 lbs. of *kapas* per acre, both under irrigated and rain-fed conditions, against the average of 500 lbs. in the case of Co. 4. The demand for its seed was great and arrangements have been made to distribute sufficient seed to cover 500-700 acres during the coming season.

In the trials of Egyptian varieties on the Irwin Canal farm, Giza 12 gave significantly better yield in all the three plantings done in November, December and January; Giza 7 was the next best, while Maarad and Ashmouni gave very low yields. On the Babbur farm seasonal sowings were done in May, June and July, but owing to heavy rains in July, the germination was poor and the trial had to be abandoned. In other trials, however, G.7 is said to have given the highest yield.

The testing of Sea Island was done side by side with Egyptian types and the results, during the year are said to have confirmed the previous conclusion that October-February sowings are conducive to better growth of this cotton as compared with the Egyptian cottons.

A replicated randomised manurial experiment was conducted with Giza 12 using 3 levels of nitrogen (0, 50 and 100 lbs. per acre), 3 levels of phosphoric acid (0, 25 and 50 lbs. per acre) and 3 levels of Potash (0, 25 and 50 lbs. per acre). The analysis of the data revealed that the effect of nitrogen alone was significant and that the highest yield was obtained from the treatment of 100 lbs. of nitrogen in combination with 25 lbs. of  $P_2O_5$  per acre. A slightly modified trial with S.I.V. 135 and Giza 12 using six levels of nitrogen (0, 50, 75, 100, 125 and 150 lbs. N per acre) with a basic treatment of 25 lbs.  $P_2O_5$ , 25 lbs. of  $K_2O$ , and sann hemp at 2,000 lbs. per acre is now in progress.



## CHAPTER V.

### EXTENSION WORK IN THE PROVINCES AND STATES

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. 17½ lakhs. During the period under review, there were twenty 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 later 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. The scheme terminated on the 31st March, 1945.

During the fifteen years of operation of the scheme, the area under 1027 A.L.F. fluctuated widely from year to year, depending on the response of the Co-operative Cotton Sale Societies and the demand of the market. The largest area covered by this variety was 1,93,498 acres in 1934-35, out of a total area of 2,80,713 acres under cotton in that year. Owing to its low ginning out-turn and unremunerative premia realised in the comparison with Selection 1A, 1027 A.L.F. did not find favour with the cultivators and gin-owners. It was, therefore, decided to replace it by the newly evolved type "Suyog" a derivative from the cross between 1027 A.L.F. and 1A, which combines the high ginning of the latter with the lint qualities of the former.

(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 Talukas, 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. The scheme terminated on 31st March, 1945.

To prevent illicit import of cotton by road from Olpad to the Surat and Ankaleswar areas, check stations were maintained on the Tapti and Kim rivers. During the past two years, however, check stations were maintained on the Tapti alone. Half pressed bales from Olpad area were allowed to be transported under licence to Surat for being pressed and marked "Olpad" before sale.

With the introduction of the improved strain "Suyog", which combines the good qualities of both 1A and 1027 A.L.F., the question of the comparative merits of the two varieties, 1A and 1027 A.L.F., has ceased to be a problem and the Co-operative Cotton Sale Societies in the Olpad area have gone in for the seed of the new strain for sowing in the coming season. In view of the changed situation, the Bombay Government were requested, at the instance of the Local Sub-Committee, to withdraw the Notification segregating the Olpad taluka and part of Chorasi taluka north of the Tapti from the remaining portion of the Surat district, on the ground that with the introduction of the improved strain "Suyog", the need for such segregation has ceased to exist.

Action has been taken accordingly by the Provincial Government.

(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 20.20 acres on the farm and gave 3,130 lbs. of seed for multiplication in Stage II. Out of 100 acres of cultivators' land at Mamurabad (near Jalgaon farm), an area of 9 acres and 5 *gunthas* had to be ploughed up owing to adverse seasonal conditions. The seed of Stage II produced from the remaining area was 13,264 lbs. All the cotton under the two stages was ginned in the farm gin and the lint sold by auction at Jalgaon; it fetched Rs. 234/- per boja, i.e., Rs. 518/- per candy F.O.R. Bombay, against Bombay *Jarila* quotation of Rs. 457/- per candy on that day.

**Stages III and IV.**—Of the 65,78,260 lbs. of *Jarila* seed distributed by the Department and approved stockists, only 47,70,090 lbs. of seed were reported to have been utilised for sowings. The controlled area during the year was 2,31,362 acres (including a reserved area of 64,005 acres). This falls short of the stipulated area of 4,50,000 acres by 2,18,638 acres; the reduction is attributed to (a) the lateness of the season, (b) the Grow More Food Campaign and to (c) a stock of about 16,74,140 lbs. of seed remaining unsold. The total area under *Jarila* cotton (including natural spread) is estimated at 3,44,267 acres against 8,38,548 acres last year.

The growers realised on an average a premium of Rs. 17/- per maund of kapas. The auctions organised by the Co-operative Societies during the year were successful. A total quantity of 1141 bojas of purified Jarila lint was sold at a premium varying from Rs. 4/- to Rs. 60/- over the prevailing Bombay Jarila quotations. The gross extra income realised by the cultivators of Jarila is estimated at Rs. 49,05,805/-.

For sowing in 1945-46, the Agricultural Department and approved stockists have stocked 64,81,800 lbs. of seed sufficient to cover 3,49,000 acres.

The Bombay Government have applied the Cotton Control Act to the whole of East Khandash District and to West Khandesh excluding Nawapur Peta, Nandurbar, Taloda talukas and to the talukas of Nandgaon, Malegaon, Baglan, Kalwan and Yeola of Nasik District, from the 1st November, 1944, Jarila being the prescribed variety for these tracts. Mixing of and trade in any variety other than Jarila has also been prohibited. Arrangements are also stated to be under consideration for the application of the Cotton Transport Act to the Khandesh tract, the restriction being confined to imports by rail only as imports by road are not very large.

**(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) **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 9½ 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 keynote 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 1,11,852 acres of *Jayawant* and 19,600 acres of *Gadag No. 1*, of which 89,785 acres and 18,084 acres respectively were rogued. 29,845 bags of *Jayawant* seed and 6,800 bags of *Gadag No. 1* seed

were distributed to cover an area of 4,17,830 acres and 68,000 acres respectively. The area under natural spread is estimated at 2,00,000 acres and 50,000 acres under Jayawant and Gadag No. 1, respectively, thus bringing the total area under Jayawant to 6,17,830 acres and that under Gadag No. 1 to 1,18,000 acres, the corresponding figures in the previous year being 6,53,200 and 1,53,600. The reduction in acreage in the year under report is attributed to the application of the Bombay Growth of Food Crops Act, absence of timely rain and fall in the price of cotton.

44,970 docras of Jayawant and 10,929 docras of Gadag No. 1 were sold by auction at a premium of Rs. 15/- per bag of 1344 lbs. for Jayawant and Rs. 20/- for Gadag No. 1 over the *bazar* rates.

It was originally programmed to stock 1,01,50,000 lbs. of seed of Jayawant and 20,00,000 lbs. of seed of Gadag No. 1 for sowing in the next season; the purchases up to the 30th April, 1945, amounted to 28,00,000 lbs. and 8,00,000 lbs. respectively. Owing, however, to the reduction of cotton area in Karnatak under the Bombay Growth of Food Crops Act, it is now not proposed to stock the full quantity of seed programmed for.

Agmarking was continued on an optional basis. Up to the end of April, 1945, the number of bales agmarked were 4,292 of Jayawant and 203 of Gadag No. 1. It is stated that unless the millowners appreciate the value of Agmarking and are prepared to pay adequate prices for Agmarked bales, the Agmarking of cotton would not become popular.

**(f) 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 and it came into operation on the 4th May, 1942. In January 1945, it was extended for a period of one year.

The original object of the scheme was to cover an area of 25,000 acres in Nawapur taluka with 1027 A.L.F. cotton. During the extension period, it is proposed to multiply 1027 A.L.F. cotton in the controlled area so as eventually to cover the whole area with it.

During the year under report, 105,552 lbs. of seed of 1027 A.L.F. were distributed over an area of 4,302 acres (against 3,320 acres programmed for), including a certified area of 3,790 acres. The

produce was pooled and marketed by public auction at Rs. 5/- to Rs. 10/- per *bhar* (924 lbs.) of seed cotton, over local. It is stated that the growers of 1027 A.L.F. realised a gross extra income of Rs. 55,625/- (at Rs. 5-9-0 more per acre over the local).

**(g) 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.

During the year under review, the Agricultural Department controlled a seed multiplication area of 11,051 acres (including 259 acres grown with farm pedigree seed), against an area of 15,257 acres (including 571 acres grown with farm pedigree seed) in the previous year. The total estimated area under 'Vijaya' cotton during the year was 89,450 acres against 1,10,000 acres in 1943-44, the reduction being attributable chiefly to the application of the Bombay Growth of Food Crops Act. Out of a total quantity of 7,34,530 lbs. of 'Vijaya' seed handled this year (against 13,28,376 lbs. in the previous year), 2,54,570 lbs. were distributed by the Agricultural Department and the balance, viz., 4,79,960 lbs., by the co-operative societies, to cotton growers in Ahmedabad, Kaira and Broach districts. It is stated that the usual rate of multiplication of the area under 'Vijaya' cotton in the tract is 15 times. Of the 3,247 bales obtained from the controlled area, 2,943 were sold at a premium varying from Rs. 41/- to Rs. 80/- per candy F.O.R. Bombay, over May Indian Cotton Contract quotation.

It is stated that the premia obtained by the improved types, like B.D. 8 and 1027 A.L.F., were not sufficient to compensate for the loss due to their low ginning outturn and consequently 'Vijaya' cotton, which is a better ginner than the two varieties mentioned, was purchased by the ginowners at a premium of Rs. 15/- to Rs. 20/- per *bhar* of 1020 lbs. of seed cotton.

**(h) 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, a total quantity of 104,000 lbs. of Wagotar seed was available for distribution. Of this, 29,010 lbs. were purchased by the Department, 43,000 lbs. were distributed directly by the approved agents and the remaining quantity was sold by merchants to the farmers. The seed handled by the Department was sufficient to cover about 3600 acres. Owing, however, to unfavourable seasonal conditions, the area controlled was only 560 acres against 6,000 acres originally programmed. Stages II and III were organised at Jakhawada and Haripura in Viramgam taluka over 1-30 and 67-23 acres, respectively. The produce of these two stages is being purchased and ginned under Departmental supervision.

The *Kalas* (dry bolls with seed cotton) of stages IV and V were purchased by the approved agents at Dholka, Dhandhuka and Viramgam (at Mandel only) talukas at a premium of three to four annas per maund of 40 lbs. over the prevailing market rates.

The gross extra income derived by the growers of Wagotar during the year is estimated at Rs. 3,944/-.

## 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, 12,150 maunds of seed of Sind-Sudhar and 33,300 maunds of M.4 seed were distributed by the Department on the Left Bank against 22,600 maunds of Sind-Sudhar and 49,000 maunds of M.4 distributed last year. The total area under cotton in Sind is estimated at 9,00,000 acres against 8,99,365 acres in the previous year, the area under improved varieties on the Left Bank being 5,20,000 acres (1,45,000 acres under Sind-Sudhar and 3,75,000 acres under M.4) and that on the Right Bank, 3,700 acres. The percentage of the area under improved strains was 62.3 of the total cotton area against 74.4 in 1943-44. The reason for the fall has not been given. The short staple *desi* varieties are reported to have been almost completely replaced by American varieties on the Left Bank.

Certified *kapas* on the Left Bank fetched a premium of Rs. 0-8-0 per maund. The gross extra income to the growers on the Right Bank is estimated at Rs. 51,800/-.

**(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. In July 1944 it was

extended for a period of one year and three months, up to the 31st March, 1946.

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 organisation 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 Bank under departmental control were as follows:—

	Sind Sudhar (acres)	M-4 (acres)	Total. (acres)
(a) Government Farms .. .. .	64	90	154
(b) Selected big growers .. .. .	8,600	16,200	24,800
(c) General .. .. .	27,528	34,304	61,832
<b>Total ..</b>	<b>36,192</b>	<b>50,594</b>	<b>86,786</b>

On account of its satisfactory performance under varied conditions in all parts of the Province, including Nāwabshah district, where other American types have failed and its earlier maturation than Sind-Sudhar by 30 days as a result of which it escapes boll-worm attack and damage by early frosts, it is reported that M-4 strain has become more popular than Sind-Sudhar. The quantity of pure seed purchased by the Department for distribution is shown below:—

	Left Bank (mds.)	Right Bank. (mds.)
Sind Sudhar .. .. .	12,150	.....
M-4 .. .. .	33,300	1,240
	<b>45,450</b>	<b>1,240</b>

Ginning and pressing were supervised by the Department and certificates of purity were issued for full pressed bales in exchange for similar certificates issued for kapas. Certified lint fetched a premium of Rs. 3/- per maund for ginners; out of this, the growers received from the ginners about 8 annas per maund for kapas. It is stated that the ginners did not pay any extra premium for certified

M-4 kapas and that the demand from them for certified Sind-Sudhar kapas was better than that for M-4 kapas.

### 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, and again in January 1944, the scheme was extended for a further period of one year from the 1st March, 1944. The scheme terminated on the 28th February, 1945. The scheme aimed at the extension of area under V.434 cotton in the seven taluqs where Verum had 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 was to raise the area in six of the seven taluqs (excluding Ellichpur) to 5 lakhs of acres.

During the year under report 8,809 maunds of seed were distributed in the 3 taluqs from Departmental and other agencies and the area so covered in the 3 taluqs was 53,500 acres under Departmental spread and 1,03,400 under natural spread. The number of bales of Verum 434 sold through the Departmental pools was 2130-1/2, the average premium realised being Rs. 30/8/- on Jarila I.C. Contract. The total area under Verum 434 in the Province was estimated at 3,77,934 acres. The extra gross income accruing to the growers in the three taluqs and from a further 2,21,034 acres outside these taluqs is estimated at Rs. 48,55,800/-. 21,406 maunds of seed of Verum 434 were collected in the pools and will be utilised for sowing in the ensuing year.

**(b) 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 taluq, covering an area of two lakhs acres.

During the year under report, a total area of 13,79,850 acres was grown with Jarila of which 13,200 acres against 8,000 acres originally programmed, were covered with 2,238 mds. of pure seed of stages III and IV, distributed by the Agricultural Department. A total quantity of 7,148 mds. of seed of stages III and IV was stocked for sowing about 43,000 acres in the 1945-46 season. In all, 3,215 bales were produced and the average price obtained per *khandi* of lint on F.O.R. Bombay basis was Rs. 470/1/-; the premium thus realised over the average Indian Cotton Contract price was Rs. 26/8/-. The gross extra income realized by the growers of Jarila is estimated at Rs. 97,02,802/6/-.

## MADRAS

**(a) Co. 3 Seed Distribution Scheme.**—This scheme, which replaced the Madras Co.2 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.1 and Co.2 cotton strains with Co.3.

During the year under report, 3,71,500 lbs. of seed of Co.3 were distributed to cover an area of 18,570 acres. The area maintained under seed farm conditions by the Agricultural Department and the three crop marketing societies of Tiruchengode, Rasipuram and Salem, was 494 acres and 3670 acres, respectively. Of the 3670 acres, 1200 acres were ploughed up owing to stagnation of water after heavy rains. In all, 88 candies of lint were obtained from the produce of the seed farm and these were sold at a premium of Rs. 120/- per candy over the local Cambodia. The cultivators are reported to have benefited to the extent of Rs. 25/- per acre on an average on

account of higher yield and higher premia obtained for the lint; the total gain to the growers of Co.3 is thus estimated at Rs. 4,64,250/-. A seed farm area of 2250 acres is proposed to be maintained in each of the three taluks, Tiruchengode, Salem and Rasipuram.

**(b) Scheme for Distribution of H.1 Strain in the Western Area.**

—This Scheme, which was sanctioned by the Committee 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 has been maintaining 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, the H.1 strain was multiplied over a total area of 19,418 acres at Adoni, Bellary and Guntakal against 22,500 acres originally programmed. A total quantity of 583,440 lbs. of seed, sufficient to cover an area of 58,344 acres, was stocked at a number of sale centres distributed over the tract. It is stated that, to effect wider distribution of seed, arrangements were made to open more sale centres and to offer the seed at only annas eight over the market rate. An attempt was also made to exchange pure seed produced in the scheme with the seed of unselected bulk of the growers. Out of 206 *nagas* (1 *naga*=312 lbs.) of lint obtained in Bellary and Adoni from the seed farm produce, 138 *nagas* were sold through co-operative societies, the premium obtained being Rs. 3 to Rs. 5 per *naga* at Adoni and Rs. 5/- at Bellary, according to the quality of the lint marketed. The gross extra income to the growers of H.1 cotton is estimated at about 16 lakhs of rupees.

(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, K.1 and N.14.

The area selected 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.
Co. 2	Acres. 1	lbs. 462	Sown in multiplication plot of Central Farm.
Co. 4	0.70	173	To be sown in multiplication plot in the Agricultural Research Station at Palur.
K. 1	2	307	To be sown in multiplication plot in the Agricultural Research Station at Koilpatti.
N. 14	1	106	To be sown in multiplication plot in the Agricultural Research Station at Nandyal.

### UNITED PROVINCES

**Scheme for Distribution, 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 average yield of Perso-American, during the year, is estimated at about -/12/- in the rupee; this works out to about 4 maunds per acre against 3 maunds in the previous season. The produce obtained from stages III and IV was purchased by the Agricultural Department at a pre-

mium of Rs. 5 to Rs. 11 per maund of kapas over *desi* cotton. The quantity of 8,492 maunds of pure seed secured in Stage V will suffice for an area of 40,000 acres next year.

During the year under report, 220 bales produced from the kapas of stages I to IV, purchased by the Department, were sold at a premium of Rs. 88/- per candy over Jarila. Perso-American lint fetched Rs. 35/- to Rs. 38/- per maund more than *desi*. The gross extra income to the cultivators is estimated at Rs. 6,00,101/- from an area of 22,591 acres. Of 737 bales pressed from stage V of the produce purchased by the Co-operative Societies, about 266 were sold at a premium of Rs. 88/- over Jarila. The Aligarh District Cotton Purchase and Sale Society is reported to have made a profit of about Rs. 15,000/- and a bonus of Re. 1/- per maund is proposed to be distributed to the growers.

### BARODA STATE

(a) **Baroda (Navsari) Seed Distribution 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. The scheme, however, terminated on the 31st March, 1945, and is now replaced by the new scheme for the distribution of *Suyog* (Seg. 8-1) cotton seed.

The quantity of seed distributed, the area covered by the variety and controlled by the Agricultural Department and the percentage of the total area under 1027 A.L.F. cotton during the 11 years the scheme was in operation, are given in the statement on page 82.

The most important step taken to extend the variety over the whole of Navsari district is stated to be the passing of the Cotton Control Act in 1941 which provided that, except under a permit, no cotton seed other than that of genuine 1027 A.L.F. could be sown in the Navsari district of the Baroda state. As a result, the area sown in 1941-42 under this variety was 2,52,863 acres against 80,000 acres in the preceding year. Owing, however, to the "Grow More Food

S No.	Year.	Seed depots opened.	Seed Distribution in lbs.	Area sown in acres.	Controlled area by the Dept. in acres.	P. C. under 1027 cotton of the total area in the Dist.
1	2	3	4	5	6	7
1	1934-35	5	231285	18382	5382	9
2	1935-36	12	1020534	74456	4956	40
3	1936-37	8	314432	75000	5250	33
4	1937-38	8	469514	50000	18594	23
5	1938-39	8	449787	50000	8200	22
6	1939-40	11	300798	75000	30000	37
7	1940-41	21	2696925	80000	40000	40
8	1941-42	21	3747942	252863	46955	90
9	1942-43	21	2656500	210000	31655	90
10	1943-44	21	2266785	165000	17312	82
11	1944-45	21	1080825	160000	24236	82*

\*Because of more area under food crops.

Crops" campaign, the cotton area in the State was compulsorily reduced by nearly 25%, the decrease of area in the case of 1027 A.L.F. in the Navsari district being to 2,10,000, 1,65,000 and 1,60,000 acres in the three years, 1942-43, 1943-44, and 1944-45, respectively.

The produce in the district has gained a reputation for its standard of purity and is appreciated by the trade. The gross extra income obtained by the cultivators of this variety since 1940-41 is estimated at Rs. 26,18,251/-.

To conform with the cotton policy of the Bombay Department of Agriculture, who are replacing 1027 A.L.F. by Suyog (Seg. 8-1), the Baroda Department of Agriculture undertook experiments to investigate the suitability of the new strain in the Navsari tract. The results showed that Suyog gave 8 to 10% more yield than 1027 A.L.F. and its lint obtained a premium ranging from Rs. 8/- to Rs. 15/- per candy over local. The increased profit to the cultivators of this variety is estimated at Rs. 5 per acre. Accordingly, a new scheme for the replacement of 1027 A.L.F. by Suyog over an area of 2,10,000 acres in Navsari district was sanctioned by the Committee in January 1945, and it came into operation on the 1st April, 1945.

(b) **B. 9 Seed Distribution 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.

It will be seen from the report that 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 7,30,739 lbs. of B.9 seed (42,500 lbs. of 'A' grade, 2,25,000 lbs. of 'B' grade and 4,63,239 lbs. of commercial type) and 13,380 lbs. of 'Vijaya' seed (600 lbs. of 'A' grade and 12,780 lbs. of 'B' grade) for sowing. The combined area under both the types was 1,04,950 acres, of which 2,992 acres of 'A' grade and 6,858 acres of 'B' grade were certified.

Upto the 31st March, 1945, 1,483 *bhars* of B.9 kapas (486 of 'A' grade and 997 of 'B' grade) and 282 *bhars* of 'Vijaya' cotton (10 of 'A' grade and 272 of 'B' grade) were pooled at different centres. The certified cotton fetched on an average Rs. 4/- more per *bhar* over uncertified cotton; the certified growers thus realised an extra income of Rs. 7,060/-.

For sowing in 1945-46, 18,560 lbs. of B.9 seed (3,840 lbs. of nucleus seed sufficient for 384 acres and 14,720 lbs. sufficient for 1,472 acres) and 6,27,840 lbs. of 'Vijaya' seed (19,200 lbs. of nucleus, sufficient for 1,920 acres, 1,35,040 lbs. of 'A' grade sufficient for 13,504 acres and 4,73,600 lbs. of B grade sufficient for 47,360 acres) have been stocked.

It is reported that in comparative trials conducted at various centres, 'Vijaya' gave better yield than B.9 at all except one locality, viz., Vejpur, where B.9 will continue to be grown. 'Vijaya' is stated to be the type most favoured by the cultivators now, and it has been decided to grow only this cotton in the whole of the Baroda district (except at Vejpur) during 1945-46.

**(c) 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 14th 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 year under review, 5,18,710 lbs. of Wagad 8 seed (69,550 lbs. of 'A' grade and 4,49,160 lbs. of 'B' grade) and 27,995 lbs. of Wagotar seed were distributed by the Agricultural Department for sowing. The area covered with pure seed of Wagad 8 was 24,963 acres, of which, 4,963 acres were controlled by the Department. An additional area of 646 acres of 'A' grade Wagotar cotton was also certified. It is stated that the total area under cotton during the year was 47,100 acres against the normal 100,000 acres in the Wagad zone of Mehsana district. This reduction is attributed chiefly to the 'Grow-More-Food' campaign, low prices for cotton and continuous rains. Wagotar, however, is said to be making a headway owing to its good yield and high ginning percentage.

**(d) Scheme for distribution and multiplication of Vijaya cotton in Baroda State.**—This scheme was sanctioned by the Committee in January, 1944, for a period of five years and it came into operation on the 1st April, 1944. It aims at the replacement of B.D.8 cotton by Vijaya over approximately 3,00,000 acres in the black soil areas of Baroda State.

It is reported that, during the year, the State enforced the Cotton Control Act, under which the cultivation of Vijaya cotton in the whole of the Baroda district is obligatory. During the year, 3,68,709 lbs. of Vijaya seed were issued for sowing over an area of 36,958 acres, of which 33,572 acres (10,066 acres of A grade and 23,506 acres of B grade) were controlled and certified. It is reported that owing to unfavourable seasonal conditions, the cotton suffered both as regards ginning % and staple length. The yield obtained was also poor in the earlier part of the picking season. Of the 11,236 *bhars* (12 B. mds.) of *kapas* were obtained from the A and B grade areas, 10,121 bales were pressed from it and certified with agmark labels. The premium obtained for Vijaya seed cotton was on an average Rs. 20/- more per *bhar* than that obtained for B.D.8, and that for Vijaya lint varied from Rs. 25/- to Rs. 65/- per candy over the quotation for Jarila. The gross extra income to the growers of Vijaya cotton is estimated at Rs. 5,17,412/- at Rs. 14/- per acre. For distribution in the coming season 40,41,600 lbs. of seed have been stocked.

**CHAPTER VI.**  
**PROGRESS IN THE INTRODUCTION OF IMPROVED**  
**VARIETIES OF COTTON.**

The area under improved varieties of cotton during the year under review was 7,786,000 acres or 52% of the total cotton area as compared with 9,893,000 acres or 48% of the total in the previous year. While the percentage of the area under improved varieties to the total acreage during the year under review showed an increase as compared with the previous year, there was a shrinkage in the actual area under improved varieties due mainly to the reduction of the cotton acreage, particularly in the Bombay Province, as a result of the 'Grow-more-food' campaign. In accordance with the policy of increasing the production of better staple cottons, the improved varieties disseminated were mostly of medium and long staple. This policy has resulted in raising the average staple of the Indian cotton crop as will be seen from the following table in which an attempt is 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 1939-44	1944-45.	% increase (+) or de- crease (-) of col. 4 over col. 2
1	2	3	4	5
<i>Short staple—below 7/8".</i>				
(1) Bengals .. .. .	905	864	555	
(2) Oomras .. .. .	1,890	918	143	
(3) Central India.. .. .	324	246	154	
(4) Broach (Part) .. .. .	65	205	36	
(5) Dholleras .. .. .	525	304	134	
(6) Kumpta and Upland (Part) .. .. .	(a)	40	43	
(7) Bijapur and Bagalkot Jowari } .. .. .	(b)	124	{ ..	
(8) Westerns (Part) .. .. .			{ 53	
(9) Warangal and Cocanadas .. .. .	49	33	23	
(10) Salems .. .. .	30	7	5	
(11) Chinnapathi .. .. .	39		{ 1	
(12) Comillas .. .. .		43	{ 44	
Total Short staple .. .. . Quantity	3,827	2,804	1,191	—69
% on " Total—All staples " ..	70	52	34	

\*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 1939-44	1944-45	%increase (+) or decrease (-) of col. 4 over col. 2
1	2	3	4	5
<i>Medium &amp; Long staple—7/8" &amp; above.—</i>				
(13) Americans—Punjab and Sind (staple, 1" and above)* .. ..	....	350	259	
(14) Americans—Punjab and Sind (staple below 1") .. ..	264	933	940	
(15) C. P. and Berar Verum .. ..	....	93	62	
(16) Hyderabad Gaorani .. ..	332	146	81	
(17) Broach (Part) .. ..	214	38	76	
(18) Surti .. ..		148	60	
(19) Kumpta and Upland (Part) .. ..	259	186	120	
(20) Westerns (Part) .. ..		42	45	
(21) White and Red Northern .. ..	251	20	12	
(22) Tinnevellies (including Karungan- nies) .. ..	155	152	128	
(23) Cambodias .. ..	147	222	158	
(24) Jarila .. ..	....	257	350	
(25) Buri .. ..	....	43	53	
(26) Perso-American .. ..	....	....	7	
Total—Medium Quantity % on Total & Long staple. All Staples .. ..	1,622 30	2,630 48	2,351 66	+45
Total—All Staples .. ..	5,449	5,434	3,542	-35

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

It will be seen that the proportion of cotton of staple length 7/8" and above to the total production increased from 30% in the quinquennium 1922-27 to 48% in the quinquennium 1939-44; the proportion in 1944-45 was 66% against 62% in 1943-44. The production of 'medium and long staple' cotton in 1944-45 increased by 729,000 bales or 45% as compared with 1922-27; under "short staple" there was a reduction of 2,636,000 bales or 69%. The production of cotton of staple length '1" and above,' which was *nil* in 1922-27, amounted to 387,000 bales in 1944-45.

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 in yield 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 <hr/> Col. 2.	Approximate (commercial crop. (Thou- sand bales of 400 lbs. each.)	Yield per acre calculated from approximate (commercial) crop. (lbs.) Col. 5. <hr/> Col. 2.
1	2	3	4	5	6
Average 1922-27 ..	24,723	5,449	87	*5,954	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 ..	21,086	5,258	100	†5,723	112
1944-45 ..	14,859	3,542	95	‡4,500	121

\* 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.

‡ Provisional.

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 1944-45 was 121 lbs. per acre against 112 lbs. in 1943-44.

The main criterion in a general policy of cotton improvement must, however, 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 1944-45 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 about 32 lakhs acres, amounted to roughly two and a half crores of rupees. This works out to Rs. 8/- per acre on the average, and on this basis, the total increased income, accrued to the cultivators in 1944-45, by growing improved cottons on an area of 7,786,000 acres, may be estimated at about 6.22 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

The total estimated area under cotton in the Bombay Province during the year 1944-45 was 22,35,895 acres including 8,81,437 acres in the Indian States as reported in the final cotton forecast for 1944-45 season.

**Broach tract.**—During the year, the Agricultural Department controlled 19,660 acres of Suyog and 8,540 acres of 1027 A.L.F. for seed multiplication including 658 acres grown with Farm Pedigree Suyog and 140 acres with Farm Pedigree 1027 A.L.F. The Department purchased in all 581,757 lbs. of Suyog seed of which 17,340 lbs. were the produce of the Surat farm. This stock was distributed in the District through depots in the interior. In addition the Nana-Varachha and Sonsak Co-operative Cotton Sale Societies supplied 4,45,204 lbs. of Suyog seed direct to their own members as well as to those of other Cotton Sale Societies in the tract. Thus the total quantity of Suyog handled was 10,26,961 lbs. The Department also purchased 9,00,668 lbs. 1027 A.L.F. seed of which 8,236 lbs. were the produce of the Surat Farm. Further 1,49,268 lbs. were supplied direct to their members by the Hansot Co-operative Cotton Sale Society and the Purchase and Sale Union, Nawapur. Thus the total quantity of 1027 A.L.F. handled was 10,49,976 lbs. Out of this, 7,15,066 lbs. were supplied to the Chhota-Udepur and Baria States and others

outside the areas. The remaining quantity of seed was distributed through depots in parts of the Anklesvar and Nawapur talukas.

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

The Bombay Cotton Control Act of 1935, was repealed during the year and replaced by the Bombay Cotton Control Act of 1942. This Act has for its object the regulation and prohibition of the cultivation of any variety of cotton, the mixing of prohibited varieties of cotton with other cottons and the possession or use of, or trade in the prohibited variety of cotton in any part of the Province of Bombay.

During the year, 4,087 bales of Suyog and 975 bales of 1027 A.L.F. were agmarked under the Grading and Marking Act of 1937. Out of these 2,816 bales of Suyog and 324 bales of 1027 A.L.F. were sold at premiums varying from Rs. 11/- to Rs. 25/- over local for Suyog and Rs. 14/- to Rs. 25/- for 1027 A.L.F. leaving an unsold balance of 1,271 bales of Suyog and 651 bales of 1027 A.L.F.

The marketing of Suyog Agarmarked certified bales was satisfactory and remunerative to growers on account of the high ginning percentage of this variety. Agmarking of 1027 A.L.F. was limited to a few centres in view of the policy to cover the tract with Suyog.

“Vijaya” is the new type of cotton that is being introduced in the Broach Tract, i.e., the cotton area lying between the rivers Nurbuda in the South and the Sabarmati in the north. During the previous year, great difficulty was experienced in disposing of this variety as that was the first year of its being put on the market. In the year under report, the variety was disposed of easily and at an adequate price, as the trade had become convinced of its intrinsic value.

For seed multiplication purposes the Agricultural Department controlled 11,051 acres of Vijaya cotton, including 259 acres grown with Farm Pedigree seed from the Broach Farm and Registered seed growers.

The Agricultural Department purchased and distributed through five depots 2,54,570 lbs. of Vijaya cotton seed, out of which 1,220 lbs. were the produce of the Broach Farm. Besides, 4,70,960 lbs. were

supplied direct, under Departmental guidance, to the growers in parts of Ahmedabad, Kaira and Broach Districts by Co-operative Cotton Sale and seed supply societies in Broach District. The total quantity of seed handled, during the year was thus only 7,34,530 lbs. as against 13,28,376 lbs. in the previous year. This was due to the application of the Bombay Growth of Food Crops Act.

**Wagad tract.**—Wagotar cotton which has been introduced for general cultivation in Wagad Tract of Ahmedabad District is superior to the local cotton in fineness of staple, ginning outturn, spinning capacity and yield per acre. It is suited to the conditions in Wagad tract and is appreciated by the cultivators as well as the trade. A scheme, financed jointly by the Indian Central Cotton Committee and the Government of Bombay, for the multiplication and distribution of the seed of this variety, was launched two years ago. The total area under cotton in the Wagad tract during 1944-45 was 1,20,000 acres against the normal acreage of 3,50,000 acres. During the year 1,04,000 lbs. of seed were secured from the controlled area. Out of this, 29,000 lbs. were distributed by the Department, 43,000 lbs. by the approved agents and about 32,000 lbs. were sold direct to the merchants by the farmers. The area under Wagotar was expected to be 3,600 acres but, owing to heavy rainfall, resulting in water-logged conditions of the soil, the final acreage under Wagotar was 560 acres (all controlled); this area was concentrated in three talukas, viz., Viramgam, Dholka and Dhandhuka in blocks of 410 acres, 80 acres and 70 acres, respectively.

**Khandesh.**—Jarila cotton which has been introduced for general cultivation in Khandesh is superior to the 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 the conditions obtaining in Khandesh and is appreciated by the cultivators as well as the trade. The year under report is the eighth year of a scheme financed jointly by the Indian Central Cotton Committee and the Government of Bombay, for the multiplication and distribution of the seed of this variety. During the year 1944-45, 4,12,360 lbs. and 7,84,040 lbs. of Jarila cotton seed were stocked respectively by the Department and the 40 approved stockists. Out of these 4,770,070 lbs. of seed were distributed in the Division, the area covered being 2,31,362 acres of which an area of 64,005 acres under stages III, IV and V was organiz-



ed for multiplication. In addition, an area of 111 acres 15 *gunthas* 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 that under natural spread, is estimated at about 3,44,267 acres, i.e., 99.5 per cent of the Oomras area in Khandesh. Other cottons covered some 1523 acres. The area under cotton decreased during the year due to (i) the application of the Bombay Growth of Food Crops Act, 1944, (ii) less demand for cotton, (iii) low trend of cotton prices, (iv) better prices for groundnut, and (v) the lateness of season for sowing cotton. Out of the pure seed produced on the Government Farms and the controlled areas, 60,37,994 lbs. of Jarila have been stocked by the Department, Co-operative Banks, Societies and Taluka Development Associations for distribution during the season 1945-46. The production of Jarila including natural spread is estimated at 56,000 bales or approximately 64 lbs. of lint per acre.

The season was unusual owing to uneven distribution of rainfall. It was later by 3 to 4 weeks but immediately after sowing, there was continuous heavy rain for about a month which reacted adversely on the yield and quality of Jarila. On an average, the prices realized by growers of Jarila cotton during the season 1944-45 varied from Rs. 4/- to Rs. 60/- over the ruling quotations for Jarila in Bombay. Transport difficulties continued as in the past season, though the demand for Jarila cotton was better than in the previous year.

As reported last year, the Cotton Control Act has been applied to the whole of East Khandesh district, the West Khandesh district excluding the Nandurbar and Taloda and Nawapur peta, and the talukas of Malegaon, Nandgaon, Baglan, Kalwan and Yeola of Nasik district. The question of the application of the Cotton Transport Act is under consideration and if introduced, will apply in the first instance to imports of cotton by rail. As mentioned in last year's report, there are now 20 Co-operative Cotton Sale Societies for marketing and agmarking pure Jarila cotton in the Division. The work of agmarking could not be taken up as the members of these Societies sold their cotton after ginning without pressing owing to limited production.

There was no controlled area under Banilla cotton during the year and this variety has now completely disappeared.

**Deccan—Barsi-Nagar Tract.**—In this tract, for the present, there is no scheme for multiplication and distribution of Jarila cotton which has been found to be suitable for this tract. On account of intensive "Grow More Food Campaign", better prices for foodgrains and the unavailability of pre-seasonal water, the area under Barsi-Nagar dropped considerably. The total area under this crop is estimated at 25,000 acres in 1944-45. The *Jarila* variety has been found to be suitable for this tract and is spreading on its own merits. Nearly 85% of the cotton area has been covered by *Jarila* in the Nagar and Poona districts.

**Satara District.**—Jayawant cotton is grown in Walava and Tasgaon talukas of the Satara district, where 6,790 lbs. of Jayawant cotton seed, sufficient for about 970 acres, were supplied to the cultivators. The area under natural spread was estimated at 400 acres during the year 1944-45, bringing the total area under Jayawant cotton in the district to about 1370 acres. The premium obtained for graded Jayawant cotton over the ungraded cotton ranged from Rs. 10/- to Rs. 15/- per *nag* (1,344 lbs.) of *kapas*.

**Sholapur District.**—The monsoon started at the right time and the sowing of the cotton crop was done in August, 1944. The crop suffered for want of rains in August, 1944, but there was improvement in the condition of the crop after the September rains. The total cotton area was 580 acres, against 12,945, acres in the previous year. Out of this, the area under *Jarila* was 200 acres and that under local 380 acres. The reduction in the cotton area in the Satara and Sholapur districts is due to increase in the area under food crops as a result of the application of the Bombay Growth of Food Crops Act.

**Kumpta Dharwar Tract.**—The work of extending the two improved varieties of cotton, viz., Jayawant and Gadag No. 1, was carried out in 13 centres through the approved agents, the Hubli, Gadag, Naregal, Annigeri, Dharwar, Nargund, Bagalkot and Bijapur Co-operative cotton sale societies and the sale shop at Haveri. The total reserved area organised and rogued for multiplying pure pedigree seed of Jayawant cotton at different centres was 89,785 acres against 1,03,247 acres in the previous year and that of Gadag No. 1 cotton

18,084 acres against 28,475 acres in 1943-44. The quantity of seed secured and stocked by the approved agents and Co-operative bodies from these reserved areas was about 70,00,000 lbs. of Jayawant and 10,00,000 lbs. of Gadag No. 1, sufficient to cover 7,00,000 and 1,00,000 acres, respectively, during 1945-46. As a result of the application of the Bombay Growth of Food Crops Act, there was great contraction in the area under cotton in the Southern Maratha Country. However, adequate quantity of improved cotton seed was stocked to cover all the cotton area with standard variety of cotton seed. Vigorous seed propaganda was made in all the centres by holding meetings in most of the villages, and leaflets regarding the application of the Cotton Control Act to the Kumpta-Dharwar Protected area were distributed. Four hundred and fourteen seed depots were opened in the 3 districts, including the States for the distribution of Jayawant and Gadag No. 1 cotton seed stocked by the approved agents and the Co-operative bodies. The general area under pure Jayawant was 3,28,045 acres against 4,15,226 acres last year and that under pure Gadag No. 1 49,916 acres against 1,30,125 acres in the previous year. The total area under Jayawant and Gadag No. 1 was 4,17,830 acres and 68,000 acres as against 5,18,500 and 1,18,600 acres, respectively, last year. Besides, about 2,00,000 acres under Jayawant and about 50,000 acres under Gadag No. 1 were covered by natural spread, i.e., the produce of the seed stocked by the cultivators. The total area under Jayawant was thus 6,17,830 acres and that under Gadag No. 1 1,18,000 acres, making a total of 7,35,830 acres. The estimated yield of Jayawant cotton was about 77,000 bales against 90,000 bales in the past year and that of Gadag No. 1 was 15,000 bales against 20,000 bales last year.

Attempts were made to pool the produce of the reserved and general area in all the up-country markets and the stuff thus pooled was graded as usual by the cotton staff and sold by auction sale. A premium of Rs. 15/- per *nag* (1344 lbs.) of seed cotton in the case of Jayawant and Rs. 20/- per *nag* in the case of Gadag No. 1 was obtained in auction sales over the market rates. The extra profit secured to the cultivators by selling their produce through auction sales was estimated at Rs. 2,70,000/-. Besides, the cultivators were benefited by selling their produce even in private sales, as all the area was covered with improved strains during 1944-45 season.

'Agmark' work was continued on an optional basis; two grade specifications, viz., 'Agmark certified pedigree' and 'Agmark certified' were arranged for and labels given accordingly for the cotton from the reserved and the general areas. Up to the end of June 1945, 7,215 bales of Jayawant cotton and 761 bales of Gadag No. 1 cotton were pressed under Agmark.

### SIND.

The total area under cotton in Sind during the year 1944-45 was 9,01,615 acres (including Khairpur State) against 8,99,365 acres in the previous year. The acreage under American and *desi* was as follows:—

	British Dists Acres.	Khairpur State Acres.
American cotton .. .. .	8,31,884	20,545
<i>Desi</i> cotton .. .. .	48,377	809
Total ..	8,80,261	+21,354

During the year, the crop which was promising at the beginning of the season, was adversely affected by unusually heavy and continuous rains during the months of July, August and September 1944.

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*):**—This improved variety is mainly grown in the Tharparkar and Hyderabad districts and occupied an area of about 1,80,000 acres during the season 1944-45 against 3,65,000 acres in the previous year. The fall in acreage was due to the very rapid increase in the area under the new strain M.4. Sind Sudhar possesses a staple length of 1", gins 29 to 30% and spins 40s highest standard warp counts; its lint which is of cream colour has a silky feel.

2. **M-4 (*G. hirsutum*):**—This variety has been evolved from N.T.21 (bulk). It is now grown all over Sind, the season under report being the fourth year of its introduction. Owing to its early maturity and high yield, its spread has been very rapid. The area covered by it during the year was about 4,30,000 acres against

1,95,000 acres in the past year. M-4 has a staple length of 7/8", a ginning outturn of 33% and a spinning capacity of 36s highest standard warp counts. The lint is bright, white in colour but of roughish feel.

3. Sind American 98. (*G. hirsutum*):—This variety which has been mainly confined to the Indus Right Bank is now almost completely replaced by M-4; the area occupied by it during the year under report, was only some 5,000 acres. It has a staple of 7/8", a ginning outturn of 33% and a spinning value of 34s highest standard warp counts. The lint is not as rough as that of M.4.

B. Sind—N.R. (*G. arboreum* var *neglectum* forma *bengalensis*): This is an improved short staple strain evolved from *desi* cottons. It has a staple of a little over 1/2 inch and ginning outturn of about 38%. It spins 6s highest standard warp counts. To discouraging its cultivation, distribution of its pure seed was stopped by the Sind Agricultural Department in 1943-44. The area under this strain, now solely confined to the Nawabshah district, was 28,000 acres.

The following quantities of seed of improved varieties were controlled and distributed by the Agricultural Department during 1944-45:—

Variety.						By the Agrl. Department.	By the factories directly.	Total.
						mds.	mds.	mds.
Sind-Sudhar	..	..	..	..	..	22,600	25,000	47,600
M—4	..	..	..	..	..	49,000	75,000	1,24,000
4F—98	..	..	..	..	..	200	200	400
	Total ..					71,800	1,00,200	1,72,000

### PUNJAB.

The total area under cotton in the British districts of the Punjab was estimated at 2,421,280 acres, which is 7 per cent less than the actual area of last year. Of the total area, 713,050 acres were grown under *desi* varieties and 1,708,230 acres under the medium and long stapled American varieties. The American varieties thus constituted about 70.5% of the total Punjab cotton crop, the highest proportion ever yet attained by such sorts. The total outturn was estimated at 9,37,300 bales (*desi* 271,900 bales and American 6,65,400 bales), which is about 10 per cent less than the crop of the last year.

**Punjab Desi Cotton.**—The campaign instituted by the Government for increasing the area under food crops in preference to short stapled *desi* cottons, brought down the area under these cottons by 6.4% as compared to last year. The big disparity in prices between the *desi* and American varieties also contributed to this reduction. Amongst the improved varieties of *desi* cottons grown in the Province, 39 Mollisoni was popular in the Central Canal Colonies, Mollisoni 6042 in the South Eastern districts and 119 Sanguineum in the South Western parts of the Punjab. The first two varieties together occupied an area of 402,588 acres, which is roughly 56.4% of the total area under *desi* cottons in the Province.

**Punjab American Cotton.**—The most outstanding feature of the year under report is that for the first time the acreage under the medium stapled 4F, which was hitherto the most extensively cultivated variety, was exceeded by some of the long-stapled varieties recently introduced by the Punjab Department of Agriculture in the various ecological zones of the Province. L.S.S. is now most popular in the districts of Lyallpur, Sheikhpura and Sargodha, while 289F/43 and 289F/K25 are the two principal varieties of the South Western tract, including the districts of Multan, Montgomery, Dera Ghazi Khan and Muzaffargarh. Another noteworthy feature is that a new long stapled variety 124F named "Victory" (staple length 0.97" and ginning % 33.5) has now been approved by the Department for distribution in the tract extending South West of Mian Channu. The total area under these long stapled improved varieties was estimated at 11,76,623 acres which constitutes nearly 68.8% of the total Punjab American Crop. The estimated acreage under each of the commercial Punjab American varieties was as follows:—

	<i>Acres.</i>
4F	5,08,691
L. S. S.	6,12,534
289F, 289F/43 & 289F/K. 25.	3,88,728
Victory ( 124F )	1,73,515
199F	1,846
Others.	24,104

Nearly 112,339 maunds of cotton seed of which 109,146 maunds were American and 3,193 maunds *desi* 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 1944-45 was 28.01 lakhs acres against 30.9 lakhs acres in the previous year. The decrease is attributed to the "Grow More Food" campaign. The area under Verum 434 was 3.78 lakhs acres against 5.32 lakhs acres in the previous year. This strain possesses fine, strong staple, about 7/8" in length, capable of spinning up to 30's highest standard warp counts. The average premium obtained in the season 1944-45 was Rs. 30-8-0 per *khandi* of lint "on" Jarila (I.C.C.) 21,406 maunds of seed are distributed for sowing purposes through departmental, co-operative and other agencies. The total area under Buri 107 (*G. hirsutum*) was 1.10 lakhs acres, out of which 94,000 acres were grown in the Nimar district from the seed distributed by the Department. This strain possesses fine staple, about 1" in length, capable of spinning up to 40's highest standard warp counts. The total quantity of seed distributed in the Burhanpur tahsil through Government Seed Depots, seed farmers and dealers amounted to 6,213 maunds. The average premium obtained by Buri 107 during the season 1944-45 was Rs. 26-7-0 per *khandi* of *kapas* over *desi kapas*.

## MADRAS.

The total area under cotton in the Madras Province during 1944-45, according to the forecast report published in August 1945, was estimated at 16,71,600 acres as against the finally recorded area of 22,10,302 acres in 1943-44. The present estimate reveals a fall of 24.4 per cent compared to the last season. The decrease in area was very marked in the districts of Kurnool, Bellary, Anantapur, Salem, Coimbatore, Madura and Tinnevely and was attributed to (1) want of timely rains for sowing (2) the restrictions imposed on the cultivation of short staple varieties and (3) the preference shown for the cultivation of food crops.

A. **Cambodia Cotton.**—The area under Cambodia during the year dropped to 343,800 acres from 5,01,100 acres recorded in 1943-44. The improved strains Co.2, Co.3, Co.4, x4463 and 920 continued to be popular and covered an extent of 2,77,010 acres which works out to 80 per cent of the total area under Cambodia. The percentage area under improved varieties remained more or less stable. Strain

Co. 2 being very cosmopolitan occupied the largest individual area and figured in all districts growing Cambodia. The demand for 920 was restricted to a section of cultivators in Madura and Coimbatore districts. The cultivation of X4463 was strictly limited to the early sown portions of Coimbatore district. The spread of Co. 3 in Salem district increased by 50 per cent. The increase under Co. 4 in Madura and Ramnad has been large and it is expected that this variety will eventually be grown as a summer cotton to the exclusion of all other strains. The extent of spread of the different varieties is indicated in Table 1.

TABLE I

*Cambodia Col'on.**Area as per forecast 313,800 acres.*

District.	Name of strain	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread. acres.
		Madras Agricultural Department. lbs.	Co-operative societies. lbs.	
1	2	3	4	5
Madura .. .. .	Co. 2	25,053	.....	41,670
Ramnad .. .. .		6,370	.....	6,120
Tinnevely .. .. .		392	.....	2,420
South Arcot .. .. .		501	.....	1,000
Chittor .. .. .		.....	.....	50
North Arcot .. .. .		1,217	.....	445
Salem .. .. .		.....	.....	46,577
Coimbatore .. .. .		2,14,700	400,000	95,642
Trichinopoly .. .. .		7,354	.....	11,249
Malabar .. .. .		10,290	.....	1,750
Kurnool .. .. .		1,666	.....	82
Anautapur .. .. .		120	.....	80
Cuddapah .. .. .		516	.....	155
<b>Total ..</b>		<b>2,69,179</b>	<b>400,000</b>	<b>2,07,240</b>
South Arcot .. .. .	Co. 3	4,281	.....	500
Chittor .. .. .		.....	.....	50
North Arcot .. .. .		91	.....	8
Salem .. .. .		7,148	76,030	18,570
Trichinopoly .. .. .		4,343	.....	300
<b>Total ..</b>		<b>15,863</b>	<b>76,030</b>	<b>14,428</b>



District.	Name of strain	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread. acres.
		Madras Agricultural Department. lbs.	Co-operative societies. lbs.	
1	2	3	4	5
Madura .. ..	Co. 4	11,285	.....	11,202
Ramnad .. ..		79,874	.....	21,062
Tinnevelly .. ..		11,216	.....	5,295
South Arcot .. ..		13,166	.....	2,336
North Arcot .. ..		201	.....	16
Total ..		1,15,742	.....	39,911
Madura .. ..	920	.....	.....	19,360
Tinnevelly .. ..		.....	.....	60
Chittor .. ..		.....	.....	150
Coimbatore .. ..		21,233	.....	30,453
Total ..		21,233	.....	50,023
Madura .. ..	4463	4,144	.....	276
Coimbatore .. ..		4,301	.....	7,428
Trichinopoly .. ..		.....	.....	400
Total ..		8,445	.....	8,104
Grand Total ..		4,30,462	476,030	3,19,706

The agencies which multiplied and organised the sale of pure seeds were (1) The Madras Agricultural Department, for Co.2, x4463, 920 and Co.4, (2) The Co-operative Sale Society, Tiruppur for Co.2 and (3) The subsidised Indian Central Cotton Committee Scheme in Salem district for Co.3.

B. Tinnevellies.—The total area under Tinnies recorded during 1944-45 was 5,20,900 acres as against 5,97,500 acres in the previous

season. The decrease was pronounced in Tinnevelly district. The estimated acreage of 2,64,618 acres under improved Karunganni strains (vide Table II) expressed as percentage on total Tinnevellys gives 51% and compares well with the last year's figure of 45.7%. K.1 was the only strain under large scale distribution. The strain C.11-2 was reported to be becoming very popular in the Coimbatore district on account of its better yield and quality. The seed multiplication and distribution of the two strains were done on a limited scale by the Madras Agricultural Department.

TABLE II.

*Tinnevellys.**Area as per forecast 520,900 acres.*

District.	Name of strain	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread. acres.
		Madras Agricultural Department. lbs.	Co-operative societies. lbs.	
1	2	3	4	5
Madura .. .. .	K. 1	19,794	....	11,700
Ramnad .. .. .		97,832	....	1,08,628
Tinnevelly .. .. .		1,79,542	....	92,750
North Arcot .. .. .		185	....	15
Coimbatore .. .. .		53,398	....	58,177
Total .. .. .		3,50,751	....	2,71,270
Coimbatore .. .. .	C. 11-2	2,240	....	1,152
Grand Total .. .. .		3,52,991	....	2,72,422

C. Salem.—The area dwindled to 23,300 acres during the year from 40,800 acres in 1943-44 mainly as a result of propoganda for "Grow More Food." As there was no special strain evolved or recommended for the area, there was no organisation for the spread of improved varieties. In Trichinopoly district, however, K. 1 is reported to have spread over 820 acres.

D. **White and red Northern.**—There was a further shrinkage in the area during the year 1944-45 and it was estimated at 114,000 acres. N. 14 was the only strain under distribution but its area remained low due to the absence of any large organisation for the production and distribution of pure seeds. During the year only 1,658 lbs. of seeds were distributed by the Department and the area of 20,200 acres including natural spread was under the variety in Kurnool district.

E. **Westerns.**—The estimated total area of 5,73,000 acres is low compared to the previous total of 7,15,000 acres. The restrictions imposed on the cultivation of *Mungari* cotton, the receipt of favourable rains for the groundnut and the low price of Westerns cotton were largely responsible for the diversion of cotton area to food crops. The reduction in cultivation is profound in the districts of Bellary and Kurnool. The area under improved strain H. 1 was estimated at 2,16,370 acres (vide Table III). In spite of the working of a subsidised seed distribution scheme for H. 1 in the area, the quantity of seeds distributed has considerably fallen short of last year's target.

TABLE III

Westerns.

Area as per forecast 5,73,000 acres.

District.	Name of strain	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread. acres.
		Madras Agricultural Department. lbs.	Co-operative societies. lbs.	
1	2	3	4	5
Kurnool .. .. .	H. 1	2,003	....	5,050
Cuddapah .. .. .		75,243	....	27,252
Bellary .. .. .		35,460	2,31,178	1,20,000
Anantapur .. .. .		1,76,966	....	64,068
Total ..		2,89,672	2,31,178	2,16,370

**F. Warangal and Cocanadas.**—The area estimated during the season under report was 91,700 acres. No special strain suitable for the tract has been evolved yet.

### UNITED PROVINCES

The revised final area under cotton in the province during the year 1944-45 amounted to 2,02,237 acres against 372,361 acres (revised) last year, showing a decrease of 170,124 acres or 45.7 per cent. The revised final outturn of the crop (lint) was estimated at 61,700 bales (rounded) of 400 lbs. each against 1,11,900 bales (revised) last year, indicating a decrease of 50,200 bales or about 44.9 per cent. As compared with the average outturn for the preceding five and ten years, the outturn in the year under report showed a decrease of about 54 and 64 per cent, respectively.

**Improved varieties.**—Although the season under report was favourable for cotton, there was a decrease in the area under the crop largely as a result of the prevailing high prices of food-grains, the "Grow More Food" campaign and the late commencement of the monsoon. The Department continued to distribute the seed of C. 520 an improved variety of *Desi* cotton, to a limited extent. The seed of Perso-American cotton is being distributed under an Extension Scheme operating in the Western Circle. The area sown under Perso-American and C. 520 during 1944-45 in the whole province and the amount of 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.
Perso-American .. .. .	23,210	5415 Maunds.
C. 520 .. .. .	7,519	334 Maunds 16 seers.

**Chief characteristics of the improved varieties.**—C. 520 cotton is a pure line selection from the 'roseum' type of U.P. Bengals, originally isolated from the material collected in the Saharanpur or Bijnor districts as early as 1920-21. It gives a high yield both 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 mds. of *kapas* per acre. It has a staple length of about 0.73", and a ginning percentage of about 30 to 37, and is capable of spinning up to 10 to 12½ highest standard warp counts. It has spread fairly well in the cotton areas, but, owing to the greater attention at present being paid to larger production of food-grains and long-staple cotton, its area is on the decline in the United Provinces. It is in demand in some of the Central India States and Rajputana, and in some areas in Eastern Punjab. The *kapas* of this variety fetches about Rs. 8/- per maund, more than that of the ordinary *desi* under normal trade conditions.

**Perso-American** cotton is a selection from the American types of cotton imported from Persia (Iran) and acclimatised in the United Provinces. When grown on a commercial scale at Raya and in other suitable areas, e.g., Budam, it gave an yield of from 13 to 14 maunds per acre. It has a staple length of 0.85" and a ginning percentage of 30 to 32 and 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/- to Rs. 4/- per maund on *desi* but during the last three seasons, it fetched a price about 40 to 100 per cent higher than the local *desi* cotton.

#### HYDERABAD STATE

The total area under cotton in Aurangabad Suba of H.E.H. the Nizam's Dominions during the year 1944-45 was 874,658 acres.

**Area under improved varieties of cotton.**—(i) *Gaorani 6* is an improved strain evolved in 1930 by straight selection from the local variety of cotton called Hyderabad Gaorani (*Gossypium arboreum* L. var *neglectum* Watt. Forma *indica* H. & G.). It is superior to the local *Gaorani* in respect of yield of seed-cotton by about 10 per cent; its ginning outturn is 2-3 per cent more and it spins 8 to 10 counts higher. The general distribution of its pure seed was started in 1936-37. In 1944-45, pure seed from the Reserved Area amounting to 55,36,084 lbs. was purchased and distributed to cultivators under Departmental control both on the *taccavi* system and on cash payment. An area of 3,74,316 acres in Mudhol, Biloli, Deglur, Nanded, and Hadgaon taluqs of Nanded district, and Nirmal taluka of Adilabad district was covered by this seed. Reserve areas

of this seed were set up again in Nanded, Mudhol and Biloli talukas and the crop was 'rogued' for maintaining the purity of the seed. The seed expected to be obtained from this Reserve Area would be sufficient to cover all the area in the abovementioned talukas in 1945-46.

(ii) *Gaorani 6 E-3* is a single-plant selection from *Gaorani 6* and is superior to it in some respects. The multiplication work was started in the village of *Badi-buzrug* near Nanded. About 15,371 lbs. of seed of this variety sufficient to cover an area of about 1,000 acres was distributed during the year.

(iii) *Parbhani-American* cotton is a single-plant selection from the locally grown mixture of acclimatised American varieties. Pure seed from the reserve area amounting to 95,840 lbs. was purchased and distributed to cultivators under Departmental control for further multiplication on 9,580 acres in the Ghat tract of Aurangabad District. The seed obtained from this crop will be distributed in the general area in 1945-46.

(iv) *Jarila* cotton is a selection developed by the Bombay Department of Agriculture from *Verum* variety. Seed of *Jarila* cotton purchased to the extent of 6,29,865 lbs. and distributed to cultivators under Departmental control for an area of 61,970 acres for further multiplication in the plains of Aurangabad.

The Department of Agriculture, H.E.H. the Nizam's Government, has set up a special organisation for seed multiplication, seed distribution and marketing of improved cottons. The predominant features of this organisation are as follows:—

(i) A special staff is maintained by the Department every year to ensure the purity of the crop of the general as well as of the reserve areas. Supervision is maintained throughout the growing period and also at the time of marketing, ginning and pressing of the produce.

(ii) Special *taccavi* grant is provided by the Government every year for purchasing all the needed seed from the reserve areas and for distributing it to the cultivators.

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

(iv) On the strength of both the superiority and guaranteed purity of improved varieties, a premium over the prices of local varieties is secured from the trade. The premium is independent of the fluctuations of the market prices.

With this special organisation, in which collaboration of the interests alike of the cultivator and the purchaser is the key-note, it has been possible to effect a rapid development in the extension of the area under improved varieties.

### BARODA STATE.

The total area under cotton in the State during 1944-45 was 4,72,433 acres against 5,84,728 acres in the previous year. The decrease in area was due to the "Grow More Food Crops" campaign.

**Baroda District.**—During the year the total cotton area in the district was about 3,05,980 acres. Of this, 37,276 acres were under Vijaya in Sinor and Karjan talukas. The total improved Suyog seed distributed and controlled was 3,81,772 lbs. The area under B.D. 8 was 2,08,344 acres in Baroda-Padra and the rest of the area, viz., 60,360 acres, was under B. 9 in Savli and Waghodia talukas. The improved seed of these two types distributed and controlled was 2,65,940 lbs. Vijaya, which is very popular, consists of a mixture of two strains, 1-2 and 1-6, in equal proportion. It is superior to B.D. 8 in respect of ginning percentage by 8 to 9 per cent and also acre yield. Its other economic characters are similar to those of B.D. 8. During 1945-46 its cultivation was made compulsory in the whole of the Baroda District, except in Vejpur area of Savli Taluka. B.D. 8 is a medium long staple cotton, with a staple length of 7/8" and spinning value of 38's H.S.W.C. It is wilt-resistant but its low ginning is its chief defect. In respect of yield, it is superior to the local. B. 9 is a type superior to the local Ghoghari mixture in staple and spinning value. Its ginning percentage is 36 to 37 and staple length 13/16". It is specially suited to Vejpur area of Savli Taluka.

**Navsari District.**—The total area under 1027 A.L.F. in this district was 1,51,638 acres against 1,65,000 acres last year, and that under Suyog 16,980 acres. The Department has stocked 1,39,970 lbs. of 1027 A.L.F. and 3,36,714 lbs. of Suyog seed for sowing in the next season.

**Mehsana District.**—The total area in the Mehsana District during the season was 52,209 acres. The areas covered by Wagad 8, Broach 9, Wagotar and Seg. 8-1 were 24,963, 517, 730 and 30 acres, respectively. The seed controlled and distributed by or through the department was 49,000 lbs. of Wagad 8, 93,580 lbs. of Wagotar and 360 lbs. of B. 9.

**Amreli District.**—The total area in the district was some 20,590 acres. The areas under the improved varieties, viz., C. 520 and "Pratap" were 3,000 and 70 acres, respectively, and the seed distributed was 50,000 lbs. of C. 520 and 1,520 lbs. of "Pratap." The latter which is a selection from Mathio, is the only new type. It has a good staple and fetches Rs. 70/- 'on' as compared with Jarila.

### RAJPIPLA STATE

The Rajpipla Cotton Improvement Act, which was passed in 1921, prohibits the import or sowing of *Ghoghari* or any other short staple cotton in the State. The export, likewise, of cotton by rail or by boat is entirely prohibited except in the form of full-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. Best cotton seed of the 1027 A.L.F. variety is supplied by the State to the *kheduts* and only the long staple cotton of this strain is grown throughout the State. The cotton grown in the State has attained a high standard of reputation on account of its purity and it finds a ready market. During the year under report the best seed was obtained through the good offices of the Commissioner of Agriculture, Baroda State, and supplied as usual by the State authorities to the cultivators. The total area under cotton cultivation throughout the State during the year was about 1,01,861 acres; the total outturn was 22,943 bales pressed within the State and about 1,449 bales pressed outside the State limits from the cotton transported by some cultivators of the outlying parts for sale outside the State. The reduction in the outturn of cotton crop was mainly due to the "Grow More Food Campaign" rigorously followed in the State.



## MYSORE STATE

The total area under cotton in the Mysore State during the year 1944-45 was 1,00,000 acres. Three improved varieties of cotton, 2 American (Co. 4 and M.A.V.) and one Asiatic (Selection 69) were under distribution. Particulars regarding these are given below:—

Particulars.	Co. 4 (Cambodia strain.)	M.A.V. (Mysore- American.)	Selection 69 (Kumpta variety.)
1. Acreage covered ..	4,000 acres.	800 acres.	10,000 acres.
2. Districts in which distributed.	Mandya, Hassan, Chitaldrug and Shimoga.	Mandya, Hassan, Chitaldrug and Shimoga.	Chitaldrug district.
3. Quantity of seed controlled and distributed by the Department.	2,000 mds.	400 mds.	3,000 mds.
4. Acre yield .. ..	500 to 700 lbs. kapas.	Slightly higher than Co. 4.	200 to 250 lbs. kapas.
5. Staple length ..	1"	1-1/8"	7/8"
6. Ginning outturn ..	85%	85%	29%

## GWALIOR

## STATEMENT SHOWING AREA UNDER COTTON IN GWALIOR STATE DURING THE YEAR 1944-45.

Total area under cotton in Gwalior State.	Area under improved types.		Quantity of seed of each improved variety controlled and distributed by the Department.		Remarks.
	Varieties.	Area in acres.	Varieties.	Quantity of seed in lbs.	
4,70,502 (Including Jagirs)	G. 16—A } Malvi strain }	10,542.1	G. 16 .. ..	1,74,672	
	Cambodia ..	4,935.5	Cambodia .. ..	37,872	
	Jarila ..	1,700.0	Jarila .. ..	16,636	
	Upland ..	1,757.8	Upland .. ..	27,090	
	Total ..	18,935.4	Total .. ..	2,56,270	

## CHAPTER VII

### COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES

(i) **Increased use of Indian cotton in mills in India.**—The question of the possibility of increasing the use of Indian cotton in mills in India received considerable attention during the year. In this connection, it was observed that the consumption of Indian cotton in mills in India had decreased from 4,306,831 bales of 400 lbs. net in 1942-43 to 4,119,461 bales in 1943-44, whilst that of foreign cotton had increased from 464,522 bales (455,232 bales of 400 lbs. net) in 1942-43 to 633,671 bales (620,998 bales of 400 lbs. net) in 1943-44. It was thought that one of the factors contributing to increased consumption of foreign cotton might be the premium which mills received for cloth manufactured from such cotton and the abolition of this premium was, therefore, suggested. The view was, however, expressed that foreign cotton was being imported into India mainly because of the demand by consumers in the country for finer qualities of cloth to meet which the supply of suitable Indian cotton to the extent required was quite inadequate. It was further pointed out that, in pursuance of a previous recommendation made by the Committee, cloth manufactured from combed Indian cotton was being treated on the same footing as cloth manufactured from foreign cotton for the purposes of the premium. It was accordingly decided that no action should be taken in the matter but that the position should be reviewed from time to time. The figures for the year ending 31st August, 1945, indicate that the consumption of Indian cotton increased by 39,146 bales over the 1943-44 season. The consumption of foreign cotton during the 1944-45 season amounted to 6,30,358 bales of 400 lbs. net, being only 9,360 bales higher than the 1943-44 figure.

(ii) **Inclusion of Indian cotton in the proposed post-war Universal Contract.**—The Committee supported the East India Cotton Association's representation to the Liverpool Cotton Association against the reported exclusion of Indian cotton from the basis of the proposed post-war Universal Contract in Liverpool. The view was expressed that it would be a great injustice if Indian cotton

of basic staple length were omitted from the Contract, particularly as legislative action was proposed to be taken to prevent "mixing" which appeared to be the main ground for exclusion of East Indian cottons from the Contract. The Government of India were accordingly requested to take up the matter with the Liverpool Cotton Association with a view to securing the inclusion of saw-ginned East Indian cotton in the proposed Universal Contract.

(iii) **Cotton baling hoops.**—The arrangements for the distribution of cotton baling hoops were continued along the lines of past year. During the year under report, some 10,474 tons of Lease-Lend hoops and hoops of indigenous manufacture, were distributed to pressing factories in the country through the agency of this office working in conjunction with the Iron and Steel Controller. In addition, permits were issued to enable pressing factories to obtain some 800 tons of secondhand hoops from mills and stockists in the country. On the recommendation of the Baling Hoops Advisory Committee, the maximum rate for pressing cotton during the 1944-45 season was fixed by the Government of India at Rs. 10/- per bale, the same as in the last season. Except in the case of one factory at Bezwada, Madras Province, no application for permission to charge a higher pressing rate was granted.

The Punjab Government intimated that the maximum charge of Rs. 10/- for pressing a bale of cotton fixed by the Government of India was somewhat high as enquiries made by them of pressing factories in the Province in the 1943-44 season had shown that the pressing costs in that season varied from Rs. 6-11-0 to Rs. 8-7-6 per bale and ginning costs from Rs. 10-3-0 to Rs. 13-5-0. In the opinion of the Provincial Government the maximum charge for pressing should be Rs. 8/- per bale and the total charges for ginning and pressing Rs. 20/- per bale; this would allow a profit of more than one rupee per bale. In regard to the maximum pressing rate, the Provincial Government were informed that the rate of Rs. 10/- per bale had been recommended by the Baling Hoops Advisory Committee on an all-India basis, and that it was within the competence of the Provincial Government to fix a maximum rate lower than Rs. 10/- per bale in any particular area within the Province, should they consider this to be warranted in the light of the prevailing rates for labour, etc. It was emphasised, however, that unless the Punjab

Government prescribed separate maximum rates for ginning and pressing, the fixing of a lower maximum rate for pressing only would be ineffectual as the factories would take advantage of the absence of a maximum ginning rate and charge a higher combined rate.

From the 1st April, 1945, sub-licences were issued by the Committee's office to individual factories to enable them to acquire their allotments of hoops. This arrangement has replaced the procedure under which Written Orders were issued by the Deputy Iron and Steel Controller, Bombay, on the recommendation of this office.

(iv) **Reversion to pre-war lashings of cotton bales.**—The question of reversion to pre-war lashings of cotton bales was considered by the Committee at one of its meetings and after a lengthy discussion, it was felt that the disadvantages resulting from reduction in the number of lashings far outweighed the saving in money affected. Since the Karachi Chamber of Commerce, the Karachi Cotton Association and the Sind Cotton Ginners' Association were also in favour of reverting to the pre-war number of lashings, and as the investigations conducted at the Committee's Technological Laboratory some years ago had shown that the degree of density within the range experimented had no deleterious effect on the cotton fibre, it was decided to advise the factories to revert to the pre-war number of 12 lashings both in the interests of the reputation of Indian cotton bales and in order to prevent waste of shipping space and loss resulting from bursting of bales due to inadequate lashings. The desirability of covering the bales properly with hessian cloth of standard quality was also stressed to the factories.

(v) **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. The total quantity of coal recommended by this office for supply to ginning and pressing factories during the year amounted to about 137,000 tons. Recommendations were also made for the supply of diesel oil to cotton ginning and pressing factories. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(vi) **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. Several such applications were dealt with during the year under review.

(vii) **Fixation of separate floor and ceiling prices for Co. 3 and Co. 4 cottons.**—The Madras Government represented that as Co. 3 and Co. 4 cottons were of comparatively recent introduction, trading in them had not yet become normal and that, therefore, in actual practice they did not fetch to the grower the price they should as compared with Co. 2. In order, therefore, to give Co. 3 and Co. 4 a fair start, the Provincial Government suggested the fixation of separate floor and ceiling prices for them. During discussion at the Committee, it was stated that the main reason for Co. 3 and Co. 4 strains not obtaining a better price was mixing. The consensus of opinion was that there was a great demand for cottons of this type and that, if offered pure, there was no reason why they should not fetch a price commensurate with their intrinsic merit. The Committee had, however, no objection to recommending a ceiling price of Rs. 725/- for average qualities of Co. 3 and Co. 4 cottons. The Madras Government subsequently proposed that the ceiling price of Co. 3 and Co. 4 cottons should be fixed at Rs. 750/- per candy and the floor price at Rs. 600/- per candy, and further requested that the cloth manufactured out of these cottons should be treated on the same footing as African cotton in respect of the premium paid for cloth manufactured from foreign cottons. The Government of India who were addressed in the matter intimated that if a special ceiling and floor price were to be fixed for these cottons, the ceiling would be Rs. 750/- and the floor about Rs. 550/- per candy. The Committee was, however, of the opinion that the difference between the ceiling and floor price should be maintained on the basis of Jarila and it accordingly recommended that the floor for Co. 3 and Co. 4 cottons should be fixed at Rs. 570/- per candy. As regards the point raised by the Madras Government about the question of treating Co. 3 and Co. 4 cottons on the same footing as African cotton for purposes of premium paid for cloth manufactured from foreign cottons, it was understood from the Textile Commissioner

that there was no longer any specific premium given for cloth manufactured from foreign cottons which, following the protest of the Indian Central Cotton Committee, had been abandoned.

(viii) **Supply of iron for agricultural purposes.**—In connection with the supply of iron for agricultural purposes, at controlled rates, the Madras Government intimated *inter alia* that the quota allotted for period III of 1945 (2812.9 tons) was very small compared with the quotas for the previous periods and that up to 31st May, 1945, a quantity of 2,687.07 tons only had been supplied against a total allotment of 15,647.82 tons from period III of 1944 to period III of 1945. This was stated to be quite inadequate to meet the heavy demand and the reason for it was waggon shortage. Enquiry was made of the Director of Agriculture, Bombay, as to whether the quota of iron allocated by Government for agriculturists in the Province of Bombay was considered to be adequate for their requirements. The Director of Agriculture, Bombay, replied that out of the estimated requirements of 5,000 tons of iron per quarter for agricultural purposes the Iron and Steel Controller, Calcutta, invariably reduced the quota by anything up to 55 per cent and that even the reduced quota was never received in time being sometimes a whole quarter behind the due delivery date. As regards the Central Provinces and Berar, the Provincial Government intimated in June 1945 that the position had improved compared to what it was in July 1944, when the matter was considered by the Indian Central Cotton Committee, but that this did not mean that all the requirements of iron and steel were being satisfied. The matter was reviewed by the Committee which expressed the view that the position was far from satisfactory and that the attention of the Government of India should be drawn to this. Action was taken accordingly and in reply it was stated that owing to war demands which continued on the same level in 1945 as in earlier years, and transport difficulties adequate quantity of steel could not be made available to meet civil needs. The Government of India have since intimated that with the cessation of hostilities and the reduction in war demands, sufficient tonnage is likely to be available during 1946.

(ix) **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 Bagalkot, Pachora and Chalisgaon, including these there are now 15 such markets in the Province. It is proposed to apply the Act to Barsi Pandharpur, Nandurbar and Nargund cotton markets in due course. In the Punjab, under the Agricultural Produce Markets Act, 1939, 133 market areas have been notified and Market Committees constituted. These Committees have functioned satisfactorily and it is reported that the Act has in a number of places already found to be of considerable advantage to the growers. In Madras three regulated markets continued to function at Tirupur, Adoni and Nandyal. In the Hyderabad State, the Hyderabad Agricultural Produce Markets Act has been made applicable to 28 markets and in the light of the experience gained the question of revising the legislation is under consideration of the State Government.

(x) **Agmarking.**—During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur 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, Sind-Sudhar and Perso-American cottons.

(xi) **Universal Standards.**—As mentioned in the 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. As already reported, on the suggestion of the two Associations, the preparation of Universal Standards was dropped for the period of the war.

(xii) **Legislation to maintain the purity of cotton and other protective measures.**—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. A brief account of the working of these measures during the year under review is given below. For more details, previous reports should be referred to.

(a) **Cotton Transport Act.**—During the year, two notifications were issued by the Government of Bombay under the Cotton Transport Act in connection with (1) the amalgamation of the Olpad Surat cotton areas and (2) the inclusion of 72 villages of Badami taluka of Bijapur district in the Kumpta-Dharwar area. The question of application of the Cotton Transport Act to the Khandesh tract is under the consideration of the Bombay Government. As a result of representations made by growers and the trade regarding the indiscriminate mixing of the different varieties of cotton produced in the Southern area, the Government of Madras on the recommendation of the Provincial Cotton Committee ordered the bifurcation of the Southern area into two protected areas, viz., Cambodia area and Tinnevely area.

(b) **Cotton Ginning and Pressing Factories Act.**—In pursuance of the recommendation of the Committee regarding prohibition of the mixing of cotton, the Director of Agriculture, United Provinces, forwarded for the consideration of the Committee a draft bill to amend the Cotton Ginning and Pressing Factories Act, in its application to that Province, with a view to preventing watering, mixing and adulteration of cotton. The draft bill was approved with certain amendments to bring it in line with similar legislation already in force in the Bombay Province.

It was reported last year that the Central Provinces Government were requested to amend Section 3A of the Cotton Ginning and Pressing Factories Act, 1925, in its application to that Province, so as to close certain loop holes in the Act. The Central Provinces Government accordingly forwarded for the consideration of the Committee an amended draft but as the Committee felt that the proposed amendment did not provide for action to be taken against offences discovered after the bales had passed out of the factory and also did not include provisions to close the loop holes in the existing Act regarding the mixing of cotton waste with cotton and deliberate watering of cotton, it decided that the Central Provinces Govern-



ment should again be addressed in the matter and requested to give effect to the amendment of Section 3A of the Act, on the lines already suggested by the Committee.

In view of the fluctuating conditions of the market with regard to gin and press stores, the Central Provinces Government decided that ordinarily no meetings of the Rate Fixing Committees should be held during the season 1944-45. The Central Provinces and Berar Cotton Ginning and Pressing Factories (Amendment Act) 1939, which dealt with the control of rates charged for ginning and pressing cotton automatically ceased to operate from June 1945, as no fresh notification extending its life was issued by the Provincial Government.

In the Punjab, seven prosecutions were instituted, four under Section 9(3), two under Sections 3(5) (a) and 3(6) and one under Section 3(6) of the Cotton Ginning and Pressing Factories Act, 1925. Out of these in two cases, viz., one under Section 9(3) and another under Sections 3(5) and 3(6), the accused were convicted and fined Rs. 10/- and Rs. 25/-, respectively.

By Notification No. 394 dated the 28th May, 1945, issued by the Government of Madras, Development Department, under Section 5A of the Cotton Ginning and Pressing Factories Act, 1925, as amended by Act IX of 1942, the provisions of Section 5A of the Act relating to submission of returns by ginning factories were brought into force in the Province with effect from the 1st February, 1946.

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 52 States; in the remaining States, pressing factories did not work during the year.

**(c) 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, the imports of American cotton during the year under review amounted to only 8,694 bales.

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

(e) **Cotton Control Act.**—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 the Acts in the areas where they are in force are stated in previous reports.

In Bombay Province, under Government Notification No. 3939/33/6581-J, dated the 1st April, 1944, only the Jarila variety of cotton is permitted to be grown in the East Khandesh District, and the cultivation of any other variety of cotton in that district is prohibited. Further, in the East Khandesh district, under Government Notification No. 3939-33-J, dated the 1st November, 1944, the mixing of any other variety of cotton with the Jarila variety and the possession, use or trade in any other variety of cotton whether mixed or not with the Jarila variety are prohibited. Similarly, the Cotton Control Act was applied to the West Khandesh District, excluding Nawapur Peta, Nandurbar and Taloda talukas and to the talukas of Baglan, Kalwan, Malegaon, Nandgaon and Yeola of Nasik District (vide Government of Bombay Notifications No. 3939/33-6581-J, dated the 29th March, 1944, and No. 3939/33-6581-J, dated the 1st November, 1944). The Act was applied to the Kumpta-Dharwar Protected Area, consisting of Dharwar and Belgaum districts and Tasgaon and Walva talukas of Satara districts, from the 1st July, 1944. All the Southern Maratha Country States included in the Kumpta-Dharwar area simultaneously applied the Act in their respective territories.

In the Central Provinces, propaganda was carried on against the cultivation of and trade in Garrowhill cotton which, as a result, has practically disappeared from the cotton tract of the Province.

D. N. MAHTA,  
Secretary.

## APPENDIX I

### 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*.**  
**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.,<br>F.I.C., Director of Agriculture. |
| <i>Bombay</i> .. .. .                      |  | Sir William Jenkins, C.I.E., I.A.S., Director<br>of Agriculture.          |
| <i>United Provinces</i> .. .. .            |  | Mr. C. Maya Das, I.A.S., Director of<br>Agriculture.                      |
| <i>Punjab</i> .. .. .                      |  | Malik Sultan Ali Noon, I.A.S., Director<br>of Agriculture.                |
| <i>Central Provinces and Berar</i> .. .. . |  | Mr. R. H. Hill, I.A.S., Director of Agri-<br>culture.                     |
| <i>Sind</i> .. .. .                        |  | Rai Bahadur R. L. Sethi, Director of<br>Agriculture.                      |
- (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.   | L. F. H. Goodwin.                                |
| The Indian Merchants' Chamber ..                   | Sir   | Chunilal B. Mehta.<br>( <i>Vice-President.</i> ) |
| The Karachi Chamber of Commerce                    | Mr.   | A. P. Darlow.                                    |
| The Ahmedabad Millowners' Associa-<br>tion.        | Mr.   | Ramanlal Lallubhai.                              |
| The Tuticorin Chamber of Commerce                  | Mr.   | J. L. Hurschler.                                 |
| The Upper India Chamber of Com-<br>merce .. .. .   | Major | S. R. Pocock, M.C., M.B.E. M.L.A.                |
| The Empire Cotton Growing Cor-<br>poration .. .. . | Sir   | William Roberts, C.I.E. .                        |
- (5) **COMMERCIAL REPRESENTATIVES NOMINATED BY CENTRAL GOVERNMENT—**
- |                                       |  |  |
|---------------------------------------|--|--|
| <i>Central Provinces and Berar</i> .. |  | { Mr. Baburao Krishnaji Patil,<br>Seth Gopaldas Mohta. |
| <i>Madras</i> .. .. .                 |  | Mr. J. R. Marshall. .                                  |
| <i>Punjab</i> .. .. .                 |  | Sardar Bahadur Sardar Ujjal Singh,<br>M.L.A.           |
- (6) **BENGAL REPRESENTATIVE .. .. .** Mr. Śurya 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. Odhumalai Gounder.<br>Mr. L. Madhava Reddi.  |
| <i>Bombay</i> .. .. .           |  | { Rao Bahadur F. B. Loxmeshwar.<br>Mr. B. K. Patel.<br>Major Nawab Mohd. Jamshed Ali Khan,<br>M.B.E., M.L.A. |
| <i>United Provinces</i> .. .. . |  | { Rai Bahadur Kunwar Laxmi Raj Singh,<br>M.L.C.  |

<i>Punjab</i> .. .. .	}	Chaudhri Ram Sarup, M.L.A.
<i>Central Provinces and Berar</i> .. .. .		Mian Mohammad Nurulla.
		Rao Bahadur Sir Madhaorao G. Deshpande, K.B.E., Mir Riyat Ali.
<i>Sind</i> .. .. .		Mr. Fakirjee Perozshaw Golwalla, J.P.

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

<i>Hyderabad State</i> .. .. .	Rai Saheb Kalidas Sawhney, Director of Agriculture (Research).
<i>Baroda State</i> .. .. .	Sir Robert 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. Mr. Roger Thomas.
9. Sir Shri Ram, Representative of the Cotton Millowners of Delhi.
10. Representative of the Karachi Cotton Association Ltd.—Vacant.
11. Dewan Bahadur Sir T. Vijayaraghavacharya, K.B.E.
12. Dr. P. J. Gregory, Second Economic Botanist, Bengal.
13. Dr. V. K. R. V. Rao, Director of Statistics, Food Department, Government of India.
14. Mr. Camar Tyabjee, Managing Agent, Osman Shahi and Azamjahi Mills, Hyderabad (Deccan).
15. Sir Padampat Singhania, Senior Proprietor, Messrs. Juggilal Kamlapat, Cawnpore.
16. Mr. R. G. Saraiya, O.B.E., Messrs. Narandas Rajaram & Co., Bombay.
17. Mr. G. V. Deshmukh.

## APPENDIX II

### 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. Hurschler; Sir William Jenkins; Rao Bahadur Sir Madhaorao 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. Hurschler; Mr. L. F. H. Goodwin; Mr. R. G. Saraiya; Sir William John Jenkins; Mr. A. P. Darlow; Rao Bahadur Sir Madhaorao Deshpande and Rao Bahadur F. B. Loxmeshwar.

#### *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. Fakirjee Perozshaw Golwalla, Rao Bahadur Sir Madhaorao Deshpande, Mir Riyat Ali,
- V. *Cotton Trade Representatives*—Sir Purshotamdas Thakurdas, Mr. R. G. Saraiya, Mr. J. L. Hurschler, Mr. L. F. H. Goodwin, Seth Gopaldas Mohta.
- VI. *Agricultural Officers*—The Agricultural Commissioner with the Government of India (*ex-officio*), Sir William John Jenkins, Malik Sultan Ali Noon, Mr. C. Maya Das, Rao Bahadur Dr. B. Viswanath, Sir Robert Allan, Rai Saheb Kalidas Sawhney, Mr. N. M. Deshmukh, Mr. R. H. Hill, Rai Bahadur R. L. Sethi, 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. Ramanatha 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. S. D. Choudhry, Dr. Nazir Ahmad, Mr. P. D. Gadkari, Mr. L. Madhava Reddi, Mr. R. Balasubramanian, Mr. Roger Thomas, Dr. Khan A. Rahman.
- 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, Sir William John Jenkins, Mr. R. H. Hill, Mr. L. F. H. Goodwin, Major S. R. Pocock, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Mr. B. K. Patil, Rao Bahadur Dr. B. Viswanath, Malik Sultan Ali Noon, Dr. Nazir Ahmad, Rao Bahadur V. Ramanatha Ayyar, Rai Bahadur Kalidas Sawhney, Seth Gopaldas Mohta, Mr. K. Ramiah, Mr. Roger Thomas, Dr. R. Sankaran, Dr. B. L. Sethi, Mr. Mohammad Afzal, Dr. K. Venkataraman, Mr. P. D. Gadkari, Mir Riyat Ali, the Director of Industries, Bombay, The Principal, Victoria Jubilee Technical Institute, Bombay, Mr. J. C. Lancashire and Mr. H. G. H. Everitt (Representing the Bombay Millowners' Association), Mr. Ambalal Himatlal and Mr. Pranalal Bhikabhai (Representing the Ahmedabad Millowners' Association) and Mr. Gatulal Rangildas and Mr. Jammadas 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, Dr. V. K. R. V. Rao, Mr. J. L. Hirschler, Mr. L. F. H. Goodwin, 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 Purshetamdas Thakurdas, Sir Sorab Saklatvala, Mr. J. L. Hirschler, Mr. R. G. Saraiya, Sir William Roberts, Sir William J. Jenkins, Mr. B. K. Patil, Major S. R. Pocock, Mr. L. F. H. Goodwin, 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.



**Statements of Receipts and Payments for the Year ended 31st March, 1945.—(contd).**

RECEIPTS.				PAYMENTS.			
	Rs.	a. p.			Rs.	a. p.	
Brought forward ...			Rs. 22,46,554	a. p. 1 1	Brought forward ...	Rs. 12,32,877	a. p. 7 0
					Current Account with the Imperial Bank of India, Bombay ...	43,079	15 8
					<i>Imprests :—</i>		
					(1) Secretary's Office ...	1,579	
					(2) Director, Technological Laboratory, Matunga ...	500	
					(3) Director of Agriculture, Bombay ...	1,820	
					(4) Director of Agriculture, Sind ...	725	
					(5) Cotton Research Botanist, Lyallpur ...	150	
					(6) Plant Physiologist, Indore ...	400	
					(7) Geneticist and Botanist, Indore ...	300	
					<i>Suspense—(Recoverable)</i>		
					(1) Committee's Account ...	3,361	8 2
					(2) Hoops & Fuel Account.		
					Expenditure incurred ...	31,987	9 0
					<i>Less—</i>		
					Receipts ...	11,557	2 0
						20,430	7 0
						23,791	15 2
					*Total Closing Balance ...		
							13,05,223 5 10
Total Rupees ...			Rs. 22,46,554	a. p. 1 1	Total Rupees ...		Rs. 22,46,554 1 1

122

\*Includes Rs. 20,844-9-0 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, 25th June, 1945.

(Signed) S. B. BILLIMORIA & CO.,  
Registered Accountants, Auditors.



**Provident Fund Account as at 31st March, 1945**

RECEIPTS.			EXPENDITURE.			
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Opening Balance as on 1st April, 1944 ... ..			6,73,240	0 4	<i>Balance.—</i>	
Subscribers' Contributions ...	29,271	10 0			(Government Securities at Market Value).	
Add—Excess recoveries ...	5	4 0			2½ per cent. Government of India Loan, 1948-52 of the Face Value of Rs. 70,000 ... ..	
	29,276	14 0			69,868	12 0
Add—Recoveries against Advances ... ..	13,943	4 0	43,220	2 0	3 per cent. Government of India Defence Bonds 1946, of the Face Value of Rs. 28,000 ... ..	
			7,16,460	2 4	28,682	8 0
Less—Refunds to subscribers who have resigned ... ..	29,021	1 3			3 per cent. Government of India Loan 1949-52 of the Face Value of Rs. 35,000 ... ..	
Advances to Subscribers ...	14,148	3 0	43,169	4 3	35,546	14 0
			6,73,290	14 1	3 per cent. Government of India Loan 1951-54 of the Face Value of Rs. 32,000 ... ..	
Committee's Contributions received from Indian Central Cotton Committee ... ..					32,280	0 0
					3½ per cent. Government Promissory Notes of the Face Value of Rs. 3,68,500 ... ..	
					3,66,887	13 0
Less—Payments made to Subscribers who have resigned, including transfers to "Lapse and Forfeiture Account" for contributions disallowed ...					3½ per cent. Government of India Loan 1947-50 of the Face Value of Rs. 1,20,000 ... ..	
					1,24,275	0 0
					4 per cent. Government of India Loan 1960-70 of the Face Value of Rs. 12,600 ... ..	
					14,206	8 0
Carried over ...			6,74,239	13 0	6,71,747	7 0
					Savings Bank Account at the Imperial Bank of India, Bombay ... ..	
					521	12 0
					Current Account with the Imperial Bank of India, Bombay ... ..	
					32,096	15 11
					Carried over ... ..	
					7,04,366	2 11

**Provident Fund Account as at 31st March, 1945—contd.**

RECEIPTS				EXPENDITURE.			
	Rs.	a. p.			Rs.	a. p.	
Brought forward ...				Rs. a. p.			Brought forward ...
				6,74,289	13	0	Rs. a. p.
Interest received on Investments	22,406	6 0					7,04,366
Interest received on advances to Subscribers ... ..	1,072	0 10					2 11
Refund of Income-Tax deducted on Interest received during 1943-44 ... ..	1,961	12 0					
			25,440				
Less—Interest paid during the year to Subscribers who have resigned :—							
On their contributions ...	401	7 9					
On Committee's contributions	446	10 6					
Interest paid in advance at the time of purchase of Government Securities (since received) ... ..	196	0 0					
Income-tax deducted from Interest on Government Securities ... ..	1,813	8 0					
Stationery ... ..	34	12 0					
Bank's Commission for collection of interest and stamp charges ... ..	26	9 0	2,078	15	3		
				22,401	3	7	
Investments Fluctuation Account :—							
Appreciation in market value of securities ... ..				7,082	13	0	
Lapse and Forfeitures Account ... ..				582	5	4	
Total Rupees ...			7,04,866	2	11		Total ...
							7,04,866
							2 11

124

Examined and found correct.

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

BOMBAY, 25th June, 1945



**Balance Sheet as on 31st March, 1946—(contd.)**

RECEIPTS.				EXPENDITURE.			
	Rs.	a. p.	Rs.	a. p.		Rs.	a. p.
Brought forward ...			1,81,44,606	11 0			
Profit on conversion and sale of securities ...			3,60,046	8 2	II. AGRICULTURAL RESEARCH—GRANTS.		37,57,853 2 2
Sinking Fund account ...			20,844	9 0	(1) <i>Research Schemes.</i>		
Miscellaneous Receipts ...			1,64,881	12 8	(i) <i>Bombay—</i>		
Refund from Provident Fund for contributions disallowed ...			3,391	1 11	(1) A. Surat Physiological ...	2,45,139	11 3
Receipts from the Cotton Fund ...	9,68,756	0 0			B. Surat Physiological Writing-up ...	5,814	7 8
Less—Amount refunded ...	36,366	0 0	9,27,390	0 0	(2) A. Surat Bollworm ...	1,14,509	9 7
					B. Surat Bollworm Propaganda ...	91,468	9 2
					C. Surat Bollworm Writing-up ...	2,315	3 0
					(3) A. Dharwar Wilt ...	1,82,836	4 11
Amount received from the Board of Scientific and Industrial Research ...	4,539	6 0			B. Dharwar Wilt Writing-up ...	10,902	10 3
Less—Expenditure incurred ...	3,529	4 0	1,010	2 0	(4) Khandesh ...	26,573	5 0
					(5) Co-ordination of Cotton Research ...	1,749	7 6
Suspense receipts ...			79	2 9	(6) Jalgaon Cotton Breeding ...	78,065	2 6
					(7) Broach Cotton Breeding ...	1,11,184	2 2
					(8) Small Leaf Disease Survey ...	3,938	9 6
					(9) Survey of Goghari cotton ...	4,199	5 0
					(10) Defibractation of cotton seeds ...	4,878	5 9
					(11) Plant Puller Propaganda ...	21,940	1 3
					(12) Breeding of Wilt Resistant cotton for Surat Area ...	29,069	6 0
Carried over			1,96,22,249	15 6	Carried over ...	9,35,184	4 6

Balance Sheet as on 31st March, 1945—(contd.)

RECEIPTS.			EXPENDITURE.				
		Rs. a. p.		Rs. a. p.	Rs. a. p.		
Brought forward	...	1,96,22,249 15 6	Brought forward	9,35,184 4 6	37,57,853 2 2		
			(13) Model Projects for improvement of cultivation of crops	2,181 6 0			
			(14) Inclusion of Northern and Westerns in Dry Farming Research at Bijapur...	6,953 12 7			
			(15) Poona Wilt Breeding	62,289 13 6			
			(16) Improvement of Cotton Crop in Kaira District	8,768 14 6			
			(17) Interspecific Hybridisation at Surat	53,366 4 3			
			(18) Dholleras Wagad Cotton at Viramgam	46,161 15 2			
			(19) Improvement of Dharwar-American cotton	7,645 12 8			
			Total for Bombay	11,22,552 2 9			
			(ii) Madras—				
			(1) Herbaceum	1,42,466 13 1			
			(2) Pempheres and Physiological	2,01,057 10 3			
			(3) Fodder Cholan	19,517 9 4			
			(4) Breeding of Nadam cotton	17,727 2 6			
			(5) Improvement of Mungari cotton	43,620 10 6			
			(6) Investigation of the possibilities for control of cotton stem weevil	6,165 7 6			
			(7) Improvement of Cocanadas Cotton	43,135 11 9			
			Total	4,73,691 0 11			
Carried over	...	1,96,22,249 15 6	Carried over	15,96,248 3 8	37,57,853 2 2		

**Balance Sheet as on 31st March, 1945—(Contd.)**

RECEIPT		EXPENDITURE			
Brought forward ...		Rs. a. p. 1,96,22,249 15 6	Brought forward ...	Rs. a. p. 15,96,248 8 8	Rs. a. p. 37,57,858 2 2
			(iii) Punjab—		
			(1) Botanical ... ..	6,82,136 4 9	
			(2) Entomological ... ..	2,25,908 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 ... ..	4,09,587 1 7	
			(9) Clean-up Campaign of Spotted Bollworm ... ..	60,025 9 3	
			(10) Jassid investigation ... ..	22,239 1 6	
			(11) Improvement of Punjab-American 289F. ... ..	20,508 10 3	
			Total ...	15,57,995 5 11	
			(iv) Central Provinces—		
			(1) Botanical ... ..	4,93,449 9 4	
			(2) Entomological ... ..	12,344 13 6	
			(3) Investigation of Heliothis Obsoleta ... ..	1,672 9 9	
			(4) Central Provinces and Berar Cotton Breeding Scheme ... ..	59,481 13 3	
			(5) Model Projects for extension of im- provement in cultivation of crops ... ..	1,851 10 0	
			Total ...	5,68,800 7 10	
			Carried over ...	37,23,089 1 5	
Carried over ... ..		1,96,22,249 15 6			37,57,858 2 2

**Balance Sheet as on 31st March 1945—(Contd.)**

RECEIPTS.			EXPENDITURE.				
		Rs. a. p.			Rs. a. p.		Rs. a. p.
Brought forward ...		1,96,22,249 15 6	Brought forward ...		37,23,039 1 5		37,57,853 2 2
			(v) <i>United Provinces—</i>				
			(1) Pink Bollworm ... ..		1,46,616 2 10		
			(2) Rohilkhand and Bundelkhand Survey.		18,061 14 4		
			(3) Botanical ... ..		93,953 13 0		
			(4) Model Project for extension of improvement in cultivation of crops.		1,835 9 0		
			(5) Scheme for Hybridization of Arboreum cotton ... ..		2,816 7 0		
			Total ...		2,63,283 14 2		
			(vi) <i>Indore—</i>				
			(1) Institute of Plant Industry ... ..		20,16,943 12 0		
			(2) Cotton Genetics Research Scheme ...		1,85,597 4 9		
			(3) Scheme for Cotton Physiological Research ... ..		43,947 0 3		
			Total ...		22,46,488 1 0		
			(vii) <i>Sind—</i>				
			(1) Physiological ... ..		2,63,945 12 10		
			(2) Jassid Investigation ... ..		15,471 15 1		
			(3) Black-headed Cricket ... ..		9,245 1 3		
			(4) Scheme for investigation for production of long-staple cotton ... ..		1,33,736 3 9		
			(5) Bollworm Investigation and Clean-up Scheme ... ..		87,304 7 6		
			Total ...		5,09,703 8 5		
Carried over...		1,96,22,249 15 6	Carried over...		67,42,514 0 0		37,57,853 2 2

**Balance Sheet as on 31st March, 1945.—(Contd.)**

RECEIPTS.			EXPENDITURE.									
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.				
Brought forward ...			1,96,22,249	15	6	Brought forward ...	67,42,514	9	0	37,57,853	2	2
						(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 ... ..	83,976	10	4			
						(4) Improvement of Kumpta cotton ... ..	51,783	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 ... ..	41,602	8	7			
						(8) Gaorani Improvement Scheme ... ..	18,002	4	0			
						Total ...	7,09,646	1	2			
						(x) <i>Bikaner —</i>						
						Bengals Cotton Improvement ... ..	70,377	10	11			
Carried over ...			1,96,22,249	15	6	Carried over ...	75,73,235	8	3	37,57,853	2	2



Balance Sheet as on 31st March, 1945.—(contd).

RECEIPTS		EXPENDITURE												
	Rs.	a.	p.		Rs.	a.	p.		Rs.	a.	p.			
Brought forward ...				1,96,22,249	15	6		Brought forward ...	75,73,235	8	3	37,57,853	2	2
								(xi) Baroda—						
								(1) Root Rot ... ..	92,904	15	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	35,745	6	11			
								Total ...	1,69,327	9	9			
								(xii) Bengal—						
								(1) Comilla Scheme ... ..	43,919	14	9			
								(2) Cultivation of Long-staple cotton ...	13,712	11	3			
								Total ...	57,632	10	0			
								(xiii) Mysore—						
								Doddahathi ... ..	30,266	1	9			
								(xiv) Collection of Iran cotton ... ..	3,121	12	0			
								(xv) Baluchistan—						
								Co-ordination of research on Blackheaded Cricket in Sind and Baluchistan ... ..	49,133	1	5			
								(xvi) Preliminary Scheme at Nawanagar ...	323	12	4			
								(xvii) Estimation of effects on cotton crops of the use of Plant Puller ... ..	4,143	12	5	78,87,184	3	11
Carried over...				1,96,22,249	15	6		Carried over ...				1,16,45,037	6	1



**Balance Sheet as on 31st March, 1945.—(contd).**

RECEIPTS.			EXPENDITURE.				
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	
Brought forward ...			1,96,22,249	15	6		
						Brought forward ...	8,54,172 7 11 1,16,45,037 6 1
						(ii) Madras :—	
						(1) Pay and allowance of Business Manager, Tirupur ... ..	24,079 13 0
						(2) Co. 2 ... ..	41,286 2 9
						(3) H. 1 ... ..	22,415 4 9
						(4) Maintenance of nucleus of pure seed of improved varieties of cotton ... ..	4,504 11 2
						(5) Co. 3 in Salem District ... ..	24,223 3 0
						Total ...	1,16,509 2 8
						(iii) Sind :—	
						(1) Seed Distribution ... ..	4,22,726 10 10
						(2) Maintenance of nucleus of pure seed of improved varieties of cotton ... ..	9,862 13 5
						(3) Financing of seed distribution ... ..	1,05,283 15 0
						Total ...	5,37,873 7 3
						(iv) Hyderabad ... ..	51,307 13 3
						(v) Central Provinces :—	
						(1) Maintenance of nucleus of pure seed of improved varieties of cotton ... ..	3,260 7 6
						(2) Jarila seed distribution scheme ... ..	6,229 15 0
						Total ...	9,490 6 6
						(vi) Baroda :—	
						(1) Navsari Seed Storage ... ..	39,023 4 4
						(2) B. D. 8 ... ..	17,330 11 9
						(3) B. 9 ... ..	9,016 2 8
						(4) Scheme for creation of pure Wagad Cotton Zone in Mehsana District ... ..	6,361 4 0
						(5) Vijaya Scheme ... ..	24,841 0 0
						Total ...	96,572 6 9
Carried over ...			1,96,22,249	15	6	Carried over ...	16,65,925 12 4 1,16,45,037 6 1

**Balance Sheet as on 31st March, 1945—(Contd.)**

RECEIPTS.		EXPENDITURE.			
Brought forward ... ..	1,96,22,249. 15 6	Brought forward ... ..	16,65,925 12 4	1,16,45,037 6 1	
		(vii) Lyallpur Ginnery ... ..	16,038 8 3		
		(viii) <i>United Provinces :—</i>			
		(1) C. 402 ... ..	18,616 11 6		
		(2) Perso-American Cotton in Western Districts ... ..	42,093 6 0		
		Total ... ..	60,710 1 6	17,42,674 1 1	
		(3) <i>Marketing Schemes.</i>			
		(1) Grading and Marking of 1027 A.L.F. in Surat Area ... ..	7,414 12 9		
		(2) Punjab Cotton Marketing Survey ... ..	7,214 1 6		
		(3) Baroda Better Marketing of 1027 A. L. F. ... ..	15,783 6 3		
		(4) Extension and Marketing of V. 484 in C. P. ... ..	3,64,979 5 4		
		(5) Distribution and Marketing of Buri 107 cotton in Burhanpur Tahsil ... ..	24,429 0 0	4,19,770 9 10	
		(4) <i>Miscellaneous Schemes.</i>			
		(1) Compilation of Manurial Trials ... ..	719 15 0		
		(2) Compilation of Handbook dealing 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 ... ..	7,345 5 11		
		(4) Scheme for Research on Chemical finishes ... ..	4,000 0 0	15,040 9 11	
Carried over ... ..	1,96,22,249 15 6	Carried over ... ..		1,38,22,522 10 11	

Balance Sheet as on 31st March, 1945—(contd.)

RECEIPTS.			EXPENDITURE.								
	Rs.	a. p.	Rs.	a. p.		Rs.	a. p.				
Brought forward ...			1,96,22,249	15	6	Brought forward ...	1,88,22,522	10	11		
						III. Technological Research—					
						1. Technological laboratory—					
						A. Capital Expenditure :—					
						(1) Land and Buildings ... ..	4,07,988	14	0		
						(2) Machinery ... ..	1,23,212	1	2		
						(3) Freight ... ..	7,502	2	8		
						(4) Apparatus and Equipment ... ..	41,068	5	7		
						(5) Machinery and Workshop ... ..	5,789	8	3		
						B. Working Expenses ... ..	32,27,265	13	0		
						2. Provincial ... ..	2,61,799	1	4		
						3. Development of alternative uses of Indian cotton :—					
						(a) Capital Expenditure ... ..	29,006	7	9		
						(b) Working Expenses ... ..	55,886	18	5		
						4. Investigation for improvement in the ginning of Indian cotton :—					
						(i) Capital Expenditure ... ..	34,072	13	9		
						(ii) Working Expenses ... ..	21,781	2	0		
						IV. Research Studentships ... ..	2,82,566	1	4		
						Less—Refund from Dr. Taskhir Ahmad ...	3,585	6	0		
						By Suspense Account—					
						(1) Committee's Account ... ..	3,361	8	2		
						(2) Hoops & Fuel Account :—					
						Total Expenditure ... ..	31,987	9	0		
						Less—Receipts ... ..	11,557	2	0		
							20,480	7	0		
						BY BALANCE ... ..	12,81,481	6	8		
								13,05,223	5	10	
Grand Total ...			1,96,22,249	15	6	GRAND TOTAL ...			1,96,22,249	15	6

**INDIAN CENTRAL COTTON COMMITTEE.**

**PROVIDENT FUND ACCOUNT.**

*Balance Sheet as on 31st March, 1945.*

RECEIPTS.				EXPENDITURE			
	Rs.	a.	p.		Rs.	a.	p.
Subscribers' contributions account ... ..	5,28,858	10	4	Advance to subscribers ... ..	1,27,427	9	0
<i>Less—</i> Payments made to subscribers resigned ...	1,98,315	8	11	<i>Less—</i> Recoveries made upto 31st March 1945 ...	1,06,528	2	0
Committee's contribution account ... ..	5,17,508	3	0	Interest accrued on Government Paper credited for distribution to subscribers upto 31st March 1945			6,101 0 0
<i>Less—</i> Payment made to subscribers resigned and forfeitures for Committee's contributions disallowed.	1,87,296	3	7	BY BALANCE ... ..			7,04,366 2 11
Lapse and Forfeiture account ... ..							
Net interest received on investments ... ..							
Investment fluctuation account ... ..							
Suspense receipts—							
Balance due to subscriber (deceased) Mr. N. Srinivas	500	0	0				
Deposit of Mr. Dutt's own contribution ... ..	1,378	11	2				
<b>Total</b> ... ..	.....			<b>Total</b> ... ..			<b>7,31,866 9 11</b>

## APPENDIX IV

### STOCKS OF INDIAN COTTON ON 31st JANUARY, 1945, 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				
	1941.	1942.	1943.	1944.	1945.	1941.	1942.	1943.	1944.	1945.	1941.	1942.	1943.	1944.	1945.
Tinnevellies .. ..	18	27	31	17	37	14	17	15	18	23	32	44	46	35	60
Salems .. .. .	9	10	20	19	..	2	6	5	4	6	11	16	25	23	6
Cambodias .. ..	34	66	99	83	83	21	38	39	49	70	55	104	138	132	153
Northerns & Westerns	23	25	27	15	19	16	10	32	26	13	39	35	59	41	32
Cocanadas .. ..	1	4	3	3	1	9	19	5	19	19	10	23	8	22	20
Outside Cottons.. ..	56	61	55	84	66	..	4	1	5	2	56	65	56	89	68
<b>Total ..</b>	<b>141</b>	<b>193</b>	<b>235</b>	<b>221</b>	<b>206</b>	<b>62</b>	<b>94</b>	<b>97</b>	<b>121</b>	<b>133</b>	<b>203</b>	<b>287</b>	<b>332</b>	<b>342</b>	<b>339</b>

## 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.)

—	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.	1944-45.
Bombay Island ... ..	664,546	611,606	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	1,223,679
Ahmedabad ... ..	321,503	322,257	348,009	373,345	326,558	320,982	304,398	346,269	346,375	305,459	341,800	414,870	364,990	428,677	401,544
Bombay Province ... ..	1,178,659	1,132,645	1,116,297	1,063,549	1,230,616	1,189,310	1,128,744	1,353,998	1,316,313	1,172,285	1,580,079	1,764,339	1,939,423	1,906,606	1,910,619
Madras Province ... ..	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	506,585	603,796
United Provinces ... ..	235,623	256,820	273,573	277,230	292,424	317,011	299,073	288,320	356,331	349,340	381,025	427,305	437,441	414,210	410,596
Central Provinces and Berar ... ..	118,492	115,018	111,208	112,660	125,014	130,298	122,987	146,587	164,616	142,868	153,825	178,791	174,385	148,020	169,727
Bengal ... ..	91,993	102,390	103,784	107,633	101,101	98,892	79,944	92,546	90,611	111,383	135,227	125,740	136,098	138,203	135,697
The Punjab and Delhi ... ..	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	181,384
Rest of British India ... ..	27,101	30,342	31,935	35,139	38,575	38,010	35,823	46,840	49,806	44,867	47,316	64,804	59,003	52,242	52,291
Total—British India ... ..	1,935,363	1,987,603	2,009,664	1,946,210	2,183,791	2,228,374	2,172,725	2,445,606	2,591,863	2,493,408	2,994,735	3,335,020	3,575,861	3,440,816	3,464,110
Total—Indian States* ... ..	333,996	358,793	351,260	390,116	428,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375	730,970	678,645	694,554
TOTAL-INDIA ... ..	2,269,359	2,346,396	2,360,924	2,336,326	2,612,132	2,677,688	2,632,785	2,999,609	3,151,065	3,050,106	3,617,147	4,025,395	4,306,831	4,119,461	4,158,664

\*Figures for Indian States for 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 for 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.)

	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.	1944-45.
Hyderabad ...	23,074	31,290	33,488	33,231	45,588	51,771	49,981	63,093	68,156	67,095	72,860	83,725	83,689	78,204	71,640
Mysore ...	43,326	49,293	50,596	47,168	51,196	50,824	53,236	55,244	53,858	67,851	65,062	74,966	77,734	57,718	73,688
Baroda ...	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	88,628	81,964
Gwalior ...	45,207	45,892	43,306	49,362	56,318	72,163	79,079	89,243	94,090	88,688	95,517	94,300	90,025	93,152	87,485
Indore ...	88,620	95,296	91,036	111,430	114,229	113,379	106,454	147,766	140,792	120,186	138,795	148,867	149,914	144,147	154,429
Kathiawar States ...	20,283	18,849	18,868	26,506	35,438	37,397	42,717	48,545	44,109	43,703	50,479	60,628	72,857	70,577	71,184
Other Indian States ...	32,558	39,382	40,209	45,197	45,735	51,462	57,767	57,119	58,444	102,702	108,180	137,247	169,209	146,219	154,164
Pondicherry ...	18,350	20,257	23,170	23,610	22,691	20,355	19,065	22,307	26,475						
<b>Total—Indian States ...</b>	<b>333,996</b>	<b>358,793</b>	<b>351,260</b>	<b>390,116</b>	<b>428,341</b>	<b>449,314</b>	<b>460,060</b>	<b>554,003</b>	<b>559,202</b>	<b>556,698</b>	<b>622,412</b>	<b>690,375</b>	<b>730,970</b>	<b>678,645</b>	<b>694,554</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.)

	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.	1944-45.
Bombay Province ...	54,409	74,979	80,092	74,868	58,355	75,617	67,219	74,750	80,164	86,687	96,215	102,965	81,643	54,415	33,072
Madras Province ...	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	208,300
United Provinces ...	18,496	14,367	19,236	17,871	10,090	10,405	10,659	15,719	17,532	20,279	29,127	26,293	5,024	4,087	793
Central Provinces and Berar ...	15,771	20,743	17,462	18,382	20,544	27,502	26,321	32,860	26,980	29,052	32,589	31,178	19,153	7,866	3,893
Bengal* ...	...	...	...	...	...	...	90	...	...	3	...	...	483	5,000	6,017
The Punjab & Delhi† ...	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	16,908
Rest of British India* ...	...	...	...	...	...	...	19,282	17,160	22,916	12,734	15,529	21,230	6,804	4,942	7,441
<b>Total—British India ...</b>	<b>148,700</b>	<b>211,795</b>	<b>215,279</b>	<b>221,996</b>	<b>217,784</b>	<b>263,678</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>	<b>276,404</b>
Indian States* ...	...	...	...	...	...	...	131,149	109,008	122,078	116,962	131,657	118,660	83,372	78,882	59,809
<b>Total—INDIA*... ..</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>	<b>336,233</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.

---

**Associated Advertisers  
&  
Printers Ltd.  
Bombay 7**

---