



**INDIAN
CENTRAL COTTON
COMMITTEE**

**ANNUAL REPORT
FOR THE SEASON 1941-42**

CHAPTER V.

<i>Research—</i>	.. .. .	28-67
Research on Cotton Technology	.. .. .	28
Fundamental Research	.. .. .	30
Cotton Research in Provinces and States	.. .. .	33
(i) <i>Bombay.—</i>		
(a) Broach Cotton Breeding Scheme	.. .. .	33
(b) Jalgaon Cotton Breeding Scheme	.. .. .	35
(c) Scheme for breeding of wilt-resistant cottons in Surat area	.. .. .	36
(d) Scheme for improvement of Wagad cotton at Viramgam and Jagudan	.. .. .	37
(e) Scheme for improvement of cotton crop in Kaira district	.. .. .	38
(f) Scheme for interspecific hybridisation in cottons at Surat	.. .. .	30
(ii) <i>Sind.—</i>		
(a) Scheme for production of long staple cottons in Sind	.. .. .	40
(b) Scheme for Cotton Jassid Investigation	.. .. .	41
(c) Scheme for co-ordination of research on Blackheaded Cricket in Sind and Baluchistan	.. .. .	42
(d) Scheme for bollworm investigation and clean-up campaign in Sind	.. .. .	43
(iii) <i>Punjab.—</i>		
(a) Punjab Botanical Scheme	.. .. .	44
(b) Scheme for improvement of Punjab-American 289 F/K. 25 cotton	.. .. .	46
(c) Physiological Scheme	.. .. .	47
(d) Root Rot Scheme	.. .. .	50
(e) Cotton Jassid Investigations in the Punjab	.. .. .	50
(iv) <i>Central Provinces and Berar.—</i>		
Central Provinces and Berar Cotton Breeding Scheme	.. .. .	51
(v) <i>Madras.—</i>		
(a) Pempheres Scheme	.. .. .	53
(b) Scheme for improvement of Mungari cotton in Madras Province	.. .. .	54
(c) Scheme for Improvement of Cocanadas cotton in Madras Province	.. .. .	55
(vi) <i>United Provinces.—</i>		
The United Provinces Botanical Scheme	.. .. .	57
(vii) <i>Bengal.—</i>		
(a) Comilla Cotton Scheme	.. .. .	58
(b) Scheme for cultivation of long staple cotton in Bengal	.. .. .	58
(viii) <i>Baluchistan.—</i>		
Scheme for co-ordination of Blackheaded Cricket in Sind and Baluchistan	.. .. .	59

	PAGE.
(ix) <i>Hyderabad.</i> —	
(a) Botanical Research Scheme	60
(b) Scheme for Improvement of cotton of Oomras tract in Hyderabad State	61
(c) Scheme for improvement of Kumpta cotton	62
(d) Scheme for inclusion of Northern and Western cottons in Programme of work of Dry Farming Scheme at Raichur ..	63
(x) <i>Baroda.</i> —	
(a) Root Rot Scheme	64
(b) Scheme for improvement of Mathio cottons at Amreli	64
(xi) <i>Bikaner.</i> —	
Bengals Cotton Improvement Scheme	65
(xii) <i>Mysore.</i> —	
Mysore (Doddahathi) Cotton Scheme	66

CHAPTER VI.

<i>Seed Distribution and Extension Schemes.</i> —	68-83
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Bombay.—

(a) Surat Seed Distribution Scheme	68
(b) Scheme for Control of Selection 1A cotton	69
(c) Jarila Seed Distribution and Extension Scheme	70
(d) Deccan Canals (Banilla) Seed Distribution Scheme	72
(e) B. D. 8 Seed Distribution Scheme	72
(f) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme ..	73
(g) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton	74

Sind.—

(a) Sind Seed Distribution and Extension Scheme	75
(b) Financing of Seed Distribution	76
(c) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton	77

Central Provinces and Berar.—

(a) Verum Seed Distribution and Marketing Scheme	78
(b) Scheme for Distribution and Marketing of Buri 107 cotton	79
(c) Maintenance of nucleus of pure seed of improved strains of cotton ..	80

Madras.—

(a) Madras Co.3 Seed Distribution Scheme	81
(b) Scheme for distribution of H. 1 strain in the Westerns area	81
(c) Maintenance of nucleus of pure seed of improved varieties of cotton, Co.2, H. 1 and K. 1.	81

	PAGE.
<i>Baroda State.</i> —	
(a) Baroda (Navsari) Seed Storage Scheme	82
(b) Baroda B. D.8 Seed Distribution Scheme	82

APPENDICES.

I. Balance Sheet as at 31st March, 1942; statement of receipts and payments for the year ended 31st March, 1942.	84
II. Members of the Indian Central Cotton Committee	97
III. Stocks of Indian cotton on 31st January, 1942, held by the mills and the trade in Madras Province	101
IV. Indian raw cotton consumed in Indian mills	102

INDIAN CENTRAL COTTON COMMITTEE. ANNUAL REPORT FOR THE SEASON 1941-42.

CHAPTER I.

INTRODUCTORY

THIS is the 21st Annual Report of the Indian Central Cotton Committee covering the period 1st September, 1941, to 31st August, 1942. Constituted by the Government of India in 1921, the Committee was originally purely an advisory body. With its incorporation under the Indian Cotton Cess Act in 1923, however, 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. The need for a central body like this requires little emphasis. The Cotton Industry in India must be taken as a whole ; it cannot be considered provincially only as trade changes in one province may affect producers in another, whilst any change in the cotton cultivation in one province undoubtedly affects the cotton trade and the cotton spinning industry throughout India.

The funds of the Committee are derived from the cotton cess of two annas (four annas for the first three years) levied on every bale of Indian cotton exported from or consumed in mills in British India, on the principle that special expenditure for the benefit of a particular industry should be met by that industry. Of the total receipts of the Committee up to the 31st March, 1942, amounting to Rs. 1,70,72,344/-, Rs. 1,45,18,640/- 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 aim has always been to supplement and not supplant the work of the Agricultural Departments in the cotton growing provinces and Indian States and, though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appro-

priate for its grants, the general policy is to give assistance in the direction where it is most needed in the carrying out of a co-ordinated policy of cotton improvement. 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 and suggestions made for the future conduct of the work.

There was no change in the administration ; Mr. D. N. Mahta continued as Secretary of the Committee throughout the year and Dr. Nazir Ahmad as Director of the Committee's Technological Laboratory. The receipts during the year amounted to Rs. 6,75,787 and the total expenditure to Rs. 8,72,781. A statement showing the receipts and expenditure of the Committee as well as the Balance Sheet for the year as at 31st March, 1942, is given in Appendix I. As explained in the previous reports, the day-to-day administration of the Committee is carried on in consultation with the Standing Finance Sub-Committee which exercises its powers under Rule 12 (1) of the Indian Cotton Cess Rules and is the principal executive body of the Committee. Members of this Sub-Committee during the period under review were Sir Chunilal B. Mehta (Vice-President), Chairman ; Mr. P. M. Kharegat (*ex-officio*) ; Sir Purshotamdas Thakurdas ; Sir Sorab Saklatvala ; Sir Chunilal V. Mehta ; Mr. J. L. Hurschler ; Mr. W. J. Jenkins ; Rao Bahadur Sir Madhaorao Deshpande and Mr. Chandulal P. Parikh. Matters of a general nature not involving finance are disposed of with the help of the Local Sub-Committee which is composed of the local members and those residing within easy reach of Bombay. The members of this Sub-Committee during the year under review were the President (Mr. P. M. Kharegat) ; 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. Chandulal P. Parikh ; Mr. W. J. Jenkins ; Mr. A. P. Darlow ; Rao Bahadur Sir Madhaorao Deshpande and Mr. S. T. More.

A list of the members constituting the Committee and the various interests they represent as on 31st August, 1942, is given in Appendix II. 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-in-Council under Section 4 (xi) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification. The functions

of the various sub-committees have been dealt with at length in previous Annual Reports and repetition here appears unnecessary. The composition of the Sub-Committees as on 31st August, 1942, is given in Appendix II.

The Central Cotton Committee met twice during the year under review. The most important subject which received consideration at the first meeting held on the 23rd and 24th January, 1942, was the question of the measures that should be taken to safeguard the position of Indian cotton in view of the loss of markets in Europe and the Far East as a result of the war. After a full dress debate, the following resolution was unanimously passed by the Committee :—

“ In view of the necessity and urgency of avoiding any further glutting of the Indian cotton market with short and fair staple cotton hereafter, the buyers of which have been cut off from the Indian market owing to the present hostilities which may run for a period which cannot be estimated at present, the Indian Central Cotton Committee requests the Government of India to urge all Provincial Governments and States in India, especially those in areas where short and fair staple cotton is being grown, to reduce the existing acreage under such cotton forthwith by at least 50 per cent. As alternative to short and fair staple cotton, such other crops may be encouraged as may suit the conditions of each area, preference being given to food grains, adequate stocks and reserves of which will continue to be a matter of vital national importance for a number of years to come. To stimulate and accelerate such change Provincial Governments and States should be urged to subsidise the same by such means as may be most effective according to local conditions in each Province and State, including the supply of free or cheap seeds and the provision of funds and facilities for the sinking of new and the repair of old wells. The Committee requests every Provincial and State Government concerned to notify the public regarding the action taken by them as early as possible—not later than 1st March next.”

At the second meeting held in July 1942, the principal subject considered was that relating to the difficulties experienced by cotton ginning and pressing factories in obtaining their requirements of baling hoops and coal and other types of fuel. The recommendations made by the Committee in this connection are embodied in the following resolution :—

“ The Indian Central Cotton Committee is of the opinion that the orderly and prompt marketing of the cotton crop is of paramount importance to the cotton cultivator. For this purpose, it considers it essential that ginning and pressing factories should be provided with the necessary facilities for their working especially in respect of coal and other types of fuel used by them. To secure the object in

view, the Committee respectfully requests the Government of India to take early steps to place on the Priority List the requirements of cotton ginning and pressing factories, in particular coal and other kinds of fuel in good time before the commencement of ginning and pressing operations in each Province."

The financial position of the Committee was also reviewed at this meeting and the decisions arrived at are contained in the following resolution :—

" The Indian Central Cotton Committee, while agreeing with the view expressed by the Government of India regarding the desirability of maintaining a minimum balance of Rs. 9 lakhs, feels that the strict application of this prescription would not be in the best interests of the cotton cultivator, as urgent and necessary work might, as a result, be held up or indefinitely postponed. The Committee respectfully urges, therefore, if for good and sufficient reasons it considers that new work should be undertaken or that a scheme already in operation should continue, thereby necessitating incursions into the minimum balance, that the Government of India would be pleased to at least restore the minimum balance to the prescribed limit, as and when required, by granting a subsidy to the Committee from the Cotton Fund recently created from the proceeds of the additional import duty imposed on raw cotton for the purpose of financing measures for the benefit of the growers of certain types of cotton which were exported in large quantities to the Far East before the outbreak of the present war with Japan."

Mr. P. M. Kharegat, Sir Chunilal B. Mehta, Mr. W. J. Jenkins, Sir Purshotamdas Thakurdas, Sir Chunilal V. Mehta and Mr. D. N. Mahta represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1942. Mr. Roger Thomas represented the Committee on the Imperial Council of Agricultural Research. Under Article 51, as amended, of the Articles of Association of the East India Cotton Association, the Committee is entitled to nominate from amongst its growers' representatives, three persons whether members of the Association or not, not having dealings in forward contracts, as directors of the Association. Rao Bahadur Sir Madhaorao Deshpande, Sardar Bahadur Gurbachan Singh and Sardar Rao Bahadur Bhimbhai R. Naik were elected by the Committee for the cotton year under review.

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

CHAPTER II.

COTTON STATISTICS.

On the average of the five years ending 1940-41, production of Indian cotton represented some 17% of the total world production, the share of the United States of America being 42%. The total area under cotton in India during the year was 24,151,000 acres, showing an increase of 840,000 acres as compared with the previous year. The total estimated out-turn for 1941-42 was 6,127,000 bales, against 6,080,000 bales in 1940-41, the average yield per acre being 101 and 104 lbs., respectively. The out-turn was higher than that in the previous year in the major cotton growing provinces and States except Sind, the United Provinces and Hyderabad State.

The ascertained area under improved strains of cotton was 8,568,000 acres or 35% of the total, against 28% in the previous year. The improvement effected in the staple of the Indian cotton crop as a result of the introduction and extension of superior varieties of cotton will be apparent from the following table :—

Indian cotton crop classified according to varieties and staple length.

(Based chiefly on the 'Estimates of Area and Yield of Principal Crops in India' and 'Cotton Forecasts' published by the Department of Commercial Intelligence and Statistics in India.)

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

Descriptions of cotton.	Average 1922-27.	Average 1936-41.	1941-42.	% increase (+) or decrease (-) of col. 4 over col. 2.
(1)	(2)	(3)	(4)	(5)
<i>Short staple—below $\frac{3}{8}$"</i>				
(1) Bengals	905	1,207	932	
(2) Oomras	1,890	1,300	1,198	
(3) Central India	324	262	291	
(4) Broach (Part)	65	224	285	
(5) Dholleras	525	364	421	
(6) Kumpta & Upland (Part)	(a)	32	35	
(7) Bijapur & Bagalkot Jowari		152	57	
(8) Westerns (Part)	(b)		92	
(9) Warangal & Cocanadas	49	28	34	
(10) Salems	30	17	8	
(11) Chinnapathi	39	45	1	
(12) Comillas			42	
Total short staple } Quantity	3,827	3,631	3,396	—11
} % on "Total-All Staples."	70	65	55	

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

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

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

Descriptions of cotton. (1)	Average 1922-27. (2)	Average 1936-41. (3)	1941-42. (4)	% increase (+) or decrease (-) of col. 4 over col. 2. (5)
<i>Medium and Long staple—$\frac{7}{8}$" and above</i>				
(13) Americans—Punjab and Sind (staple 1" and above) † .. ..	..	211	328	
(14) Americans—Punjab and Sind (staple below 1")	264	843	1,031	
(15) C. P. and Berar Verum .. ..	..	41	134	
(16) Hyderabad Gaorani	332	139	142	
(17) Broach (Part) .. ..	..	6	5	
(18) Surti	214	165	151	
(19) Kumpta & Upland (Part)	259	167	186	
(20) Westerns (Part) .. ..	..	52	61	
(21) White & Red Northernns	251	..	17	
(22) Tinnevellies (including Karun- gannies)	155	146	170	
(23) Cambodias	147	175	256	
(24) Jarila .. ..	..	16	232	
(25) Buri .. ..	..	7	18	
Total—Me- dium & Long staple	1,622	1,968	2,731	+68
Quantity .. ..	..	..	..	..
% on "Total-All Staples"	30	35	45	
Total—All Staples	5,449	5,599	6,127	+12

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

It will be seen that the proportion of cotton of staple length $\frac{7}{8}$ " and above to the total production increased from 30% in the quinquennium 1922-27 to 35% in the quinquennium 1936-41; the proportion in 1941-42 was 45% against 36% in 1940-41. The production of 'medium and long staple' cotton in 1941-42 increased by 1,109,000 bales or 68% as compared with 1922-27; under "short staple" there was a reduction of 431,000 bales or 11%. The production of cotton of staple length '1" and above,' which was practically nil in 1922-27, amounted to 415,000 bales in 1941-42.

A noticeable improvement in the yield per acre has also taken place as will be seen from the following table, in which two sets of figures, one based

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

Year. (1st Sept—31st Aug.)	Area (Thousand acres.)	Production Government estimates. (Thousand bales of 400 lbs. each.)	Yield per acre. (lbs.) Col. 3 Col. 2.	Approximate (commercial) crop, (Thousand bales of 400 lbs. each.)	Yield per acre calculated from approximate (commercial) crop. (lbs.) Col. 5 Col. 2.
1	2	3	4	5	6
Average 1922-27 ..	24,723	5,449	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	6,127	101	†6,949	115
Average 1937-42 ..	23,656	5,581	94	†6,457	109

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

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

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

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

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

From the second set of figures given in column 6, it will be seen that the average yield per acre rose from 96 lbs. in the quinquennium 1922-27 to 109 lbs. in the quinquennium 1937-42. The average yield in 1941-42 was 115 lbs. per acre against 121 lbs. in 1940-41.

A report on the estimated production of cotton according to staple length for 1941-42 season was issued in July 1942; the trade estimates of the crop were also presented in this report. Of the official estimate of 6,025,000 (since revised to 6,127,000) bales (compared with the trade estimate of 6,642,000 bales), 7% was of staple length 1" and above and 38% of staple $\frac{7}{8}$ " to 31/32."

INDIAN COTTON SITUATION—1941-42.

The Indian cotton position at the commencement of the season was overshadowed by the impending loss of the Far Eastern markets,

consequent upon the freezing of Japanese assets towards the close of the last season. With the entry of Japan into the War in December 1941, the problem of short staple cotton became a live issue. During the three years ending August 1939, the annual exports to Japan averaged some 15 lakhs bales, most of which consisted of short staple cotton. The sudden closure of this outlet made the disposal of this type of cotton a problem of the first magnitude. Various remedies were suggested to deal with the situation, such as the lowering of the specifications of goods required by the Supply Department, the use of short staple cotton for the manufacture of durries, blankets, nitro-cellulose, cloth for road-making, ditch and canal lining, etc. The possibility of giving chemical finishes to short staple cotton yarns and fabrics was also suggested. The acceptance by the Government of India of the Committee's recommendation regarding relaxation of the specifications of cotton goods required by the Supply Department resulted in an offtake of 4 lakhs bales of short staple cotton but this merely touched the fringe of the problem. The wider aspect of the question of adjusting the supply of short staple cotton to probable demand was discussed at some length by the Committee at its meeting in January 1942, when a resolution was unanimously passed recommending *inter alia* that the Government of India should request all Provincial Governments and States in India to reduce the existing acreage under short and fair staple cotton forthwith by at least 50 per cent. 'Short and fair staple cotton' was defined as cotton comprising the whole of Oomras (excluding Jarila and Verum) and Bengals; Comillas; Hyderabad Westerns; Cocanadas and Warangal; Central India (excluding Malvi) and Mathia.

On the 29th January, 1942, the Government of India announced the creation of a special fund, called the "Cotton Fund," from the proceeds of the levy of an additional duty of one anna per lb. on all imported cotton, with a view to financing measures for assisting the grower of certain types of cotton which used to be exported in large quantities to the Far East prior to the outbreak of war with Japan. The object of this measure was not merely to steady the market by making purchases of raw cotton of the types concerned, but also to assist the cultivator to change over from short staple cotton to food crops. A "Grow More Food" campaign was started on a country-wide scale, and the cultivator was advised to reduce the area under short staple cotton and grow food grains instead. These measures, together with the announcement by the Government of Bombay of their intention to stop facilities for the movement of unwanted short staple cotton to Bombay and the replacement of the Broach, Oomras and Bengals Contracts by a new Contract—Indian Cotton Contract—with Fine Jarila $\frac{3}{4}$ " staple as the basis, were largely responsible for bringing about a reduction in the

production of short staple cotton. In the first all-India cotton forecast* for 1942-43 published in August 1942, the total cotton acreage was estimated at 11,089,000 showing a reduction of 11% on the previous year.

As regards the statistical position of Indian cotton, the season started with a carryover of 12.0 lakhs bales (400 lbs. net each) with the trade, excluding the spinning mills. The actual crop of 1941-42, on the basis of cotton pressed and unpressed cotton consumed in mills amounted to 65.0 lakhs bales (excluding extra-factory consumption of 4.5 lakhs bales), of which 31.3 lakhs were estimated to have been of staple length $\frac{7}{8}$ " and above. The consumption of Indian cotton by mills, amounting to 40.3 lakhs bales, constituted a new record, being 4.1 lakhs bales higher than in the previous season. The receipts at mills of Indian cotton on the basis of voluntary returns, amounted to 40.8 lakhs bales (400 lbs. net each). The actual receipts, however, were estimated to have been some 43.0 lakhs bales, including 18.1 lakhs bales below $\frac{7}{8}$ " in staple.

With the loss of the continental and Japanese markets for Indian cotton, the only important export outlets left were the United Kingdom, U. S. A. and Australia. The total exports during the season amounted to 8.7 lakhs bales including 5.1 lakhs bales below $\frac{7}{8}$ " in staple.

On the basis of the figures of actual production, mill consumption and exports, the calculated carryover of Indian cotton with the trade, excluding spinning mills, at the end of the season, works out to 25.3 lakhs bales as shown below :—

	In lakhs of bales of 400 lbs. net (Excluding extra-factory consumption.)		
	Total.	$\frac{7}{8}$ " and above.	Below $\frac{7}{8}$ ".
Stocks held by the trade (excluding spinning mills on 31st August, 1941)	12.0	2.9	9.1
Probable production in 1941-42	65.0	31.3	33.7
Total supply	77.0	34.2	42.8
Estimated receipts by mills in 1941-42	43.0	24.9	18.1
Exports during 1941-42	8.7	3.6	5.1
Total distribution	51.7	28.5	23.2
Estimated stocks held by the trade on 31st August, 1942	25.3	5.7	19.6

* The Final (April) Cotton Forecast for 1942-43 published on the 30th April, 1943, estimates the total acreage at 18,812,000 and the yield at 4,554,000 bales showing a reduction of 22 and 26% respectively, on the estimates of the previous year.

DEMAND FOR VARIOUS TYPES OF INDIAN COTTON

As usual, statistics relating to internal and export demand for various types of Indian cotton were compiled from information furnished on a voluntary basis and published in Statistical Leaflets Nos. 3 and 4 (1941-42). It is hardly necessary to emphasise the importance of these statistics to the trade and industry as well as to those entrusted with the responsibility of shaping and directing the cotton policy of the country. Receipts at mills of Indian cotton, during the season, were nearly the same as in the previous year, while exports showed a shrinkage of about 12 lakhs bales. The reduction of 4.4 lakhs bales under export of long and medium staple cotton was to some extent offset by the increase of 2 lakhs bales in the offtake of such cotton by mills. Under short staple cotton both exports and mill receipts recorded decreases by 7.6 and 2.4 lakhs bales respectively.

STOCKS.

The information collected in respect of stocks held on the 31st August, 1942, was published in Statistical Leaflet No. 2 (1941-42). Stocks of Indian cotton held in India by the trade at the end of the season 1941-42, on the basis of voluntary returns, amounted to 14.9 lakhs bales, showing an increase of 2.7 lakhs bales on the previous year. The figures of stocks of cotton held by the trade do not cover certain areas while the information collected for some of the other areas is not complete. It is considered that the figure of 14.9 lakhs bales is very low as on the basis of the figures of actual crop exports, mill receipts, etc., the carryover on the same date is estimated at some 25.9 lakhs bales; one important cotton firm, in fact, puts the figure as high as 29 lakhs bales. The discrepancy has been examined and is accounted for mainly by the incompleteness of the figures for the Provinces of Bombay, the Punjab and the United Provinces and the States of Central India. Steps are, however, being taken to remedy the position, as far as possible.

As the season adopted for the cotton crop of the Madras Province is the year ending 31st January, figures of stocks 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, 1942, together with comparative details for previous years, are given in Appendix III.

As in the past, mills, trade associations, market committees and other authorities gave valuable assistance in the collection of figures of stocks of

cotton held in the country at the end of the season. Much ground, however, still remains to be covered before the statistics can be claimed to be complete.

INDIAN MILL CONSUMPTION.

Figures of consumption of Indian cotton in mills in British India and Indian States for the years 1927-28 to 1941-42, based on the monthly statements issued by the Committee, are given in Appendix IV. The total consumption of Indian cotton in mills in India during the season under report, *viz.*, 4,025,232 bales, showed an increase of 408,085 bales as compared with the previous season, and constitutes yet another record. Bombay Province alone accounted for about 45% of the increased consumption. All the Provinces in British India except Bengal recorded increases. Indian States shared 17% of the increased consumption which was mainly in Hyderabad, Mysore and Indore States.

EXPORTS.

The exports of Indian cotton from British India during the season totalled 873,000 bales against 2,013,000 bales in 1940-41. On the average of the three financial years ending 1940-41 the value of cotton (including waste) exported from British India formed 36% of the total value of "Raw materials and produce and articles mainly unmanufactured" exported, and 14% of the total value of all merchandise exported.

STATISTICS OF COTTON PRESSED.

During the season under review, 4,207,681 bales of cotton were pressed in British India and, 1,729,102 bales in Indian States, making a total of 5,936,783 bales for all-India; the corresponding figures for 1940-41 were 4,195,719, 1,779,554 and 5,975,273 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 391 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 in cotton growing areas often use considerable quantities of ginned, unpressed cotton. During the year, 562,053 bales of unpressed cotton were consumed in mills in India against 523,001 bales during the preceding year. The relevant figures for 1927-28 to 1941-42 are given in Appendix IV to this report.

STATISTICS OF COTTON GINNED.

The figures of cotton pressed do not cover the entire crop as, apart from ginned unpressed cotton consumed in spinning mills for which figures are available, both ginned unpressed cotton and *kapas* are also utilised for domestic purposes, such as, hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If, however, ginning returns could be instituted, all that would be necessary for arriving at the actual crop would be to estimate the quantity of *kapas* used for domestic purposes. The two returns would at the same time serve as a check on each other. The submission of such returns is already in force in the Central Provinces and Berar, Bombay Province and Sind. The necessary amending legislation has been passed by the United Provinces Government. During the year, the Central Government passed the Cotton Ginning and Pressing Factories (Amendment) Act, 1942. The new Section 5A, which has been inserted in the original Act of 1925, provides for the submission of weekly returns of cotton ginned in Chief Commissioners' Provinces only and at the same time empowers any Provincial Government by notification in the Official Gazette to bring this section into force in that Province.

IMPROVEMENT OF COTTON FORECASTS.

The all-India cotton forecasts of the 1940-41 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 Sub-Committee had also before it the note submitted by the Director General of Commercial Intelligence and Statistics on the various points raised during the discussion on the subject at the previous meeting. It was decided that in the present circumstances, the method used at present in determining the actual production in connection with the annual post-mortem examination should be continued and the position re-examined after ginning returns for all-India become available, when it would be possible to check the results arrived at by the two methods with this independent source. It was further agreed that efforts should be made to obtain from commercial firms their estimates of the commercial crop for the use of the forecasting authorities to help them in deciding whether any correction should be applied to the primary reports of anna valuation.

In connection with the post-mortem examination, the inaccuracy of the pressing figures of Sind for 1940-41 was brought to light and investigation

showed that this was due to the failure on the part of some of the factories to submit the returns and to inaccurate returns in the case of some others. Suitable action in the matter has been taken. The Committee endorsed the proposal of the Sind Government to replace the system of anna valuation, for purposes of forecasts, by the direct method of assessment of yield per acre.

In order to improve the cotton forecasts, it is the considered view of the Committee that a systematic and scientific revision of the standard yield figures is necessary. A scheme for crop estimating survey on cotton in the Central Provinces and Berar has accordingly been sanctioned by the Committee for one year with the object of providing a suitable sampling technique for crop-cutting experiments on cotton, by determining the most suitable plot size and density for obtaining estimates of average yield with the desired level of accuracy.

At one of its meetings during the year under review, the Committee considered a note by the Director General of Commercial Intelligence and Statistics, on the procedure followed at present in India in the preparation of cotton forecasts and recommended that the February forecast should, in future, be designated as the "Fourth" Forecast and the April one as the "Final" Forecast.

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

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

As usual, a report on the accuracy of the all-India cotton forecasts of the 1940-41 season was published in August. According to this report, the commercial crop of 1940-41 was estimated to be in the neighbourhood of 7,032,000 bales, whilst the figure forecasted in April 1941 was 5,785,000 bales. The forecast estimate was thus lower by 18 per cent on the basis of the actual crop as arrived at by the Committee; this was probably due to the observed underestimation in the forecasts of the United Provinces, the Punjab, Sind, Bombay Province, Madras Province and Hyderabad State.

PUBLICATIONS.

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

- (1) *Statistical Leaflet No. 2.*—Eighth Issue (1940-41), “Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1941.”
 - (2) *Statistical Leaflet No. 3.*—Eighth Issue (1940-41), “Receipts at mills in India of raw cotton classified by varieties—1940-41 season.”
 - (3) *Statistical Leaflet No. 4.*—Eighth Issue (1940-41), “Exports by sea of Indian raw cotton classified by varieties—1940-41 season.”
 - (4) *Statistical Leaflet No. 1.*—Ninth Issue (1941-42), “Report on the staple length of the Indian cotton crop of 1941-42 season.”
 - (5) *Statistical Leaflet No. 5.*—Fifth Issue (1940-41), “Report on the accuracy of the all-India cotton forecasts of 1940-41 season.”
 - (6) *Statistical Bulletin No. 11.*—(1940-41), “Supply and Distribution of the various types of Indian cotton during the season 1940-41.”
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CHAPTER III.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The improvement of the quality of cotton has always ranked foremost in the programme of work of the Committee. In the attainment of this object, the needs of the Indian mill industry which consumes nearly three-fifths of the total Indian crop have constantly been borne in mind. The success achieved in this direction may be gauged from the fact that practically the entire requirements of the industry for cotton of staple length 1" and below are now being met from indigenous production. At the same time steps are being taken to increase the production in the country of cotton of staple length over 1", of which over 6 lakhs bales are imported from abroad annually. The following paragraphs deal briefly with 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 Central Cotton Committee and the Provincial and State Departments of Agriculture. The information is confined mainly to acreage and production in the interests of paper economy; for fuller details, reference to previous reports will be necessary.

BOMBAY.

During the year under review, the total area under cotton in the Bombay Province, including Indian States except Baroda, was 6,107,000 acres, of which the improved varieties constituted roughly 1,670,000 acres or 26%. The position with regard to the various cotton growing tracts is given below; the figures in brackets after each tract indicate the area under cotton in the tract in 1941-42:—

Kumbla and Upland tract (including Bijapur District, 677,000 acres) (1,836,000 acres).—Two important varieties, *viz.*, *Jayawant* and *Gadag 1*, are grown in this tract. The chief centres of distribution of *Jayawant* are Hubli, Navalgund and Haveri in Dharwar District; Bailhongal and Athani in Belgaum District; and Walva and Tasgaon taluqs in Satara District. *Gadag 1* is chiefly grown in the Gadag and Ron taluqs of Dharwar District. The area under *Jayawant* and *Gadag 1* in this tract (including *Jayawant* grown in Bijapur District) during the year was about 809,000 and 187,000 acres, respectively. Roughly 54 per cent of the tract, including Bijapur

District, was covered by improved strains. The production of these two varieties was estimated at 99,000 and 15,000 bales, respectively.

Barsi-Nagar tract (187,000 acres).—*Banilla* is the improved variety grown in this tract and covered an area of about 6,000 acres during the year. *Jarila* cotton evolved for the Khandesh tract is also spreading in this tract.

Khandesh tract (1085,000 acres).—Khandesh *Banilla* was the original improved strain evolved for this tract, but owing to its susceptibility to wilt, its extension has been abandoned in favour of *Jarila* which is a selection from *Verum* evolved under the Jalgaon Cotton Breeding Scheme. During the year under review, *Jarila* fetched an average premium of Rs. 74 'on' Broach. The estimated area under it during the year was some 552,000 acres, including natural spread, the production being 150,000 bales. Out of the pure seed produced on Government Farms and in controlled areas, the quantity stocked by the Agricultural Department and approved stockists for distribution in 1942-43 season was 53,30,000 lbs.

Surti tract (502,000 acres).—1027 A. L. F. is the improved cotton grown in this area. The area under Departmental seed of this variety during the year was 70,000 acres, excluding Baroda State; the area under natural spread is not known. The Committee finances a scheme for grading and marking of 1027 A. L. F. cotton in the Surat protected area and 5,964 bales were sold under 'Agmark' at premiums ranging from Rs. 5 to Rs. 27 on the local.

Broach tract (488,000 acres).—B. D. 8 is the improved strain in this tract which was grown on 16,000 acres during the year; the production was estimated at 5,000 bales.

SIND.

The total area under cotton in Sind, including Khairpur State, was 999,000 acres, of which Sind-American occupied 820,000 acres and Sind *desi* 179,000 acres. The area under improved varieties was about 82% of the total.

In the Sind-American tract four types of cotton are grown, *viz.*, Sind-American 4F, Sind *Sudhar* (289-F-1), Sind-American 289F types (other than Sind *Sudhar*) and Sind-American 98. The area and yield of Sind-American 4F were 38,000 acres and 18,000 bales, respectively. There were some

285,000 acres under Sind *Sudhar* during the year, the estimated yield being 158,000 bales. Under Sind-American 289F types (other than Sind *Sudhar*), are included the improved varieties variously known as K. T., N. T., L.S.S., etc. The propagation of these strains has been discontinued by the Agricultural Department in favour of Sind *Sudhar*. Sind-American 98 is considered to be the most suitable type for cultivation in the new cotton area on the Right Bank of the Indus. There were some 50,000 acres under it during the year, yielding about 22,000 bales.

The improved Sind *desi* cotton known as Sind N. R. or 27 W. N. is the standard *desi* cotton of Sind and is grown in the Nawabshah District and the upper part of Hyderabad District. The area under it during the year was 112,000 acres which is 63% of the total *desi* acreage.

PUNJAB.

The total area under cotton in the British districts of the Province was 2,801,000 acres of which 1,561,000 acres were under Punjab-American and 1,240,000 acres under Punjab *desi*. The total estimated area of about 2,240,000 acres (*i.e.*, 80% of the total cotton acreage) under improved varieties during the year was distributed as under :—

(a) Punjab-American varieties :—		Acres.
(i) 4F		838,000
(ii) L. S. S., 289F/K. 25 and 289F/43		723,000
	Total	1,561,000
(b) Improved <i>desi</i> cottons :—		
(iii) Mollisoni and M. 60 A2		665,000
(iv) Sanguineum		14,000
	Total	679,000

CENTRAL PROVINCES AND BERAR.

The total area under cotton in the Central Provinces and Berar during 1941-42 was 38,05,000 acres. Improved varieties occupied some 822,000 acres or roughly 22% of the total. The chief improved varieties are V. 434, *Jarila* and *Buri* 107.

V. 434 is the best all round strain available at present and is grown chiefly in Nimar, Wardha and Nagpur districts and Berar. During the year it fetched a premium of Rs. 131 per *candy* over the local Oomras. The area under all *verum* strains was 365,000 acres during the year under report.

Jarila, an improved Verum type evolved for the Khandesh tract, is finding much favour with the cultivators in the adjoining tracts, particularly Berar. The total area under this cotton in the Central Provinces and Berar in the past year amounted to 274,000 acres.

Buri 107, a selection from acclimatised *Upland* American cotton, is grown chiefly in the Burhanpur Tahsil of the Nimar District for which it has been found to be particularly suitable. The area under it during the year was 60,000 acres.

MADRAS.

The total area under cotton in the Madras Province (including Pudukkottai and Banganapalle States) was 2,556,000 acres of which 613,000 acres (or 24%) were under improved superior strains. The position of improved strains in the different tracts is dealt with below; the figures in brackets after each tract refer to the area under cotton in 1941-42.

Cambodia tract (636,000 acres).—Cambodia, an acclimatised American Upland cotton, is the original improved type introduced in this tract. This variety is now being replaced by several better strains such as *Cambodia* Co.2, Co. 3 and Co.4, etc. Compared with ordinary Cambodia, Co.2 is estimated to benefit the grower to the extent of Rs. 15 per acre. Another strain 920 is now gradually replacing Co.2 in parts of Coimbatore District, on account of its sturdier growth and lesser susceptibility to shedding. The area under Co.2 (including 920) in 1941-42 was 301,000 acres. The Cambodia Uganda Crosses, Co.3 and Co.4, are both earlier and more prolific than and superior in quality to either Co.2 or 920. In 1941-42, Co.3 and Co.4 were grown in Ramnad, South Arcot and Tinnevely Districts over an area of 26,000 acres, the estimated production being 14,000 bales.

Tinnevellies tract (724,000 acres).—The improved *Karunganni* strains at present being propagated are C. 7, A. 10 and K.1, which were originally evolved by selection in *Karunganni* at the Koilpatti Agricultural Research Station. K.1 was evolved by re-selection in C. 7 in a year of drought; besides being earlier and hardier than the latter, it does better than either C. 7 or

A. 10 under adverse conditions and is not affected by February rains. Further, it has been found to give a higher yield than the local cottons. Owing to its earliness, drought resistance and non-shedding qualities, it is gaining popularity and is expected to replace both C. 7 and A. 10. The area under improved Karunganni in 1941-42 was 213,000 acres, the estimated production being 32,000 bales. . .

Westerns tract (859,000 acres).—The improved strain grown in this tract is H. 1, which is a selection from another strain H. 25. It is grown chiefly on the black soils of Bellary District and in parts of Anantapur and Cuddapah Districts. There were some 312,000 acres under it in 1941-42.

Northerns tract (164,000 acres).—N. 14, the improved strain grown in this tract, was evolved by selection from the Northerns cottons and is considered to be one of the finest indigenous cottons in India. There were 42,000 acres under it in 1941-42.

UNITED PROVINCES.

The total area under cotton in the Province during 1941-42 was 439,000 acres. The improved varieties, C. 520 and Perso-American, occupied 31,000 acres or 7% of the total. C. 520 was grown on 22,000 acres.

HYDERABAD STATE.

The total area under cotton in the State during 1941-42 was 3,283,000 acres, of which 1,309,000 acres (or 40%) were occupied by the improved varieties, *Gaorani* 6, Parbhani-American, *Jarila* and *Jayawant*.

Out of 837,000 acres in the Gaorani tract, Gaorani 6 covered an area of 606,000 acres during the year. Pure seed of Parbhani-American, which is a selection from the local American varieties, is being distributed, on *tacavi* system, in the Aurangabad District. The area under it during the year was 16,000 acres. It is estimated that the improved variety, *Jarila*, was grown on an area of about 5 lakhs acres in the State, during the year under report.

Jayawant (same strain as that grown in the Kumpta tract of the Bombay Province) is being extended chiefly in the *Kumpta* cotton protected area of the Raichur District. In 1941-42, *Jayawant* occupied an area of 187,000 acres in the State.

BARODA STATE.

The total area under cotton in the State in 1941-42 was 882,000 acres ; improved varieties occupied 252,000 acres or 29%. The position of improved varieties in the different tracts is indicated below :—

Surti tract (258,000 acres).—Surti cotton is grown in the Navsari District of the State. The improved strain being extended in this tract is 1027 A. L. F. which covered an area of 210,000 acres in the Navsari District in 1941-42.

Broach tract (403,000 acres).—The cotton crop of Baroda District is classified under Broach. The improved strain of this tract is B. D. 8, which is extending particularly in Dabhoi, Sankheda, Karjan and Sinor Talukas of the Baroda District, where wilt predominates. The area under it during the year was 13,000 acres.

In large areas of Waghodia and Savli Talukas where damage by wilt is not noticeable, B. 9, an improved type, is in keen demand. It is distinctly superior to the local Goghari and the Agricultural Department had a controlled area of 21,000 acres under it in 1941-42.

Dholleras (221,000 acres).—Mehsana and Amreli Districts of the State are included in this tract. In the Mehsana District, the improved strain *Wagad* 8, originally evolved by the Bombay Agricultural Department by selection in *Wagad* cotton is proposed to be extended. 3,000 acres were under this cotton during the year. In the Amreli District, pending further breeding work, C. 520 the improved *Bengals* type grown in the United Provinces, is proposed to be extended. The area under it was 5,000 acres.

RAJPIPLA STATE.

The total area under cotton in the State during 1941-42 was 164,000 acres, the whole of which was sown with 1027 A. L. F. The import and sowing of *Goghari* or any other short staple cotton are prohibited under the Rajpipla Cotton Improvement Act of 1921. Pure seed of 1027 A. L. F., for distribution to the cultivators, is obtained by the State every year from the Cotton Superintendent, Surat.

CHAPTER IV.

IMPROVEMENTS IN COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

In addition to the production of better cottons, the Committee has, from its inception, devoted special attention to better marketing (in the widest sense of the word). An investigation into the financing and marketing of cultivators' cotton conducted by the Committee established beyond doubt that, in those tracts where regulated markets exist, the cultivators obtain better prices for their cotton and accordingly a recommendation was made to Provincial Governments to take steps for the establishment of such markets. As a result, 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 connection with the adoption of a definite cotton policy in Gujerat, the view was expressed that the crux of the whole problem centered round the better marketing of cotton and it was accordingly suggested that the Agricultural Produce (Grading and Marking) Act should be utilised to enable 1027 A. L. F. cotton to be marketed as a special grade of Surat cotton. As a result of the Committee's recommendation, 1027 A. L. F. grown in certain tracts in Gujerat (Bombay Province) was marketed under a special AGMARK during the last two years. The system of "Agmarking" based on field inspection and issue of certificates of purity to cultivators was, however, not found to be effective, as the premia obtained for "agmarked" cotton was not greater than that obtained for the same cotton when not guaranteed by "Agmark." This might possibly have been due to the abnormal conditions which prevailed in the cotton markets of Gujerat during the past two seasons and to the increasing unpopularity of the low ginning 1027 A. L. F. variety.

Although, as stated in the last year's report, the Rules under the Agricultural Produce (Grading and Marking) Act have been made applicable to 289F/1 (Sind-Sudhar), the AGMARK scheme has not been put into operation, as the major portion of the crop has not reached the standard of purity required. In regard to V. 434 cotton, the grade specifications are being given another year's trial before the system of "AGMARKING" is introduced. The

Government of Madras have also had under consideration the application of the Rules under the Agricultural Produce (Grading and Marking) Act to Co.2 cotton in the Coimbatore District, but owing to the difficulty of grading this cotton on the basis of quality factors, such as length, colour, strength, cleanliness, etc., and the fact that almost the entire quantity of this cotton is readily purchased on the spot by the local mills, the adoption of the "AGMARK" system is not considered necessary.

Universal Standards were prepared during the year for the following varieties of cotton :—

- | | |
|--------------------|-----------------------|
| 1. <i>Oomras</i> , | 3. <i>Kumptas</i> , |
| 2. <i>Broach</i> , | 4. <i>Dholleras</i> . |

Owing to the lateness of the crop, standards for *Mathios* were not prepared. At the suggestion of the Karachi Cotton Association, the preparation of standards for Bengals, Sind, Punjab-American (Roller and Saw ginned), and Sind-American (Roller and Saw ginned) has been postponed till after the war.

In view of the present abnormal conditions, it was decided not to put into operation, until the return of normal times, the two cotton marketing survey schemes recently sanctioned by the Committee, one for the Madras Province and the other for Gujerat, the adjoining Agencies and States of Kathiawar and South Rajputana.

It was brought to the notice of the Committee that mixing of old cotton (lint) with new crop was being resorted to on a large scale in Berar during the 1941-42 season. In view of the desirability of checking the malpractice before it became widespread, the Committee decided to recommend that in those provinces where the malpractice of mixing old with new crop exists, it should be laid down that the press-owner who knowingly mixes old crop with new cotton or the owner of cotton who gets the mixture pressed, should be made liable unless, when old or a mixture of old and new crops is pressed, an additional mark "old" is put on the bale. During the year it was reported that in Khandesh a considerable amount of mixing of *Jarila* with inferior types was going on in the areas outside departmental control and that there was the danger that large quantities of mixed cotton might go into the market and depress the prices. To meet this situation, the Government of Bombay issued a notification in July 1942, making the mixing of *Jarila* with inferior cotton a penal offence.

In view of the transport difficulties, the Government of Bombay convened a conference, at which the Committee was represented, to examine the possibilities of revising the Cotton Hedge Contracts. At this conference it was decided that the Hedge Contracts Sub-Committee of the East India Cotton Association should devise a new system of contract in the light of the existing conditions. Subsequently, the report of the Hedge Contracts Sub-Committee was considered by the Committee and its main recommendations approved as being the best alternative under the existing circumstances. With regard to the varieties tenderable against the new Indian Cotton Contract recommended by the Hedge Contracts Sub-Committee, the Committee suggested the inclusion of Hyderabad *Gaorani* in addition to *Gaorani 6*, *Kumpla*, Upland and Westerns and also Cambodia and Tinnevelles which, in the opinion of the Committee, more than satisfied the requirements of the new Contract. The minimum staple length of $\frac{3}{4}$ " prescribed for Fine *Jarila* was, however, considered by the Committee to be too low and the fear was expressed that this might possibly lead to mixing. The consensus of opinion was that 13/16" would have been a more correct estimate of the average staple length of *Jarila*. The Committee also recommended that trading in new crop should begin from 1st March. The recommendations of the Committee regarding the inclusion of Hyderabad *Gaorani*, Cambodia and *Karungnies* in the list of tenderable varieties were accepted.

In January 1940, the position arising from the reported shortage of cotton baling hoops was examined by the Committee and as no substitute was thought likely to effectively take the place of steel hoops, it was decided to draw the attention of the Government of India to the extreme urgency of taking immediate measures for maintaining an adequate supply of this material by arranging the import annually of some 16,000 tons of steel hoops for the specific purpose of baling cotton. In July 1942, the Committee was informed that orders had been placed by Government on America, under Lease/Lend, for 8,000 tons and 5,000 tons of baling hoops for the first and second half of 1942, respectively, apart from some 2,266 tons ordered on behalf of individual indentors. While noting this with satisfaction, the Committee reiterated its view that in order to ensure that there would be no profiteering and no discrimination in the allocation of the material to *bona fide* consumers, the work of distribution should be entrusted to the Indian Central Cotton Committee. It was pointed out that the object of the Committee in offering itself to undertake this work was to ensure expeditious and equitable distribution of the material so that the normal marketing

of the crop may not be hampered. The Government of India accepted the principle of the proposal and agreed that the distribution of hoops arriving under Lease/Lend should be made in accordance with the recommendations of the Indian Central Cotton Committee. In consultation with the Deputy Steel Import Controller, a scheme of distribution was drawn up and put into operation in the middle of August. At the same time, having regard to the position of supply of hoops in the country, it was decided that all cotton baling hoops arriving in India on account of orders placed under Lease/Lend by the Steel Import Controller, whether against Government stocks or private indentors, should be taken over under the Iron and Steel (Control of Distribution) Order, 1941, and distributed to actual users according to plan. A Sub-Committee was appointed to assist the Secretary in dealing with matters connected with the distribution of hoops. A questionnaire was sent out to all pressing factories in the country and, at the same time, the Provincial and State authorities were requested to furnish the pressings of individual factories during each of the past three seasons. At the same time, in order to exercise as complete a control as possible over the supply of hoops to pressing factories, an arrangement has been arrived at with the Iron and Steel Controller, Calcutta, whereby releases to factories from stocks held by the trade in the country are made by the Iron and Steel Controller only after consultation with the Secretary of the Committee. Applications for purchase of hoops from local stockists are also received direct in the Secretary's office and, after verification regarding the genuineness of the demand, necessary recommendations for acquirement and transport of the material are made to the Iron and Steel Controller. The object of this arrangement is to ensure that no pressing factory is put in a position to hoard stocks.

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

(i) **Cotton Transport Act.**—A brief account of the working of this Act is contained in the previous year's report and no important changes have since taken place. The Sangli State issued a Notification during the year prohibiting the import into the State of cotton from outside the Kumpta-Dharwar protected area.

(ii) **Cotton Ginning and Pressing Factories Act.**—The Cotton Ginning and Pressing Factories Act, 1925, applies to the whole of British India, and practically all cotton growing Indian States have passed similar legislation or enforced the main provisions of the Act. A brief review of the working of this Act is contained in the previous year's report and only important changes that have taken place during the year under report are dealt with below :—

Rules 8 and 10 of the Cotton Ginning and Pressing Factories Rules, 1941, under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, were amended by the Sind Government during the year, by which the Buyers' and Shippers' Chamber, Karachi, were appointed as one of the authorities (with the Karachi Cotton Association and the Karachi Indian Merchants' Association) to issue reports on moisture content of cotton and to examine cotton, etc., at the request of the Director of Agriculture.

In order to relieve to some extent the difficulties arising from the shortage of hoops, the Committee recommended that old and riveted hoops should be allowed to be re-used provided the press marks on them were obliterated so as to make them indecipherable. In this connection it was pointed out that it was practically impossible to remove the old marks or to make them indecipherable without weakening the strength of the hoops and rendering them unfit for baling purposes. The Government of India were accordingly addressed to amend Rule 7 of the Cotton Ginning and Pressing Factories Rules, 1925, to provide that in cases where a bale is bound with old or riveted hoops bearing old press marks, the special mark allotted to the press and the serial number should be stencilled on the hessian only.

It was reported last year that the Government of India had been requested to amend Section 9 (1) of the Cotton Ginning and Pressing Factories Act, 1925, with a view to withdrawing the exemption granted to small factories under the proviso to this Section as it was being taken advantage of by some ginowners in the Central Provinces and Berar. The Government of India replied to say that as such complaints had not been received from any of the other cotton growing provinces, they were not satisfied that a case had been made out for the amendment of Section 9 (1) of the Act by Central Legislation. The views of the other cotton growing provinces and the East India Cotton Association were subsequently obtained and placed before the Committee which decided that, as the malpractice was reported to be prevalent

in the Central Provinces and Berar, there was no reason why the Central Provinces Government should not go ahead with legislation for the deletion of the provisos to Section 9(1) and 9(1A) of the Cotton Ginning and Pressing Factories Act, 1925, in its application to the Province, instead of waiting for the other provinces to agree to the proposal. The Provincial Government were addressed accordingly.

Out of 70 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 60; in the remaining 10 States, pressing factories did not work during the year.

(iii) **Prevention of introduction of Foreign Cotton Pests.**—In order to prevent the introduction into India of the Mexican Boll-weevil (*Anthonomus grandis*) with imported American cotton, at the instance of the Committee, regulations have been imposed by the Government of India under which the import of American cotton into India is prohibited except through the port of Bombay where it must be fumigated with hydrocyanic acid gas before entry into the country. The work of fumigation is carried out under the technical supervision of the Secretary, and the cost involved is met by the levy of a small fee from importers on each bale of American cotton fumigated. Owing to the restrictions necessitated by the war, there were no imports of American cotton during the year under review, while 1930 bales were imported in the preceding year.

The Red (Sudan) Bollworm (*Diparopsis castanea*) and other pests.—The restriction on the import of foreign *kapas* (unginned cotton) and of foreign cotton seed remained in force throughout the year. 40 parcels of foreign cotton seed were received during the year, examined and fumigated, where necessary.

(iv) **The Cotton Control Acts.**—Cotton Control Acts are in operation in the Provinces of Madras, Bombay and the Central Provinces and in the Baroda and Bhopal States. The aims and objects of these Acts in the areas where they are in force are stated in last year's report. In so far as the Madras Province is concerned, it is reported that no breach of the Act was committed in the Coimbatore, Madura and Ramnad districts. In the Tinnevely district, 293 suspected samples were seized, of which 80 were certified

to contain *Pulichai*. Prosecutions were launched against the owners, 74 of whom were convicted; six cases are pending. The fines levied amount to Rs. 272.

In Bombay, a few petty merchants in Ankleshwar area, dealing in *Goghari* cotton were traced and prosecuted and fines imposed. The spread of Selection 1A in preference to 1027 A. L. F., in parts of Surat district where *Goghari* was formerly grown is still going on, mostly in Bardoli and Jalalpur Talukas, on account of higher ginning percentage of the former and unremunerative premium for the latter. The new Segregate 8-1, which is nearly as good as 1027 A. L. F. in staple and as Selection 1-A in ginning, is likely to replace both. This is expected to solve the problem of the tract. As stated in last year's report, the Provincial Government have drafted a Bill to replace the existing Bombay Cotton Control Act to prohibit the cultivation and handling of any specified type or types of cotton, the spread of which they may desire to restrict.

On account of the mixing of inferior cotton with superior types in the Southern Maharatta Country, a draft notification has been published by Government with a view to applying the Act to the tract in question.

In Baroda State, the Act worked very effectively during the year. There were fourteen cases of infringement, nine of which resulted in conviction. The remaining cases are pending.

The Government of the United Provinces have decided not to put into force the United Provinces Cotton Pest Control Act.

CHAPTER V.

RESEARCH

Research into cotton problems of all-India importance is perhaps the most important function of the Committee. 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. Research on cotton technology is carried on at the Committee's Technological Laboratory. In addition, trained Technological Assistants are posted at the Cotton Research Stations at Lyallpur, Mirpurkhas, Cawnpore, Surat, Dharwar, Coimbatore, and Parbhani, to help the botanists in charge in their work of breeding improved varieties of cotton.

RESEARCH ON COTTON TECHNOLOGY.

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

The total number of samples tested at the Laboratory during the period under review was 2,100 against 1,800 last year. The samples tested are dealt with in spinning, fibre test, yarn test and cloth test reports, which are issued on these samples. The number of such reports issued during the year was 1,208 against 1,046 in the previous year. Among the tests made on agricultural samples were those of *Jarila* cotton, grown in different localities in Khandesh, samples of *Jayawant*, *New Jayawant* and *Early Jayawant* to ascertain their relative suitability for the Dharwar tract ; samples of long staple cottons under trial in the Mysore State ; samples grown in mixed cultivation at Indore. In addition tests were made on a large number of representative trade samples, and the results of these tests were published for general information in the form of technological circulars and bulletins.

Samples received in the Testing House of the Laboratory from Government Departments, cotton mills and firms covered a very wide range showing the useful function fulfilled by the Laboratory in this respect and its growing appreciation by the interests concerned. These included a large variety of materials for the use of the Army, the Navy, the Air Force and the War Hospitals. An improved type of Quartz micro-balance has been designed which gives more consistent readings than a torsion balance. Several mills and firms referred their difficulties in the manufacturing processes to the Laboratory and these were successfully tackled. These included, among others, the causes for tendering of cloth, methods for removing stains in cloth, causes responsible for coloured spots in cheeses of cotton cord, relationship of mercerisation to fibre-properties.

In addition to these tests, a number of technological investigations are in progress and some of them were completed during the year. The first series of experiments on the precleaning and ginning of Indian seed cottons on different machines and with different speeds and settings was completed. The investigation on the effect of different speeds of beater and fan in the Crighton opener was pushed a stage further and a short note giving the tentative conclusions was published. Among the experiments in progress, mention may be made of the effect of employing different weights, speeds and roller settings in the draw-frame, prediction of spinning value from fibre-properties of Indian cottons, efficiency of Kier boil and bleach treatments, alternative uses for short staple Indian cottons, study of relationships between wax content, feel and fibre-weight per inch of Indian cottons, determination of the constants for finding the standard hair weight of Indian cottons, etc. In addition, the work on Indian linters was also continued and for purposes of comparison standard grades of American linters were analysed. A brochure on Technological Research on cotton in India giving a connected account of the work done at the Laboratory between 1924 and 1941 was published.

Among the other activities of the Laboratory, mention may be made of the experiments for determining the alfa-cellulose content of Indian raw materials which are being conducted for the Board of Scientific and Industrial Research. Tests are also being made on behalf of the Central Marketing Department of the Government of India on a large number of samples of Agmark cottons with a view to laying down criteria for quality.

FUNDAMENTAL RESEARCH.-

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

Genetics of lintless genes.—The study of the inter-relationships among the genes responsible for lintlessness in Asiatic cottons and the linkage relationships of these lintless genes to other known genes was continued during the year. F_2 populations of several crosses were under observation and the analysis of the results has revealed that the two genes *lia* and *lic* are independent of each other and that while both of them inhibit lint production, *lic* is epistatic to *lia*. The gene *lic* was found to slow down the growth of the plant carrying it and the gene *lia* to assort independently of the petal colour (*Y*) and anthocyanin (R_2) genes. Indication as to the independent assortment of *lib* gene with anthocyanin, flower colour and leaf shape genes was also obtained. The study of the cross, Punjab hairy lintless (*lic*) x Punjab glabrous lintless (*hb*), showed that the *lic* gene, which is independent of *lia* and *lib*, is independent of *hb* also. A germination test, intended to collect evidence on the effect of environment on the viability of the seed carrying *lic* gene, was conducted with linted and lintless (*Lic* and *lic*) seeds under different temperatures—26°C. (room temperature) and 30, 40 and 50°C. It was observed that while the percentage germination decreased with increasing temperature, there was no evidence of differential effect of the temperatures on the two types, but the mean germination percentage, however, of lintless seed (42.7) was significantly less than that of linted seed (62.3).

Anthocyanin genetics.—During the year progenies of certain aberrant plants that had occurred in the various F_2 s and backcross families and whose behaviour could not be explained were followed up. It was clear from the observations that the aberrant plants arose by mutation of the alleles of the R_2 series; in one case it was a mutation in F_1 gametes of R_2^{OS} to R_2^{AS} . In another case, the mutation was from R_2^{AS} to R_2^{AS} ; in a third case, a mutation had occurred from R_2^{VO} to “green spotless.” The behaviour of this “green spotless” isolated at Indore would appear to differ from the green spotless R_2^{VO} described by Silow and which has some pigment in the exposed petal margins.

Single leaf mutant.—Further results about the single leaf mutant mentioned in last year's report have been obtained. One of the F_2 s of the cross between the mutant and Malvi 9 (Broad leaf) gave 45 broads to 11 mutants suggesting a single factor difference. Of the segregating families only two approached a 3 : 1 ratio. In all other families the mutant types were much fewer than the expected one-fourth and the ratio between broad and mutant varied very widely with an average of 9.95 : 1. From a fresh batch of selfed seed of the F_2 plants an analysis of the embryos was made to see if any abnormal or undeveloped seeds appeared with regularity. The study, however, showed that the abnormal ratios did not arise from the production of undeveloped embryos.

Petaloidy genetics.—Seed of the petaloid mutant isolated in Coimbatore was obtained and crossed with N. 6 and Narrow *Kokati* to determine the linkage relationships of the mutant. In the cross with N. 6 the expression of petaloidy was very variable and by the test of independence, no linkage is evident between petaloidy and petal colour. Segregation for anthocyanin pigment also proved the independent assortment of petaloidy gene and anthocyanin genes. The absence of linkage was also established by a small number of backcrosses of the F_1 to the parents.

In the other cross, the F_1 s backcrossed to Narrow *Kokati* gave all normal flowers showing complete dominance of normal over petaloidy. The behaviour of the petaloid gene differently in the two crosses would indicate that its dominance relationship varies according to the background.

X-ray work.—It was reported previously that by X-raying seed of M.U.4, an Upland strain, there was an increase in ginning percentage and that this increase due to X-raying had proved significant in all the three years

of trial, 1938-39 to 1940-41. In all these years, it was the treated bulks for 10 minutes and 20 minutes that were compared against the untreated control in a replicated experiment. Since there was the possibility of the M.U.4 strain itself being variable for ginning percentage, the experiment was modified during the year and instead of growing the bulks, 10 progenies (single plants) taken from each of the treatments, A (Control), B (X-rayed 10 mins.) and C (X-rayed 20 mins.), were grown in replicated family blocks. The effect of X-ray treatment (it is X-4th generation now) was still significant, although the increase due to treatment was very much less than in the previous years where the average increase due to the treatment was about 3%. Attempts are being made to have the X-ray treatment repeated.

Wilt work.—The incidence of wilt was low in the experimental area during the year, probably owing to general shortage of rain. As in the previous year, four strains, two included in the last year's trial and two promising selections from the plant breeding section, were tested in replicated plots in the wilt-sick field. Only one family H. 52, which was found homozygous last year, again proved to be so in pot and field tests, whereas the other three strains, K. 76, F. 2 and F. 18, were homozygous in the field test only.

The genetics of wilt resistance was studied in the F_2 s of three crosses, viz., Malvi 9 x New Million Dollar *Jarila* x New Million Dollar and Malvi 9 x *Jarila* and their reciprocals. The progenies were grown in a replicated experiment in an artificially wilt-infected field. The mortality data showed that the three families are not homogenous, i.e., the type of segregation was different in each of them. The behaviour of *Jarila* x New Million Dollar was different from the other two crosses. In this, the field immune group (grade (1)) formed 28.8% and the susceptible group (grades 3-5) 16.5% of the total, i.e., a higher proportion of-immunes and a lower proportion of susceptibles than in the other two crosses. From the figures of resistant and susceptible plants obtained in the F_2 s of the crosses, Malvi 9 x New Million Dollar and Malvi 9 x *Jarila*, the ratios may be interpreted as 3: 1, as the deviations from this ratio are not significant in either family. Further discussion, however, of the ratios will have to await next year's results, as the basis of interpreting the ratios varies with each cross.

Cytology.—Hybridization was concentrated on three wild species, namely *G. Thurberi*, *G. Harknessii* and *G. Raimondii*. *G. Thurberi* crossed freely both with *arboresum* and *hirsutum*, but while some of the seeds did not have the embryos in the crosses with the former, in the cross with *hirsutum* all

the seeds have well developed embryos. A successful cross between *G. arboreum* and *G. Raimondii* was obtained for the first time. The use of colchicine for doubling chromosomes was continued in six or seven crosses and so far bolls have set only in two crosses *G. latense* x *G. hirsutum* and *G. armourianum* x *G. hirsutum*.

Physiology.—The experiment designed to study the competition effects between *desi* and selected Uplands (*viz.*, M.9, M.U. 4, Indore 1., Buri 107 and x 4463) in a mixed crop was repeated for the last time. It was observed that unlike last year Malvi 9 was significantly the lowest in stand and that pure Uplands plots of Buri 107 and Indore 1 as well as their mixtures with Malvi 9 had given significantly higher stands than the rest. In yield of seed cotton M. 9 was significantly the highest of all; among the pure Uplands, Indore 1 was significantly better than the other three. Comparing the yields of the mixtures against the average of the constituents, the mixture of Malvi 9 and M.U.4 was significantly higher than the components. The effect of competition appeared to be in favour of Malvi 9 in the case of mixtures with M.U.4 and x 4463 and in favour of Indore 1 and Buri 107 in the case of the other two. The results of the technological examination showed that among the four Upland strains, both Buri 107 and x 4463 are nearly alike in having high fibre length and low fibre weight, but it was only the latter when mixed with Malvi 9 that gave a higher spinning value. It seems evident that apart from fibre length and fibre weight, certain cottons have got some special characteristics to make them most suitable for mixing. As the experiment has now been closed, the results will be written up.

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.

During the year under report, Segregates, 76-1, 1-2, 1-6, 5-18, 7-29 and 3-1, were tested in wilt-free soil on the farm against B. D. 8 and Broach local for yield. The results showed that though all of them were as good as B. D. 8 in respect of yield, they were significantly poorer than the local. All the segregates maintained their high ginning percentage of 42-44 against 35% and 43% of B. D. 8 and Broach local, respectively. Their lint yields per acre were significantly higher by 27-37% than that of the quality strain B. D. 8, but 10 to 16% less than that of the Broach local. In the wilt-sick plot, the local was more affected than either B. D. 8 or the segregates.

Village trials were carried out with segregates, 1-2 and 1-6, B. D. 8 and Broach local, in four centres, 3 in black soil and 1 in *gorat* soil, of the Broach district. The yield of Segregate 1-2 was found to be on a par with B. D. 8 and Broach local at Kelod, a black soil centre; at Nabipur, another centre in black soil, both the segregates yielded as well as B. D. 8. The results at the remaining centres were not significant. The ginning outturn of the segregates was higher than that of B. D. 8 at all the centres and equal to that of the local at Nabipur and Kelod. The spinning test results indicated that both the segregates, 1-2 and 1-6, are superior to Broach local in spinning value, being adjudged suitable for 41's and 45's highest standard warp counts, against 13's of the local. On the basis of mill valuations, it is stated that the segregates realised Rs. 7 more per acre than B. D. 8 and Rs. 20 more than Broach local. In respect of acre cash values, the new strains—1-2 and 1-6—fetched in 1940-41 Rs. 11 and Rs. 13 more than B. D. 8, but Rs. 7 and Rs. 9 less than the local, respectively. Broach local is reported, however, to have given abnormally high yield of seed cotton during the season in question.

To obtain further improvement in fibre length and feel, the segregates, 1-2, 1-6 and 5-18, have been crossed with 1027 A. L. F.

Under the wilt-breeding part of this scheme, the object is to evolve a cent per cent wilt-resistant type from the material available at Broach. The

testing, during the year, for 100 per cent wilt resistance in pot culture at Poona was confined to the most promising segregates, 76-1, 1-2, 1-6, 5-18, 7-29 and 3-1. With the exception of 76-1, all the segregates showed a high degree of wilt resistance.

The study of the F_3 of the cross (K. F x 1027 A. L. F) and the back cross (K. F. x 1027 A. L. F.) x K. F. has confirmed that resistance to wilt in *G. herbaceum* is due to a single factor.

(b) **Jalgaon Cotton Breeding Scheme**—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridization, 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 review 18 cultures of *Docras* cotton were tested against *Jarila*; of these 15 failed, while the remaining three were on a par with *Jarila* in respect of yield but superior to it in ginning outturn by 1 to 3% and in staple length by 0.1 to 2 mm. The behaviour of these three promising cultures in the wilt plot indicated a gradual building up of resistance in all their sub-cultures except three which showed high mortality.

Segregates from the following crosses were under observation :—

- (1) [(*Jarila* x N.R. 5) x New Million Dollar] F_3 .
- (2) (*Jarila* x N.R. 5) F_4 .
- (3) [(*Jarila* x New Million Dollar) x *Jarila*] F_2 .

All the cultures, except one from the first cross, proved to be undesirable in all respects; out of four cultures from the second cross tested in a replicated trial, only one did not give any significant yield. All these cultures, however, were superior to *Jarila* in respect of ginning percentage and equal to it as regards lint length. Twenty-two plants with high ginning percentage and staple length have been selected from the third cross for further study. A new cross has been made during the year, between *Jarila* and N. R. 5 and the F_1 is proposed to be backcrossed to *Jarila* to combine the staple of *Jarila* with the high yield and ginning of N. R. 5.

Village trials, undertaken in 33 centres of Khandesh, with *Jarila* and local, did not reveal any significant differences in yield.

Comparative yield trials of *Jarila*, *Banilla* and N.R. 6 were conducted on Jalgaon, Bhadgaon and Dhulia farms. At the former two places the yield of *Jarila* was equal to that of N. R. 6 but superior to that of *Banilla* while at the latter place N. R. 6 gave the highest yield ; between *Jarila* and *Banilla*, however, there was no difference in respect of yield. *Jarila* was valued at Rs. 90 to Rs. 110 'on' Broach per candy of 784 lbs. by the Mill-owners' Associations of Bombay and Ahmedabad.

Under the wilt-breeding part of this scheme, progenies of 14 plants of two cultures of *Jarila* were tested in pot culture. All the cultures showed a high degree of mortality ; the tests will be continued.

(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, the following crosses were tested in the wilt-sick plot at Shera :—

- (1) [(B. D. 8 x 1 A. L. B.) x 1027 A. L. F.] F₈.
- (2) (8-1 x B. D. 8) F₃.
- (3) [8-1 (B. D. 8 x G. A. 26) x B. D. 8] F₆ 1-6] F₃.
- (4) [1027 (B. D. 8 x G. A. 26) x B. D. 8] F₆ 1-6] F₃.
- (5) (8-1 x 1027 A. L. F.) F₇.

As none of the plants of the first two crosses showed the desired combination of characters, it is proposed to discontinue further work on them. The remaining three crosses gave respectively 6, 11 and 2 families which are promising in respect of wilt resistance and other agricultural characters.

The wilt resistance of Segregate 8-1 was confirmed in field tests at Shera, but in the pot culture tests at Poona, it suffered a mortality of 93%. It is proposed to test it further at Poona in the ensuing season.

(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 report, 29 families derived from the local *Wagad* and the hybrid population of crosses and back-crosses were tested in two randomised and replicated experiments. Families 293 and 72-2 were found to yield significantly better than *Wagad* 8 and 18 other families were on a par with it. The ginning percentage, however, of the two high yielding families was lower than that of the control, but it is stated that there is scope for further improvement in this character. Of the latter set of 18 families, eight were promising in respect of fibre characters and early maturity.

Three hundred and sixty-nine selections from the crosses of *Wagad* with Surti Broach, Iranian quality cottons and Russian *herbaceums* were grown in non-replicated progeny rows and forty-four families have been retained for further study. The study of a large number of plants of local *Wagad*

raised from the seed samples collected from Porbunder and Junagadh States is reported to have shown the limitations of the scope for effecting further improvement over the standard *Wagad* type—*Wagad* 8. Seg. 4-1, a derivative of the back-cross—(W. 8 x 1027 A. L. F.) F₁ x W. 8—which was included in the village trials along with local *Wagad* and *Wagad* 8 for six seasons in Viramgam taluka where the vagaries of the season are great, however, gave on an average 8% more *kalas* (dry bolls with seed cotton), 7% more seed cotton, 21% more lint and 5.6% higher ginning percentage than the local *Wagad*. It has also been found to do well in years of favourable rainfall and fetches a premium of Rs. 5 to Rs. 15 over *Wagad* 8. It is accordingly considered to be a profitable type for general cultivation.

As a result of large scale variety trials carried out in the past, an open-boll type, Seg. 7-1, derived from the cross W. 8 x 1027 A. L. F., has been found to be promising in the Lali tract of Mehsana *Prant*. It is superior to Chokadia Broach 9 and Broach local in respect of lint yield and ginning outturn and approaches 1027 A. L. F. of Surat in spinning value. Village trials of this type are proposed to be carried out in 1942-43 in Lali tract of Ahmedabad District.

(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 soil, whilst 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 the introduction and trial of other perennial or annual cottons, to replace the *Rozi* type on the *goradu* soils of the Kaira district.

During the year under review, the progeny of *Rozi* cotton seed samples collected from representative villages of 9 different talukas in the tract were examined and 55 plants with ginning percentage of 20.7—37.2 and staple length of 17.1—23.4 mm. were retained for further study. The growth and bearing of the indigenous and exotic perennial varieties were not found to be impressive. Most of the American annual types also did not come up well.

The Broach segregates, *viz.*, 76-1, 1-2, 1-6, 5-18, 7-29, 3-1 and B. D. 8, were tested against the local *Kanmi* in a varietal trial. The lint yields per acre of segregates 1-2, 1-6, 5-18 and 7-29 were on a par with that of *Kanmi*, while those of 76-1, 3-1 and B. D.8 were statistically lower. An analysis of the cotton types grown in the district showed that *Kanmi* is composed of two main varieties, Broach *Desi* and *Goghari*, the proportion of *Goghari* being higher than Broach *Desi*; no distinct types were found in *Rozi*.

The examination of cotton plants undertaken during a survey of cotton diseases prevalent in the Kaira district showed that the majority of the plants of *Kanmi* variety were attacked by root rot while a few were also affected by wilt. Plants of *Rozi* variety did not, however, suffer from these diseases. Stenosis (small leaf) was observed both in *Rozi* and *Kanmi* cottons.

(f) **Scheme for interspecific hybridization in cottons at Surat.**—This scheme was sanctioned by the Committee in January 1938, for a period of five years, with the object of obtaining, if possible, fully fertile hybrids between Asiatic and American cottons, combining the useful agronomic characters of both, particularly the good staple length of the American and 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.

During the year under report, it is stated that 41 F_1 hybrids (Asiatic x American) and 46 first back-cross plants were under observation. The set

of back-cross plants is considered to be a permanent source of material for selection of stable types as 40 of them are more or less fertile and most of the plants contain 52 chromosomes. Fertility has been induced in the F_1 hybrids, which were all self-sterile, by back-crossing them to new world types; nearly 174,000 flowers were pollinated, and 91 bolls, having 128 seeds, have been obtained.

Colchicine having proved an effective chemical for restoring fertility was repeatedly tried on the F_1 hybrids. Out of the 15 hybrids thus treated, three showed the effect of the chemical and two set a number of bolls with many seeds. Back-crosses 22, 68, 125, 134 and 170 are stated to be valuable from the economic point of view. Some of the cultures obtained from these back-crosses were found to be superior in respect of lint length, ginning percentage and earliness. Attempts are being made to synthesise the desirable characters in one type by using these promising cultures as parents in crosses. It is reported that hybridization between a tetraploid and hexaploid and between a hexaploid and an octoploid showed that too much increase in the chromosome numbers adversely affects the normal growth process in the plant.

Cytological work has helped in explaining the causes of sterility met with in the several crosses and in judging the chromosomal balance of the fertile back-cross cultures.

SIND.

(a) Scheme for production of long staple cottons in Sind.—Ever since the opening of the Lloyd Barrage, the question of the establishment of a compact block of long staple cottons in Sind has engaged the attention of the Indian Central Cotton Committee. Although attempts in the introduction of long staple quality cottons in Sind, in the past, have not met with the success it was anticipated they would, the project, nevertheless, is considered to have possibilities which are well worth investigating. Accordingly, a five-year scheme for cotton-breeding investigations for the production of long staple cottons has been launched. The scheme came into operation in April 1940. The experimental stations are situated at Mirpurkhas and Oderolal. The most important problem to be tackled is to see whether high quality cottons, preferably of the American types, but possessing a better staple than Sind *Sudhar*, can be produced. The aim is to evolve a cotton longer than 1-1/16" which would spin about 60 counts and give a high acre cash value off

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 report, the progenies of 144 selections from each of the two groups of cottons, *hirsutum* and *barbadense*, were examined for desirable combination of characters; sixteen from the former and twenty-three from the latter have been retained for further study. The F₁ progenies of the crosses between each of the long staple Upland types imported from U.S.A. and the two local strains, Sind *Sudhar* and M-4, are reported to have shown no appreciable differences as regards staple length; in respect of ginning outturn, however, the M-4 crosses were better than Sind *Sudhar* crosses. The F₁ population of the crosses between Sind *Sudhar* and the imported types was raised at Coimbatore during the period, October-April, 1940-41, and the F₂ generation was grown at Mirpurkhas during the year under review; out of a population of 754 plants examined, 57 were found to possess a staple of 1-1/16" and over. Twenty-two of these were obtained from the cross, Sind *Sudhar* x Wilds strain, and thirteen from Sind *Sudhar* x Express. All the crosses were appreciably superior to Sind *Sudhar* in respect of ginning percentage.

In the experiment, ridge *versus* flat sowing, the yield obtained from flat was significantly greater than that on the ridge, in spite of the stand on the flat being significantly poorer than on ridge. The result is contrary to that of last year and it is proposed to repeat the experiment in the ensuing season.

(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 cottons resist jassid attack. In January

1941, the scheme was extended up to 18th April, 1945. The progress made during the period under review is described below :—

During the year under review, six varieties, viz., Sind *Sudhar*, M-4, N.T. 38, 4F-98, L.S.S. and S.L.D. 1, were tested for their susceptibility to jassid attack. The measure of susceptibility in this study was the number of jassids attracted. Viewed in this light, 4F-98 and Sind *Sudhar* appear to be the most susceptible varieties, whilst S.L.D. 1 is highly resistant. An examination of the varieties and crosses raised in the Long Staple Cotton Scheme has indicated that Acala-8 is markedly susceptible and that amongst crosses those of M-4 are less susceptible than those of Sind *Sudhar*. Varietal differences in the degree of resistance are attributed to the inhibition to a greater or less extent of the oviposition of the insect. It is stated, however, that the density of jassid population attracted by a variety is not necessarily related to the amount of damage caused to it.

In the seasonal sowings, it was found that the May sown crop suffers more from pest attack than the March-April sown crop. The jassid population increases, irrespective of variety, by the beginning of July, reaches the climax in late July or early August and declines from mid-September. *Bhindi*, brinjal and potato are the important alternative host plants in Tharparkar district which help the pest to tide over the period intervening between two successive cotton seasons.

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

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

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

During the year under report, the study, in Sind, of the life-history and seasonal behaviour of the cricket showed that it does not hibernate in any season. It is found throughout the year, being abundant from April to July. Baiting material was distributed to the infested cotton growing centres on the Indus Right Bank from three depots in the Larkhana district and from six depots in the Dadu district, and the efficacy of the poison bait was also demonstrated to the *zamindars* who were, at the same time, advised to dig a trench round their cotton fields and keep it filled with water. Flooding the fields and the surrounding trenches with water was advocated as a measure for driving out the pest.

It is reported that many *zamindars* availed of the help given by way of free supply of the baiting material and that the more enlightened unhesitatingly adopted the measures recommended.

(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 3½ 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 the succeeding year's crop. The investigations are confined to the Tharparkar district.

During the year under review, the incidence of the pest was studied from August to October in 19 different localities selected at random in Tharparkar district. As in the previous year, it was found that the bollworm attack on cotton in areas, where the rice crop preponderated, was on an average 29.8% ; in areas growing partly rice and partly cotton, the mean attack was 12.2% and in areas growing cotton mainly, the attack was comparatively mild, the average being 6.3%. The night caging experiments

conducted at four different centres are reported to have shown that the loss caused by the pest to Sind *Sudhar* in the mixed area was about twice as much as in the purely cotton area. Data from the centre in rice area, however, could not be gathered owing to severe damage to the night cage.

Large numbers of the larval parasite of the spotted boll-worm—*Microbracon lefroyi*—collected from the South-Eastern Punjab, were liberated in the cotton fields of Gammuri and Bodar farms in the Umerkote taluka and some also near Digri and Mirpurkhas. Observations showed that the percentage of parasitism in the first half of August was 55.2 at Gammuri and 21.6% in Bodar, but from the second fortnight, it gradually decreased, until in November it ranged from 5 to 20% at both places.

Seven thousand five hundred *kudalis* were distributed during the year in the selected area (87,478 acres) for the clean-up operations, *i.e.*, roughly one *kudali* for 12 acres. The removal of cotton stalks began in December-January and the campaign in 97.1% of the area was completed by the close of February; 90.7% of the area was cleaned up by the use of *kudali* and the remaining by means of the indigenous hatchet. Further, the eradication of the important alternative host plants, *viz.*, *Patiteer* weed (*Abutilon indicum*), *Bhindi* and *Gulkharlo* (*Althea rosea*) was also completed in the clean-up area. The effect of the wide campaign carried out, however, will not be known until about the end of the next cotton season.

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 improved Punjab-American strains, *viz.*, 289F/43, L.S.S., 289F/K.25, are now under large scale cultivation in different regions of the province. L. S. S. is said to preponderate in the districts of Lyallpur, Sheikhpura and Sargodha, 289F/43 in the south-western districts and parts of Lower Bar Doab Canal Colony, while 289F/K.25 is the chief variety in Multan and parts of Montgomery. Though these varieties are a great improvement over the original type 4F, each of them is still found to be defective in certain characters, *e.g.*, 289F/43 is a low ginner, L. S. S. is late maturing and 289F/K.25 is highly susceptible to jassid infestation; efforts are, therefore, being made to remedy these defects by re-selection in the respective varieties. It is stated that a few high ginning selections from 289F/43 are on hand and that jassid resistant types are being evolved from the cross between 289F/K. 25 and 289F/43.

Two new American types, 124F and 199F, evolved under the scheme are reported to deserve special mention. The former, which has been extensively tested, has proved to be one of the best cottons for cultivation in the south-western districts of the Punjab and the Lower Bari Doab Canal Colony. It combines an average lint length of 0.98" and 34-35% ginning outturn with high yield. The second strain, 199F, is said to be a potentially better yielder than most of the present Punjab-American strains; it possesses, in addition to a staple length of 1" and ginning percentage of 33-40, marked capacity to resist jassid attack.

The breeding of *desi* cottons, suitable for the different ecological regions, gave 39 Mollisoni, well established now over vast areas in the Colony districts, and 119 Sanguineum, suitable for the south-western tract. However, the recent general slump in prices of *desi* cottons has militated against the spread of these types. During the year, Jubilee gave, on the Military farms at Okara and Iqbalnagar, an average yield of 11.1 maunds and 10.7 maunds, respectively, against 10.0 and 9.9 maunds obtained from 39 Mollisoni.

Two new sub-stations, one at Jhang, for breeding American cottons, and the other at Hansi for work on *desi* cottons, have been started on 1st April, 1941. Work on the improvement of *Kapara* cotton was taken up at the Agricultural Farm, Ferozepur.

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

During the year under review, owing to low incidence of jassid attack at Khanewal, it was not possible to judge precisely the purity of the hybrid progenies for jassid resistance. The purity of these progenies in respect of halo length and ginning outturn also could not be established as, owing to heavy *tirak* attack, only a few well opened bolls were obtained. Several progenies evolved from the back cross, (289F/K. 25 x 289F/43) x 289F/K. 25, are, however, said to be promising as regards jassid resistance. Efforts are being made to breed jassid-resistant strains possessing similar lint length and ginning out-turn as 289F/K. 25 from the following crosses also :—

1. (4F (Sakrand) x 124F) x 4F,
2. (920 Cambodia x 58F) x 124F,
3. (920 Cambodia x 58F) x 289F/43,
4. 124F x L.S.S.,
5. 124F x 289F/K. 25.
6. Co.2 x Sind *Sudhar*.

It is stated that mass selection adopted on the British Cotton Growing Association Farm with a view to eliminating plants with low ginning percentage and plant habit differing from the normal has substantially increased the ginning outturn and homogeneity of the 289F/K. 25 cotton crop and that as the immediate objectives have been attained, further improvement will be looked for in pure line selection.

(c) **Physiological Scheme.**—Partial failures of the American cotton crop in the Punjab occurred in the years 1919 to 1921, 1926 to 1928, 1931 and 1932. The external symptoms of the cotton plants during these failures were early reddening and shedding of the leaves, premature opening of the bolls with immature seeds and low quality lint and, in extreme cases, the dwarfing of the plants. To account for these failures, various views were advanced, such as the heat stroke theory (Milne, 1924), attack of White Fly (Roberts, 1929) and unfavourable combination of climatic and biotic factors (Trought, 1931). As, however, these theories could not be supported by sufficient data, it was thought that the failures might be due to malnutrition of the plant and a physiological scheme was accordingly started by the Committee in March 1935, to study the physiology of the cotton plant with a view to determining, if possible, the nature of the nutritional disorder, its causes and the measures necessary to combat it. The scheme started work in 1935. In March 1937, the Empire Cotton Growing Corporation loaned the service of Dr. Mason to the Committee to inspect and report on the scheme and, on his recommendation, a soil survey on a large scale was undertaken to connect up soil conditions with cotton failure. The scheme is due to terminate in March, 1943.

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

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

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

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

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

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

Two schedules have been prepared on the basis of experiments conducted during the past few seasons ; one giving details of the optimum sowing time for the commonly-grown American varieties in the different districts, and the other furnishing particulars of the changing seed rates and spacings with the advancing sowing dates.

Several experiments conducted to investigate the need for additional watering late in October showed that neither early nor late sowings profited by an extra watering after the 15th October. The late sown crop practically finishes at the same time as does the early sown and thus there is no special danger of frosts to the June sown crop. In addition late sowings of cotton fit in well in the agricultural programme. Further, late sown crop if closely spaced (2 ft. distance between rows) suffers much less damage from jassids than that spaced widely (3 ft. distance). It was observed that the jassid attack

was severe whenever the June sown plants did not make sufficient growth on account of salinity near the soil surface.

During the year under report a large number of farms located in the different circles of Montgomery, Multan and Sarghodka districts have been selected and sowings of cottons have been arranged according to the two schedules referred to. In addition several plots to demonstrate the importance of deferring sowings have been arranged in collaboration with the district staff.

The work during the season has revealed that the greater spread of '*tirak*' in certain years is explicable in terms of the interaction of saline subsoil conditions with the temperatures during the months of September and October. Whenever September and October are hot and dry the internal water relations of the plant are unusually strained in soils which are saline in the subsoil. '*Tirak*' in such years is intensified, besides, it spreads to patches, which have medium or low salinity.

The correlation coefficients between the temperatures above normal during the spell of eight days or more in the months of September and October and yields of cotton from 1921-40 for three different districts and for three commercial farms had been worked out and it was found that the correlation between two factors was negative. Thus higher temperature than normal during the spells of dry and warm weather were associated with low yields.

The development of '*tirak*' on a field has been found to depend on three factors: (1) degree of salinity in the subsoil, (2) temperatures in the months of September and October and (3) sowing time. The interrelation of these factors is as follows:—

1. Under given conditions of temperature and sowing date resistance to '*tirak*' declines as salinity increases.
2. Under given conditions of salinity and sowing date resistance to '*tirak*' declines as the temperature in the month of September or October increases above normal in long continuous spells.
3. Under given conditions of salinity and temperature resistance to '*tirak*' increases as the sowing time advances from May up to the end of June.

The causes of variations in the yields of *kapas* in the same field from year to year are explainable on the basis of the above three principles.

(d) **Root Rot Scheme.**—This scheme, which was sanctioned by the Committee in 1932, is concerned with the investigation of the cause and control of root rot in the Punjab, where, particularly in the canal irrigated areas, the annual damage done to cotton by this disease is estimated at several lakhs of rupees. Both *desi* and American varieties are equally affected by the disease which makes its appearance towards the end of June and continues up to the middle of September. The organisms responsible for the disease are *Macrophomina phaseoli* and *Corticium solani*.

During the year under review, the experiments conducted in different places, under canal irrigated conditions, generally corroborated the results obtained in the previous years, *viz.*, that the incidence of disease is high in the May sown crop and is markedly reduced in the early and late sown cottons, and that the disease is effectively checked when cotton is grown mixed with *moth*. In view of the effectiveness of late sowing in the control of *tirak* in addition to root rot, June sowing is now being adopted as a general practice by the cotton growers in several parts of the canal colonies.

The efficacy of mixed cropping with *moth* in the control of the disease was found to be greater when both crops were sown on the same day than when *moth* was sown a month later. The increase of yield in plots grown mixed with *moth* was markedly greater in the case of American cottons than in that of *desi* cottons. The differences in yield have, however, not been statistically analysed.

(e) **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.

During the year under review, jassid attack, was severe at Lyallpur, Okara, and Sargodha, mild at Montgomery and Jhang and negligible at Khanewal and Multan. Of the seven varieties tried in a replicated experiment to test their response to jassid infestation, 289F/K.25 and 124F were found to be most susceptible and 199F most resistant; the remaining four—L. S. S., 4F, 289F/43 and 148F—occupied intermediate positions.

The study of the effect of agronomic factors on jassid population showed that the different spacings did not affect the population while heavy irrigations were conducive to greater concentration of the insects. Of the morphological characters, density and length of hairs on the leaf veins appeared to contribute to resistance in the case of the American varieties; this correlation, however, did not hold good in the case of *bhindi* and 39 Mollisoni.

Cambodia Crosses stood up very well, showing no appreciable ill effects of the attack even under severe conditions of infestation.

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 hybridization, 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, possesses a staple capable of spinning between 20s to 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 work done during the year is described below under 'Central Provinces Cotton Breeding Scheme' and 'Berar Cotton Breeding Scheme.'

The Central Provinces Cotton Breeding Scheme is concerned with the breeding of improved strains of cotton suitable for Nagpur, Wardha, Chanda and parts of Chindwara districts and capable of replacing the ordinary short staple mixed cotton of these areas.

The total area under V. 434 in different parts of the province during the year was some 4.1 lakhs acres, against 2.72 lakhs acres in the previous year. Of this, the area in the Central Provinces was about one lakh acres and that in Berar 3.1 lakhs acres, compared with 63,471 acres and 1,96,389 acres, respectively, in the previous year. The yield of V. 434 on the Government Farm, Nagpur, averaged 472 lbs. per acre while on the Akola Farm, it was 745 lbs. per acre.

During the year, a large number of selections¹ derived from Bani x *Cernuum* cross, H. strains, V. 434, local *Jadi*, etc., were tested in single

lines at Nagpur and 162 plants with a lint length of over $\frac{3}{8}$ " and a ginning percentage of 33 to 42 were selected for further study. Another set of ten progeny bulks, which have been breeding true, were grown in small randomised and replicated plots, with V. 434 as the control. Progeny No. 6 gave significantly higher yield than the rest except No. 7; another progeny "1" is said to be superior to the control in respect of lint length and ginning percentage.

Yield trials were carried out with V. 434, H. 415, H. 420, *Jarila* and local *Jadi*, in 30 representative centres of Nagpur, Wardha and Nimar districts in the Central Provinces. Eight trials failed completely, and in eight others, H. 420 was either on a par with the local or superior to it; in five of the remaining trials the local *Jadi* proved to be the best in respect of yield. The H. strains—H. 415 and H. 420—however, proved distinctly superior to V. 434 as regards quality of lint and ginning percentage. Both these strains have been adjudged suitable for spinning up to 34s highest standard warp counts against 26s of V. 434 and 24s of *Jarila*.

The Cotton Breeding 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. At the Akola farm, 564 plant progenies—426 of *desi* and 138 of Buri—were raised; 15 from the former and 7 from the latter appeared to be promising.

Eight promising *desi* selections were tested for yield against V. 434 and local *Jadi* in small randomised plots. Selection No. 487 and the local *Jadi* gave significantly higher yield than the remaining strains but the difference in yield between the selection and *Jadi* was not significant. Selection No. 487 has an average staple of 12/16" to 13/16" and a ginning outturn of 40%.

District trials were carried out with the same strains as in the Central Provinces, viz., V. 434, H. 415, H. 420, *Jarila* and *Jadi*—in 30 representative localities of Berar. The results showed that in only 10 trials was the 'Z' test satisfied.

During the year, Buri 103 and Buri 107 were tested against the local Buri in 7 centres in Berar and the Nimar district. In two trials, Buri 103

gave significantly higher yield than both Buri 107 and local Buri. The results of the remaining five trials showed that the yield differences between the varieties were not statistically significant.

On the Akola farm Buri 107 gave an average yield of 953 lbs. per acre. The total area under this strain in the Burhanpur tahsil of Nimar district was about 34,000 acres.

MADRAS.

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

As in previous years, two generations of plants were raised during the year, one from March to August at Srivilliputhur and the other from September to March at Coimbatore. Unlike in previous years the plant mortality which used to be practically nil at the former, and high at the latter centre, was equally high at both centres during the year. The conditions were therefore favourable for marking out the resistant biotypes. Co. 2 recorded an average of 20 and 24% mortality and 78 and 74% adult emergence at Srivilliputhur and Coimbatore, respectively. Twelve cultures were tested at Srivilliputhur of which four recorded statistically higher yields and mortality below 10%. Out of thirty one cultures tested at Coimbatore, five alone combined yield and pest resistance. Two of these were consistently better in both the characters during the past two seasons. Resistant cultures 7178A/A. 1, 7178A/A. 2, 7178A/A. 3 and 7178-1/D. 1 of which mention was made in the last report recorded low yields during the year, and were discarded despite their past resistant quality. In addition 265 and 1317 cultures were tested in progeny

rows at Srivilliputhur and Coimbatore, respectively. Of these, 424 had higher yields and better insect resistance than the standard Co. 2. Forty-six cultures showed no deaths at all; most of the promising cultures were derivatives of crosses between the poor yielding, late maturing, pest resistant cultures and the more productive, early maturing but insect susceptible strain of x 4463. The results indicated that this kind of crossing had been useful.

Experiments were laid out to find out if planting of other crops with cotton would reduce the weevil incidence. *Cumbu* (*Pennisetum typhoides*), *Tenai* (*Setaria italica*) and *Ragi* (*Eleusine coracana*) were planted along with Co. 3, a susceptible strain of cotton. It was observed that *Cumbu* and *Tenai* were too aggressive to permit the normal growth in cotton and as a result the yields were low. *Ragi* was the best for growing in association with cotton as the yields of both the crops were fairly high. There was however no appreciable reduction in plant mortality. The object of the experiment was thus not fulfilled, although indications were obtained about the greater remunerativeness of mixed cropping.

(b) Scheme for Improvement of Mungari Cotton in Madras Province.— This scheme was sanctioned by the Committee in 1937 and has for its object the evolution of strains suitable to the red soils and combining the quality of the *Westerns* with the yield of *Mungari*, to replace the inferior *Mungari*, the existence of which affords opportunities for mixing, with the result that the better cottons of the tract fail to get their proper value. On the black soils of Anantapur, Bellary and Kurnool districts of the Madras Province, cottons commercially known as *Westerns* and *Northerns* are grown. These are medium staple varieties, capable of spinning 24s to 32s. The type of cotton grown on the red and mixed soils, on the other hand, is that known by the name of *Mungari*, which is a coarse, short staple variety, similar to *Bengals*, and not fit to spin more than 8s or 10s. The co-existence of these widely different varieties in the same tract favours undesirable mixing, with the result that the better cottons suffer in value. It is to overcome this difficulty that the Mungari scheme was started.

During the year under report, the sowings commenced late owing to the partial failure of the seasonal rains; as a result, yield levels were low and the small leaf disease was not much in evidence. Ten strains including *Jarila*, x 4463, Co. 4, 710, V.434 and 6042 were tested for yield against *Mungari* on both red and light black soils. Four were equal to the standard. One of these—

strain 6042—was uniform in its behaviour for the past three seasons. It is capable of spinning 40s but its ginning outturn is low. Strains V.434 and Co. 4 were definitely lower than the control in respect of yield on the red soil. Five of the above strains were compared in three other taluks. One, *viz.*, strain 710, was distinctly better than the standard in two taluks and lower in the third. Another strain—6042—was equal to *Mungari* in the three taluks.

During the year under review three hundred and nine cultures were tested in single rows but only eleven were found to be superior to the control. Experiments were carried out to study the effect of time of sowing on the yield of the varieties and on the degree of incidence of the small leaf disease. In the varietal test, the results were not decisive, while in the other, the disease was absent in the later sowings. Experiments were also designed to determine the nature of the small leaf disease. Plants grown in insect proof cages were grafted to the diseased plants and 51% of the grafted plants were found affected by the disease. When the cotton plants were infested with certain bugs that cause similar disease in other crops, it was found that none of them was able to transmit the disease. It was therefore inferred that the disease might be of virus origin.

The experiments laid out during the year, to determine the efficacy of the cucumber crop for controlling the red hairy caterpillars, indicated that the damage could be lowered considerably by growing this crop all round the plots and by a systematic picking of the caterpillars from these plants.

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

As the Cocanadas cotton is cultivated on both black and red soils, arrangements were made to sow the seed material at two places, *viz.*, at Narasurupet to represent the red soils, and at 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 were 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.*, x 20 with higher grades up to 5. Besides, a Cambodia strain having lint of grade 1 was crossed with cottons of grade 6 and 7 with the object of evolving a type of American cotton suited to the red soils of the tract. The studies also indicated that it would be necessary to determine whether the lint colour standards used by the trade were the result of genetic or environmental factors. Such a clarification would be necessary since, in case the former set of factors was found responsible for deeper colour, it would not be possible to combine lint length and colour owing to the negative correlation existing between them.

During the year under report, eight hundred and thirty cultures were grown in progeny rows. The examination of cultures sown in July alone had been completed. Twenty two out of one hundred and twenty one were pure for deeper colour. Eight of them had high ginning percentage and fairly good lint length. When the collections made in the survey were tested in progeny rows, it was noticed that those made in Godavari district had high heritable variability for colour of lint and those from other districts showed low variability. In addition, seeds from three villages reputed for high yields were sown for comparison with the standard Cocanadas strain x 20 in August and September. The results indicated that the bulk from Gollaprolu in Godavari district contained a larger number of plants with high productivity. Observa-

tion plots with Cocanadas strain x 20, Gurzala bulk, Kanigiri bulk, and local bulk as variants were arranged at three centres in Nellore district with the object of finding if x 20 would replace the local white cotton which is an undesirable cotton in a tract growing coloured cottons. The results showed that in two places x 20 outyielded the local, while in the third it recorded a lower yield. The Gurzala bulk which was considered by the trade as No. 1 cotton for the tract not only yielded less but also deteriorated in colour.

UNITED PROVINCES.

The United Provinces Botanical Scheme.—This scheme was sanctioned by the Committee in 1938 for a period of five years. The object of the scheme is (1) to develop improved strains of Bengals cottons, for the rain-fed and irrigated tracts of the United Provinces, from the material collected in the course of the survey of cottons in Rohilkhand and Bundelkhand, (2) to test the suitability of the United Provinces improved cottons—C. 402, C. 520 and Perso-American—against local and other promising introductions, both on Government farms and cultivators' fields, and (3) to investigate the possibilities of American cottons under the United Provinces conditions.

The comparative yield trials of C. 520/2, C. 402/6, strains A. and D from the survey material and Perso-American, carried out during the year at 9 centres under irrigated conditions, with C. 520 and local *desi* as controls, are stated to have established, for the third time in succession, the general superiority of the survey variety 'D' in respect of yield. This variety gave the highest yield at five centres and C. 520/2 and Perso-American the highest yield at two centres each. Strain 'D' outyielded C. 520 significantly at four centres and C. 520/2 at two centres. In respect of quality, strain 'D' compares favourably with C. 520, and in respect of ginning percentage it is definitely better. The comparative acre cash values show a profit of Rs. 3-4-0 and Rs. 1-2-0 for 'D', over C. 520 during the years 1939-40 and 1940-41, respectively. Under unirrigated conditions the results were inconclusive, as almost all the experiments failed due to late rains and prolonged drought.

In the trials designed to study the behaviour of the Punjab-American types, L.S.S., 289F, N15, 100F, 83F, under the United Provinces conditions, Perso-American was outyielded significantly by L.S.S., 289F and N. 15. The latter were also much superior to Perso-American in respect of spinning performance. The experiments conducted are reported to have indicated

the possibility of establishing in the United Provinces long staple cottons spinning over 30 counts. Perso-American is said to be gaining popularity in the Province ; its acre cash value is estimated at Rs. 39-14-0 more than that of C. 520.

BENGAL.

(a) **Comila Cotton Scheme.**—This scheme was sanctioned in February 1933 and came into operation in December 1934. It is concerned with the improvement of the commercial characters of *cernuum* cotton by the isolation of coarse, high ginning and good yielding strains suitable for mixing with wool. In view, however, of the apparent absence of *cernuum* cotton and predominance of *neglectums* in the tract, it has been decided to extend the breeding work to the *neglectums* and to find out whether useful ecotypes suitable for Chittagong hill tracts can be isolated from the *cernuum* collection obtained from the Garo hills of Assam.

The season during the past year was very unfavourable for the cotton crop due to unprecedented rainfall of 125" against the normal of 95", and some of the experiments had to be abandoned. Sixty-five cultures were tried in replicated progeny rows but 38 had to be discarded due to poor stand. Significantly better yield was obtained in eight cultures, but only four of these gave better ginning outturn also.

The survey of the Bhomong Circle was completed and the samples collected were found to possess a high ginning outturn (42%) and a coarse short staple (18 mm.). A wide range of samples were also collected from Manipur State, Naga hills and Garo hill district for trial under Chittagong conditions. Two yield trials were conducted on the Sapchhari *Jhoom*, one with five strains and the other with six, but owing to bad season, the yields were low and the differences between the strains were not statistically significant. Strain No. 9 gave the best yield. The ginning outturn and coarseness of the cottons, however, were not affected by the abnormal conditions. While the crops within a radius of 105 miles of the *Jhoom* completely failed, the improved types gave some yield indicating that they can stand the adverse seasonal conditions better than the local.

(b) **Scheme for cultivation of long staple cotton in Bengal.**—The object of this scheme is to test the possibilities of introducing long staple cottons in the well drained highland soils of Bengal. It is financed jointly on a 50 : 50

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

The past season in Bengal was very unfavourable for cotton growing owing to unusually heavy and continuous rainfall in the months of October and November. Dacca 289F is said to have suffered the most in respect of yield on this account.

Six varieties, *viz.*, Dacca Cambodia, Dacca Parbhani, Dacca Buri (107), Dacca Dharwar and Dacca Kampala were tested at the Dacca Farm in replicated randomised experiments. Dacca Parbhani gave the best results, combining good yield with high ginning capacity and long staple.

Trials with cotton cultivation were undertaken at six centres in six districts on a compact block of 20 to 50 *bigahs* at each centre. It is reported that the centres at Naokhali and Malda had to be abandoned owing to the indifference of the cultivators towards the crop. Out of the remaining four centres, Rangpur was found to be the best. The yield of Dacca 289F, however, did not come up to expectation, being only 6 *maunds* or 492 lbs. per acre. Dacca Parbhani, which was tried in 1 to 3 *bigahs* at each of the centres, proved to be promising in all the localities; its yield at Rangpur, Jessore and Nadia was 13½ *maunds*, 10½ *maunds* and 10 *maunds* per acre, respectively. It is stated to have also proved to be highly resistant to anthracnose and other diseases. Owing to its excellent performance in all the centres in respect of yield and capacity to resist disease and adverse seasonal conditions, it is proposed to grow as much area as possible under it in the coming season.

BALUCHISTAN.

Scheme for co-ordination of Research on Black-headed Cricket in Sind and Baluchistan.—The scheme for the control of Black-headed Cricket in Baluchistan was originally sanctioned in August 1939, for a period of two years, to run concurrently and in co-ordination with the scheme for investigation into the Black-headed Cricket in Sind sanctioned by the Committee in January 1938. The combined scheme for the co-ordination of work in progress in Sind and Baluchistan was sanctioned in January 1941, for a period of three

years from the 1st April, 1941. The objects of the scheme are : (1) to study the life cycle and seasonal behaviour of the pest with special reference to the breeding places in both the provinces, (2) to investigate suitable control measures, special attention being paid to the recent literature on anti-locust measures, and (3) to control and prevent the pest by means of poison-baits.

The control work, during the year, was carried out on the lines of the previous years. Poison baits were distributed in 19 villages in Baluchistan. It is reported that there is an increasing realisation on the part of the *zamindars* regarding the damage caused by the pest and the necessity for its control, though their attitude is still largely one of expecting free help from Government.

HYDERABAD.

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

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

During the year under report, a varietal test was conducted at each of the three centres, Nanded, Latur and Madhol, with three or four improved *Gaorani* strains, the local and *Jarila* being used as controls at the former two places and *Gaorani* 6 at the latter place. The improved strains, G. 12F-2, G. 4M-11 and G. 6, tried at Nanded, yielded significantly better than either of the controls. In Latur, G. 16C proved to be the best type, and at Madhol none of the strains outyielded *Gaorani* 6 significantly.

Comparative trials were also carried out at Nanded, Latur and Madhol, with 24, 20 and 16 *Gaorani* strains, respectively. Twenty three strains gave significantly better yields than the local at Nanded and of these nine

outyielded *Gaorani* 6 ; amongst the latter nine strains, *Gaorani* 12F-2, G. 162 and G. 163, were found to be wilt resistant also. At Latur, the yields of 17 strains were significantly higher than the control. G. 16C, which was one of the strains included in the test at Latur last year, maintained its performance this year also but it is susceptible to wilt. The test at Madhol showed that none of the improved strains was better than *Gaorani* 6 in respect of yield, though two strains, G. 4M-11 and G. 12F-2, were wilt resistant.

Over four hundred single plant selections were tested for wilt resistance in a highly wilt infected plot at Latur. Five progenies recorded nil mortality and three 3-5% against a range of 21-88% of the control. All the promising types, of which there were 134, have been retained for further study. District trials were undertaken with 2 or 3 improved strains and the local variety in 28 centres in the *Gaorani* protected area and 12 places in east and west Telingana. The data obtained so far have not yielded any definite results.

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

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

During the year under review, 963 single plant selections were tested against the susceptible G. 6 for wilt resistance in a highly wilt infected plot. Four progenies showed nil mortality, four more 3% or less and five others

between 3 to 5%, compared with 50-100% mortality of the control. II-41-6838, a sib from 16C, had a mortality of only 4.3%. Material of ten promising strains of *Gaorani*, showing a fair degree of wilt resistance, has been sent to Poona, for testing under controlled conditions. In the wilt-sick plot at Parbhani, it was noted that the mortality in all the strains except II-40-6106 was higher than in the previous year. This strain is said to have shown high resistance even under controlled conditions at Poona.

In the yield trial carried out with 58 wilt resistant strains on wilt-free soil, it was found that the yields of 26 strains were statistically better than Parbhani local, but only 8 outyielded *Jarila* significantly. When tested on wilt-sick soil ten out of 58 maintained their resistance to the disease and six of them gave high yield also.

At Parbhani, the *Gaorani* strains—G. 16C and G. 12F-1—proved to be significantly better than Parbhani-American 1 in respect of yield. The results of the varietal tests conducted on the main farm and the Research Station, Parbhani, showed that *Gaorani* 12F-2 is promising as regards yield and spinning capacity.

During the year, about 1,000 fresh single plant selections were made in the crop raised from the seed samples obtained from villages in the *Oomras* tract, for study in the ensuing season.

Comparative trials were undertaken with 2 or 3 improved strains and the local variety in different centres of the districts of Parbhani, Aurangabad and Bhir. The data collected indicated that G. 16C was on a par with the local in East Parbhani, while in the Western part of the State, *Jarila* proved to be better than G. 16C. On the light soil of the Ghat area, *Jarila* and G. 16C gave significantly better yield than Parbhani-American 1. In one centre of the Ghat area, Parbhani-American 1 outyielded the local variety. The trials will be repeated in the coming year to confirm the results obtained.

During the season, ten strains of *Gaorani* received from Parbhani were tested in the glass house at Poona for wilt resistance. Strain II-39-5315 showed a high degree of resistance. 104 plants were selected for transplanting in the infected plot.

(e) **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, the varietal tests conducted with the three strains of *Kumpta*, Hagari and the local on the heavy black soil proved a failure as, owing to the spell of dry weather that followed the sowings, the plants withered in patches and the yields obtained were very low. Strains R. K. 15, 19, 25 and nine wilt resistant strains were tested in another experiment against Hagari and the local variety on light black soil, where the crop-growth was found to be fairly good in spite of adverse climatic conditions. Nine strains in all gave significantly higher yield than the local and ten higher than Hagari. Of these, six strains, including R. K. 19, were found to be fairly resistant to wilt at Hansihalhuda; R. K. 25, R. K. 19 and two of its sibs, II-40-1214 and II-40-1219, were also drought resistant.

Six hundred and ninety-two fresh selections were tested in single rows in wilt-infected land at Hansihalhuda; seven progenies had no mortality, four showed 3 to 5% mortality and 17, 5 to 10% mortality against 33—90% mortality of the control. In the district trials, R. K. 19 came up well, its only defect being that it is late-maturing.

(d) Scheme for inclusion of Northern and Western Cottons in Programme of work of Dry Farming Scheme at Raichur.—This scheme has a two-fold object, *viz.*, (1) to consider the possibility of growing medium and long staple cotton in short staple areas in India, and (2) to find out how far the devising of dry farming methods would go hand in hand with the successful growing of such cottons in the dry and low rainfall tracts of the country. It was sanctioned by the Committee in March 1937 and terminated on 31st March, 1942.

During the year the variation induced by the seasonal factors, chiefly rainfall, was of such magnitude as to nullify the treatmental effects to a considerable extent and to render the results inconsistent in the various experiments. Amongst the varieties that were under trial, strain N14 proved to be promising, giving on an average 6% more yield than the local kumpta. R.K. 15 and R.K. 19 also gave good yields.

BARODA.

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

The results obtained, during the year under review, showed that *karkhadi* is distinctly less susceptible than B. 9; the average mortality in the former was 46%, which was 15% less than in the latter. Differences in the mortality between the various *karkhadi* families were not significant.

Fourteen families of *karkhadi* which showed superior resistance in previous seasons together with one bulk of the general *karkhadi* were tried in a yield trial along with B. 9 as 'Control.' The yield data when adjusted to stand failed to show any significant differences between the yields of the several families, the yields of families, 52, M-6, 25 and 22, were, however, superior to Broach 9, but not significantly.

It is stated that notwithstanding the high death rate observed this year in the *karkhadi* material, about 18 progenies were found to suffer 30 to 40% less mortality than the control, thus providing material for further selection. The present *karkhadi* stock has been replenished by a considerable number of fresh selections from the districts. Selection is proposed to be made also in *Rozi*, which, though inferior in quality, is resistant to root rot.

(b) **Scheme for improvement of Mathio cotton at Amreli.**—This scheme has for its object the improvement of *Mathio* mixture in respect of yield ginning percentage and quality and the trial at Amreli of the early strains of *Wagad* evolved at Viramgam with a view to replacing, if possible, inferior *Mathio* by early *herbaceums*. The scheme came into operation in June 1937.

During the year under report, ten families and 22 selections from local *Mathio* were tried against C. 520; seven families from the former and five progenies from the latter have been retained for further testing. Out of the

seven families, S. 21-2 and S. 24-2 were by far the best, combining good yield and ginning percentage with superior lint quality. The results of the varietal trials have shown that S. 18 and S. 20, types evolved from *Mathio*, are better than C. 520 in respect of yield, and S. 6, S. 9 and S. 18 superior to it as regards ginning percentage. S. 6, S. 18, S. 19 and S. 20 which are desirable in all respects have been retained for study in the ensuing season.

About 1000 plants from the F₂ generation of the crosses made between two high ginning, good yielding local types, *viz.*, S. 5 and S. 6 and *Jarila*, were studied during the season and selections, with desirable combinations of characters, have been made for further study.

BIKANER.

Bengals Cotton Improvement Scheme.—The opening of the Gang Canal under the Sutlej Valley Scheme resulted in the colonization of a new and virgin area, known as the Gang Canal area, with immigrant peasants, mostly from the Punjab, who were accustomed to the cultivation of the Punjab *desi* and American types of cotton. These cultivators found it difficult to successfully cultivate cotton under local conditions, evidently because the new environment was not quite the same as they were accustomed to in the Punjab. This scheme was, therefore, started in January 1931, for the purpose of studying the local problems of the agriculturist and for obtaining by selection and hybridization one or more superior types of cotton suitable to the locality. Until 1934, the botanical work was confined to the testing out of a large number of outside varieties, both *desi* and American. After that year, however, extensive survey of the Rajputana tract was undertaken to collect breeding material; at the same time, extensive trials of the few selected cottons from outside were continued to test their suitability to the tract. Agronomic work was pursued intensively from the beginning of the scheme. At the end of the first five years, it was found that C. 520 was the most profitable cotton to grow in the tract and that the American cottons were generally unsuitable because of their low yield and susceptibility to disease. Also the staple of Punjab-American cottons was found to deteriorate both in length and strength when grown under Ganganagar conditions. A large amount of data and useful information regarding sowing times, seed rate, frequency and distribution of irrigation, optimum spacing for the *desi* and American cottons, rotation and manuring have been collected. Since 1934, greater attention has been paid to selection and breeding problems.

During the year under review, 63 progenies from the crosses—Shan x Mollisoni, Bani x C. 520 Shan x C. 520 and Rajputana x Mollisoni—were tested in two replicated progeny row experiments, against C. 520, R. 18 and Sang. 119. Families of the Shan cross were found to be better yielders than those of other crosses, but none of the progenies from any of the crosses was as good as C. 520, in respect of ginning percentage, though the maximum halo length of all of them was definitely superior to C. 520 and R. 18. Thirty-two of the best progenies have been selected for further study.

Variety trials have shown that R. 18 is equal to C. 520 in yield, halo length and spinning capacity, and significantly better than it in ginning percentage. Amongst the Americans, P. 289-F/43, which is now recommended to the cultivators, gave very satisfactory yields. The general level of field germination, during the season, was better than in the previous year. There was no difference between C. 520 and Mollisoni in final stand; 289F was, however, very poor in this respect. Measures taken against white-ant attack did not prove of avail.

MYSORE.

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

During the year under report, the five strains, M.A.V. (Co. 2 x Uganda), M.A. VI (Uganda x Co. 2), M.A. VII (Co. 2 x 289F/38), M.A. VIII (289F/38 x Co. 2) and M.A. IX (a strain of irradiated Co. 2), were tested for yield against Co. 4 and M.A. II in a seasonal trial planted during January, February and March; March plantings gave the best results. M.V.A. gave a higher yield than Co. 4 and M.A. II; the yields of M.A. VI, M.A. VII and M.A. IX were the next best. M.A. VI is superior to the remaining strains in respect of fibre qualities, having been adjudged suitable for spinning 40s highest standard warp counts. M.A. V. and M.A. VI are now being multiplied on a large scale for distribution.

Amongst the several hybrid populations under study, the F₄ of crosses of M.A. II and Co. 2 with *G. purpurascens* appeared promising in regard to disease resistance, staple length and ginning percentage.

Multiplication of the newly imported Egyptian cottons, Giza 7 and Giza 12, was started in June 1941, with the object of acclimatizing and breeding suitable types. The response of these two types to local climatic conditions is stated to be very encouraging. In addition, a few more Egyptian and Sea Island cottons, *viz.*, Sakel, Maraad, Zagorra, V. 135 and Montserrat Sea Island, were tested on a small scale and selections made in all the types to obtain a hardy and well adapted type.

CHAPTER VI.

SEED DISTRIBUTION AND EXTENSION SCHEMES.

During the period under review, there were eighteen seed distribution and extension schemes in operation in the various cotton growing provinces and States ; a brief report on the working of these schemes is given below :—

BOMBAY.

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

During the year under report, the Agricultural Department controlled a seed multiplication area of 31,543 acres (including 1,360 acres grown with farm pedigree seed), against 20,640 acres (including 1,094 acres grown with farm pedigree seed), last year. It is reported that the demand for 1027 *A.L.F.* in Surat district was not as good as last year because many of the co-operative societies and Bardoli group villages reverted to the policy of growing Selection 1A or a mixture of Selection 1A and 1027 *A.L.F.* The amended Cotton Transport Act did not help much in the expansion of 1027 *A.L.F.* in Surat district. The Agricultural Department handled 25,34,690 lbs. of seed of which 10,33,837 lbs. were distributed in British area, 14,38,497 lbs. supplied to States and the rest disposed of locally, against 23,68,355 lbs. in the previous year, including 16,74,755 lbs. for the British area and 6,93,600 lbs. for the States.

Inspection and survey of the cotton area in Surat were continued. It was found that the 1027 *A.L.F.* controlled area was pure to a greater extent than in the previous year because the cultivators who were not in favour of

this seed dropped out altogether and only those who wanted to grow 1027 purchased the seed during the year. It is reported that the survey of Selection 1A revealed the same condition as last year, *viz.*, that the general tendency of cultivators was to grow Selection 1A, either pure or as a mixture, in preference to pure 1027.

Guaranteed pure cotton of 1027 *A.L.F.* was sold under two Agmark labels—red for pedigree cotton and black for certified cotton. It is reported, however, that there was no marked difference between the premium obtained for Agmarked 1027 and that obtained in the past years when no Agmark was applied. 420 bales of Agmarked pedigree cotton (red label) and 5,544 bales of Agmarked certified cotton (black label) were sold at premiums varying from Rs. 5 to Rs. 27. The premium obtained last year for 1027 *A.L.F.* was Rs. 6 to Rs. 22.

The following table shows the comparative figures of yield, ginning percentage, and price of 1027 *A.L.F.* and Selection 1A :—

Name of variety.	Yield of seed cotton per acre in lbs.	Ginning percentage.	Yield of lint per acre in lbs.	Price of candy of lint. (800 lbs.)	Price of lint yield per acre.
1027 <i>A. L. F.</i>	300	33.3	100	Rs. 300	Rs. 37 8 0
Selection 1A	340	37.0	126	280	44 2 0

The table shows that the grower of 1027 *A.L.F.* gets Rs. 6-10-0 less per acre than the grower of Selection 1A.

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

During the season under report, 10 check stations (4 on the Tapti river and 6 on the Kim river) were established from the 16th January, 1942, to prevent illicit import of cotton by road from Olpad to the Surat and Ankleswar areas. Ginned cotton was allowed to be transported, under licence, to Surat for being pressed and marked "Olpad" before sale. The work was supervised by the Agricultural Overseer. 8,688 half-pressed bales were pressed into 14,344 full pressed bales after import under licence into the Surat protected area.

The survey of Selection 1A in Surat and South Surat areas, commenced last year, was continued during the year under report. It is reported that Selection 1A has spread almost everywhere in Bardoli and Navsari tracts. In Chorasi taluka, out of 20 villages visited, only 8 were found to be growing Selection 1A; in the remaining talukas, Selection 1A was found more or less in all the villages visited, the percentage of area varying from 15 to 100.

An analysis of the prices obtained for pure 1027 *A.L.F.* and Selection 1A showed that in 1942 season, pure 1027 realised Rs. 10 to Rs. 18 premium over local and Rs. 12 to Rs. 24 over Selection 1A marked "Olpad," against Rs. 13 to Rs. 18 over local and Rs. 17 to Rs. 23 over Selection 1A marked "Olpad," last year. It is stated that the position of 1027 *A.L.F.* is in no way better than it was last year.

(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.

Stages I and II.—The selfed seed from the previous year was sown on an area of about 27 acres which gave 7,250 lbs. of cleaned seed for multiplication in Stage II during 1942-43. The quantity of seed produced from about 85 acres of tenants' holdings was 25,537 lbs., which was handed over to the Cotton Superintendent, Jalgaon, for further multiplication. All the cotton was ginned in the Farm gin and sold at a premium of Rs. 69 over Broach per *candy*.

It is stated that yields of cotton on the Bhadgaon Farm and round about are low compared with those on the Jalgaon Farm and its vicinity and that as there is no particular advantage in multiplying at Bhadgaon Farm the seed required for the wilt free zone, the possibility of doing this work on cultivators' land round about the Jalgaon Farm on suitable terms is being examined.

Stages III, IV and V.—During the year under report, 9,08,180 lbs. of *Jarila* seed were distributed by the Department over a controlled area of 41,682 acres. In addition, 30,31,990 lbs. of seed of stages IV and V were distributed through the agency of 144 approved stockists. The area covered under the scheme, during the year, is reported to be 1,85,022 acres against 26,236 acres last year. The total area under *Jarila* cotton (including natural spread) is estimated at 5,99,000 acres against 1,99,236 acres last year.

Comparative yield trials of *Jarila* and local cottons were continued during the year. *Jarila* gave a higher yield of 38 lbs. in village trials and 21 lbs. in field-scale trials over local. The ginning percentage of *Jarila* was 34.93, against 35.39 of local. Mill tests on current season's crop have shown that *Jarila* spins 20s to 24s counts with strength ranging from 74 to 82 lbs.

During the year, 2,891 *bojas* of cotton were sold by auction at a premium of Rs. 74 over Broach. *Kapas* of pure *Jarila* cotton was sold at nearly double the price of local cotton. The extra gross income realised by cultivators by growing *Jarila* is estimated at Rs. 98,25,000.

For sowing in 1942-43, the Agricultural Department has purchased 10,92,390 lbs. of seed of stages II, III and IV sufficient for 60,000 acres. The approved stockists have stocked 42,38,779 lbs. of seed of stages IV and V for multiplication and general supply over an area of 2,30,000 acres approximately. In addition to the above, it is reported that 4,19,510 lbs. of seed, sufficient for 25,000 acres, have been retained by growers and merchants. It is estimated that the seed from the controlled area will approximately cover an area of 3,15,000 areas in 1942-43.

The malpractice of mixing *Jarila* with inferior short-stapled cotton was reported to be very rampant, especially in ginning and pressing factories, and it has been suggested that section 3A of the Cotton Ginning and Pressing Factories Act, 1925, should be applied to Khandesh and Nasik districts, to penalise the mixing of *Jarila* with inferior cottons. Another suggestion made is that the Cotton Control Act should be made applicable to these areas to prevent the cultivation of any type other than *Jarila*.

(d) **Deccan Canals (Banilla) 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 13,435 lbs. of *Banilla* seed were sown over an area of 550 acres in and around Sansar in the Baramati tract, the average yield of seed cotton being 800 lbs. per acre. The cotton fetched a premium of Rs. 1-8-0 to Rs. 2 per maund of *kapas* over local. The total area under *Banilla* in the tract is estimated at 6,000 acres, against 7,300 acres last year. The estimated gross extra income derived by growers of this variety is reported to be Rs. 60,000.

(e) **B.D. 8 Seed Distribution Scheme.**—This scheme is concerned with (1) the marketing of pure B.D. 8 cotton in order to secure a price commensurate with its quality, (2) the multiplication of pure seed for further extension and (3) propaganda work for increasing the production of pure B.D. 8. It was sanctioned in August 1935, for a period of three years and came into operation in December 1935; in July 1938, it was extended for a period of five years.

During the year under report, the total area under B.D. 8 cotton in Broach district (excluding Ankleswar taluka) was 13,178 acres, against 9,728 acres last year and 30,951 acres in the year before. The Agricultural Department controlled 5,617 acres for seed multiplication, including 663 acres grown with pedigree seed from the Government and Registered seed farms.

B.D. 8 cotton was ginned under departmental supervision and 1,491 bales from the controlled area were sold at a premium of Rs. 85 to Rs. 112 on Broach. Last year the premium ranged from Rs. 85 to Rs. 132 on Broach. It is reported that B.D. 8 seed cotton from the general area was sold at a premium of Rs. 5 to Rs. 15 per *bhar* (1020 lbs.) over local.

Segregates 1-2 and 1-6 were tried in the Broach tract. These are reported to compare favourably with local as regards ginning percentage and with B.D. 8 in staple quality.

(f) 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 object of the scheme is to eliminate local mixtures and to extend pure *Jayawant* and *Gadag No. 1* cottons in the Southern Division of the Bombay Province, over an area of 9½ lakhs or acres, within a period of five years.

Jayawant Cotton.—It was proposed to cover within five years, an area of 7.75 lakhs acres in Dharwar, Belgaum and Bijapur districts and a part of Satara district; at the end of six years, the area covered with *Jayawant* was 8,08,364 acres, (of which 6,74,415 were under pure *Jayawant*, and 133,949 under natural spread), against 705,544 acres last year. During the year under report, 94,409 acres of the reserved area were rogued and the produce was stocked separately and sold by auction. Out of 71,24,460 lbs. of seed stocked, 64,03,180 lbs. were sold for sowing purposes. The cultivators' produce was pooled, graded and sold by auction at different centres. 33,312 *docras* of cotton were sold at a premium ranging from Rs. 10 to Rs. 15 per *naga* over local. The extra profit realised by the cultivators of *Jayawant* is estimated at Rs. 9,33,320. To cover an area of 8,20,560 acres with *Jayawant* next year, it is proposed to stock 82,05,600 lbs. of seed.

Gadag No.1 cotton.—The object was to cover, within five years, an area of 1.75 lakhs acres in Dharwar district; at the end of six years, the area covered was 1,86,753 acres. During the year, a reserved area of 29,912 acres was rogued. 15,92,000 lbs. of pure Gadag No. 1 were stocked, of which 15,64,900 lbs. were distributed for sowing over an area of 1,51,753 acres. The natural spread of this cotton is estimated at about 35,000 acres, making a total area of about 1,86,753 acres, against 1,81,480 acres in the previous year. So far, 12,844 *docras* of cotton have been graded and sold by auction at a premium ranging from Rs. 6 to Rs. 7 per *naga* over local. The extra profit realised by the cultivators from auction sales alone is estimated at Rs. 22,000, whilst that resulting from the spread of the improved variety is estimated at

Rs. 4,91,568. With a view to covering the stipulated area of 1,87,200 acres, it is proposed to stock 18,72,000 lbs. of Gadag No. 1 seed.

(g) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton.—In pursuance of the policy of the Committee that a nucleus of seed of all approved varieties of cotton should be maintained, a scheme for the maintenance of a nucleus of each of the following seven varieties of cotton was sanctioned in August 1937, for a period of five years :—

- | | |
|-------------------------------|-----------------------|
| (1) 1027 A.L.F. | (5) <i>Jayawant</i> . |
| (2) B. D. 8 | (6) Gadag No. 1. |
| (3) <i>Jarila</i> (Bhadgaon). | (7) <i>Banilla</i> . |
| (4) <i>Jarila</i> (Jalgaon). | |

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

Name of variety.	Area Selfed.		Amount of selfed seed produced.	Remarks.
	A.	G.		
(1) [1027 A. L. F. ..	2	23	352	Selfed larger than one acre to take full advantage of short period of boll formation.
(2) B. D. 8.	1	..	162	159 lbs. of open fertilized seed were also produced. All the seed has been supplied to the Broach B.D. 8 Seed Distribution Scheme.
(3) <i>Jarila</i> (Jalgaon)..	1	..	300	Seed used for Jalgaon Farm.
(4) <i>Jarila</i> (Bhadgaon)	1	..	350	.. .. , Bhadgaon Farm.
(5) <i>Banilla</i>	1	..	172	..
(6) <i>Jayawant</i>	2	5	260	Low yield due to bad weather. 140 lbs. handed over to the Superintendent, Dharwar Farm, 105 lbs. to the Cotton Overseer, Bagalkot, 15 lbs. utilised for sowing.
(7) Gadag No. 1. ..	2	..	597	160 lbs. used for sowing on 16 acres at Gadag, 300 lbs. used for multiplication at Ron, 137 lbs. used for multiplication at Devihosur Institute.

In accordance with the decision of the Committee the scheme closed down on the 31st March, 1942.

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—Egyptian and imported American cottons.
- (c) Demonstration of cotton cultivation on non-cotton growing areas on 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 report, there were 485,000 acres under improved varieties, representing 49% of the total area under cotton in Sind, against 517,000 acres in the previous year, representing 57.1% of the Sind cotton area. The total area under cotton in the newly developed cotton tracts on the Indus Right Bank, including the non-Barrage area of North Sind, was 137,000 acres, against 112,000 acres last year. 39,170 maunds of Sind *Sudhar*, 13,250 maunds of Sind N. R. and 9,300 maunds of 4F-98 were distributed during the year, against 34,700 maunds, 11,800 maunds and 8,650 maunds, respectively, in the previous year. 84,000 maunds of Sind *Sudhar*, 5,000 maunds of Sind N. R. and 7,000 maunds of 4F-98 are reported to be available for distribution in 1942-43. The estimated

average yield per acre of *kapas* of improved varieties and the relative acre cash value are reported to be as follows :

Name of improved variety.	Estimated average yield of <i>kapas</i> per acre.	Relative acre cash value.
Sind <i>Sudhar</i>	8 <i>maunds</i> .	Rs. 76
Sind N.R.	6 „	„ 33
4F-98	5½ „	„ 46-12

The extra gross income to growers of improved varieties is estimated at Rs. 26,17,500.

(b) **Financing of Seed Distribution.**—In January 1938, a scheme for the financing of seed distribution in Sind was sanctioned by the Committee 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. The Rules in question were put into force with effect from the 18th April, 1941, but as the penal section of the Act was only partially applied, the Committee's contribution was limited to one year only from January 1942, the position to be reviewed at the end of that period.

The object of the scheme is to establish a compact block of long staple cotton in the Barrage areas free from admixture. The following table shows the area actually grown under improved varieties, for which certified seed was directly distributed through departmental agency only :—

Source of seed supply.	Area in acres sown under		
	Sind <i>Sudhar</i> .	Sind N. R.	4F-98.
Registered seed growers	3,350	1,500	1,000
General cultivation	75,000	33,300	19,800

During the year under report, 26,070 *maunds* of *Sind Sudhar*, 8,000 *maunds* of *Sind N. R.* and 5,300 *maunds* of 4F-98 were distributed by the Department. For the next season, 84,000 *maunds* of *Sind Sudhar*, 5,000 *maunds* of *Sind N. R.* 7,000 *maunds* of 4F-98 and 2,500 *maunds* of M-4 cotton seed have been made available. 24 commission agencies and 45 depots were engaged for seed distribution work, in addition to 28 departmental depots. The following table shows the general standard of purity, soundness and germination of cotton seed during 1941-42 :—

	<i>Sind Sudhar.</i>	<i>Sind N. R.</i>	4F-98.
Purity	97%	99.5%	96%
Soundness	72%	75%	85%
Germination	65%	70%	80%
Weight per 100 seeds	7.7 gms.	5.7 gms.	about 7.5 gms.

It is reported that owing to insufficient number of supervisors ginning and pressing, grading and despatching of seed did not receive proper attention.

(c) Scheme for maintenance of nucleus of pure seed of improved varieties of cotton.—In pursuance of the policy of the Committee for the maintenance of a nucleus of seed of all varieties of cotton, the spread of which has been approved by it, a nucleus scheme for the following five varieties of cotton was sanctioned in August 1937, for a period of five years :—

1. *Sind N. R.*
2. *Sind Sudhar.*
3. 4F-98.
4. *Sea Island 2-4.*
5. *Boss III-16.*

The scheme came into operation in April 1938. In accordance with the decision of the Committee in August 1940, the maintenance of nucleus of *Sea Island 2-4* and *Boss III-16* has been transferred to the scheme for the production of long staple cottons in *Sind*.

The following table shows the area required to be maintained under selfed

seed and that actually maintained, as well as the quantity of selfed seed proposed to be produced and the quantity actually obtained :—

Name of variety.	Area required to be maintained.		Area actually grown.		Selfed seed proposed to be produced.	Selfed seed produced.		Remarks.
	A.	G.	A.	G.	lbs.	S.F.	O.F.	
Sind N. R.	0	30	0	30	180	200	200	
Sind <i>Sudhar</i>	3	35	3	35	780	800	150	
4F-98	1	10	1	5	230	235	65	
Sea Island 2-4 & Boss III-16	0	10	0	10	50	59½	200	Grown at Cotton Research Station, Mirpurkhas.

The scheme terminated on the 31st March, 1942.

CENTRAL PROVINCES AND BERAR.

(a) *Verum* Seed Distribution and Marketing Scheme.—In November 1929, the Committee sanctioned, for a period of one year in the first instance, the Central Provinces *Verum* Seed Distribution and Extension Scheme. It started work in September 1930, and was extended annually up to the end of July 1934, when it was combined with the newly sanctioned scheme for the extension of long staple cottons in the Central Provinces. The combined scheme, known as “Scheme for Extension of Long Staple Cotton and Marketing of *Verum* Cotton in the Central Provinces and Berar” was sanctioned for five years from June 1934. At the meeting of the Committee, held in July 1938, it was extended up to the 31st May, 1941, the title being changed to “Scheme for the Extension and Marketing of V. 434 Cotton.” In January 1941, a further extension up to 29th February, 1944, was sanctioned. The scheme aims at the expansion of area under V. 434 cotton in the seven *taluqs* where *Verum* has made most headway in the past, the ultimate object being to eliminate all other varieties as far as possible. During the extension period, the objective will be to raise the area in six of the seven *taluqs* (excluding Ellichpur) to 5 lakhs of acres.

During the year under report, the Agricultural Department distributed 34,256 *maunds* of seed through the agency of Government seed stores, *taluk*

agricultural associations and seed farmers. An area of 291,103 acres (119,728 acres under departmental spread and 171,375 acres under natural spread) was covered against 218,000 acres last year. It is reported that in addition to the above, 7,987 *maunds* of seed were distributed outside the selected *taluqs* over an area of approximately 1.16 lakhs acres. The total amount of seed distributed in the Central Provinces and Berar was thus 42,243 *maunds* and the area covered 4.1 lakhs acres. 88,876 *maunds* of pure seed have been stocked for distribution in the next season.

The total number of bales sold through the departmental pool amounted to 9,966 bales, of which 9,167 were V. 434, the special areas contributing 6,161 bales. The average premium obtained was Rs. 95-13-6 'on' Broach and Rs. 130-12-0 'on' Oomra, against Rs. 42-13-0 and Rs. 76, respectively, last year. It is estimated that the total quantity of *Verum* produced in the Province was about 1 lakh bales, against 68,500 bales last year. The total extra income derived by the growers of V. 434 is estimated at about Rs. 64 lakhs, including Rs. 45.71 lakhs by the growers of selected blocks.

It is reported that due to the rapid expansion of *Jarila* the area under V. 434 was only 2.9 lakhs acres against 3.5 lakhs acres proposed to be covered. *Jarila* is stated to have gained a footing in *taluqs* bordering on Khandesh and to have spread also in the selected blocks. The Departmental District Officers estimate the area under *Jarila* in the Province to be 2.8 lakhs acres, of which 80,934 acres are in V. 434 areas, but it is considered that the actual area was probably not less than 4 lakhs acres. The yield of *Jarila*, in favourable seasons, is said to be almost equal to V. 434; its performance in years of heavy rainfall, however, still remains to be seen. On account of its higher ginning percentage, *Jarila* fetched a premium of Rs. 10 per *khandy* of *kapas* over V. 434 in Berar; in Nimar, however, the premium it got was not so marked and there it is probably not likely to be such a strong competitor of V. 434 as in Berar. The fixation of *Jarila* as the basis of 'futures' contracts is expected to encourage its extension. If *Jarila* does as well in the next season as in the past, V. 434, it is considered, will have to give way to it in Berar.

(b) Scheme for Distribution and Marketing of Buri 107 cotton.—This scheme was sanctioned by the Committee in July 1938, for a period of three years, and came into operation on the 1st November, 1938. In January 1941, it was extended up to the 29th February, 1944. The object of the scheme is to introduce *Buri* 107—a selection from acclimatised *Gossypium hirsutum*

developed under the Central Provinces Botanical Research Scheme—in Burhanpur Tahsil of Nimar district, where the total area under cotton is about 75,000 acres. Commencing with an area of 2,000 acres in 1938-39, the programme was to raise the area under this cotton to 10,000 acres in 1939-40 and 30,000 acres in 1940-41. During the extension period, the aim will be to raise the area to 50,000 acres and to maintain it at that figure.

During the year under report, 5,491 *maunds* of seed (83 *maunds* from Government farms, 5,194 *maunds* from Government seed stores and 214 *maunds* from the Tahsil Agricultural Association) were distributed; in addition, 1,157 *maunds* were distributed in other parts of the Province and the adjoining States. The total area covered was 34,000 acres (27,000 acres under departmental spread and 7,000 acres under natural spread). The significant achievement of the scheme is that local Buri is now practically non-existent. The gross extra return derived by growers of Buri 107 is estimated at Rs. 8·31 lakhs.

With a view to securing pure seed of *Buri* 107, a compact block of 1,842 acres was maintained; in addition seed was collected from 1,481 acres under departmental supervision and from 535 acres through *dalals*. In all, about 6,286 *maunds* of seed have been collected for distribution in the next season.

(c) Maintenance of nucleus of pure seed of improved strains of cotton.—This scheme for the maintenance of nucleus of pure seed for each of the cotton strains, V. 434, *Late Verum*, No. 438 and Buri 107, was sanctioned by the Committee in July 1938, for a period of five years from April 1939.

The following table shows the quantity of selfed seed proposed to be produced under the scheme and the quantity actually obtained :—

Strain.	Area selfed.	Selfed seed proposed to be produced.	Selfed seed produced.	Remarks.
	acres.	lbs.	lbs.	
V. 434.	1	200	399	Supplied to Government Farm, Akola.
<i>Late Verum</i>	1	200	323	Supplied to Government of Nepal.
No. 438.	1	200	287	Supplied to Government Farms, Khandwa and Yeotmal.
Buri 107	1	200	263	Supplied to Government Farm, Akola.

The scheme terminated on the 31st March, 1942.

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, 31,079 lbs. of seed were distributed by the Department, through the agency of the Tiruchengode Marketing Society, to 343 *ryots* in 41 villages and 89 hamlets under the jurisdiction of 17 rural co-operative societies. Though sowing could not be done early in September, 1942, due to delayed rains, germination on the seed farm area of 1,250 acres was satisfactory and the condition of the crop good.

(b) **Scheme for distribution of H.1 strain in the Westerns area.**—The scheme, which was sanctioned by the Committee in July 1941, started work in July 1942, in three selected centres, *viz.*, Bellary, Adoni and Guntakal. In collaboration with the co-operative loan and sale societies at these centres, suitable villages where seed farms could be laid were selected and the necessary arrangements completed. H.1 cotton seed to cover an area of 6,000 acres has been distributed to the members of the seed farms.

(c) **Maintenance of nucleus of pure seed of improved varieties of cotton, Co. 2, H.1 and K.1.**—This scheme was sanctioned by the Committee in January 1938, for a period of five years and came into operation in September 1938. The area sowed and the quantity of sowed seed of each variety produced during the year are given below :—

Name of strain.	Area sowed.	Quantity of sowed seed obtained.	How disposed of.
Co. 2	Acres. 1.00	lbs. 533	Sent to Agricultural Demonstrator, Tirupur, for sowing inner seed farm area.
H. 1	2.20	532	Reserved for sowing inner seed farm area at Hagari.
K. 1	2.00	657	Reserved for sowing the bulk area on the Agricultural Research Station, Koilpatti.

BARODA STATE.

(a) Baroda (Navsari) Seed Storage Scheme.—This scheme is concerned with the spread of 1027 A.L.F. 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 further period of five years from 1st April, 1939.

During the year under report, the total area under 1027 A.L.F. was estimated at 2,52,868 acres, of which, the area controlled was 46,955 acres, the corresponding figures of the previous year being 80,000 and 34,645 acres, respectively. 29,826 lbs. of 'A' grade seed, 3,29,755 lbs. of 'B' grade seed and 2,04,945 lbs. of 'C' grade seed were distributed. It is reported that 'A' and 'B' grade areas and a large portion of 'C' grade area were very carefully examined and 10,543 acres were rejected as uncertifiable, leaving 36,762 acres of controlled and certified area.

The produce of the improved variety was ginned and baled under departmental supervision and stamped with "Agmark" before sale. To provide for some distinguishing mark for Baroda State produce, a stencil stamp of "1027 A.L.F. Baroda State Produce" was applied to the bales sold from Baroda State areas. In all, 6,940 Agmarked bales were sold at a premium of Rs. 8 to Rs. 15 per *candy*. It is reported that 1027 grown in Navsari district fetched a premium of Rs. 145 'on' Broach, against Rs. 132 last year, and a premium of Rs. 65 in the previous years. The gross extra income received by the cultivators of 1027 is estimated at Rs. 4,74,127-8-0 at the rate of Rs. 1-14-0 per acre for an area of 2,52,868 acres. To meet the demand for seed in the ensuing year, 37,47,942 lbs. have been purchased and stored.

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

During the year under report, 11,120 lbs. of A grade seed, 86,400 lbs. of B grade seed and 187,560 lbs. of C grade seed were stocked at four depots,

but owing to heavy rains and floods, only 12,000 acres were sown with B.D. 8, including 8,473 acres of certifiable purity. Against an expected produce of 3,815 *bhars* of seed cotton, 2,944 *bhars* were collected which gave 2,112 bales. These were sold mostly to Ahmedabad mills at Rs. 62 (Dabhoi) to Rs. 88 (Bombay) 'on.' The additional income realised by the growers of certified crop is estimated at Rs. 60,000, excluding Rs. 10,000 realised by the growers of non-certified crop. 14,640 lbs. of A grade seed, sufficient for 1,500 acres, 103,560 lbs. of B grade seed, sufficient for 12,000 acres and 286,440 lbs. of C grade seed, sufficient for 25,000 acres, have been stocked for sowing in 1942-43.

It is reported that large stocks of seed have been issued to leading cultivators in tracts growing B.D. 8, on the condition that they would store it for issue to growers in case the sowings fail for any reason. This precaution is taken to ensure the purity of the re-sown crop. As a result of the tests conducted at Dabhoi Farm, Segregate 1-6 is reported to be the most suitable strain in place of B.D. 8. It is wilt-resistant, high-ginning and ranks next to B.D. 8 in respect of premium; its spinning value is nearly the same as that of B.D. 8 though the feel is somewhat less soft. Arrangements have been made to test Segregate 1-6 on cultivators' fields.

D. N. MAHTA,

Secretary.

APPENDIX I.

BALANCE SHEET AS ON 31st MARCH, 1942.

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Cotton Cess Receipts	1,45,61,009	10	0				I. A. Administration				21,95,406	13	0
Less: Refunds of cess to Burma	42,869	10	9	1,45,18,689	15	9	B. Improvement of Cotton Marketing:—						
<i>Interest account:—</i>							1. Cost of exhibits, travelling allowance of representatives on the Board of East India Cotton Association and members of Standards Sub-Committee and cost of Standards..	1,71,961	8	9			
Amount received on investments	21,71,262	4	3				2. Enquiry into cost of cotton production in India	2,71,963	8	9	4,43,925	1	6
Add: Refund of income-tax from interest ..	24,178	10	0				C. Seed Distribution and Extension Schemes:—						
	21,95,440	14	3				(i) Bombay:—						
<i>Less:—</i>							(1) Hubli	44,048	8	3			
1. Interest paid in advance at the time of purchasing Government papers (since recovered), interest on temporary overdrafts and bank's commission for collection of interest	61,984	14	3				(2) Gadag	41,700	15	1			
2. Interest credited to Provident Fund ..	4,886	0	2				(3) Gadag (Supplementary) ..	20,167	11	4			
3. Bank's withdrawal charges	5,342	0	0				(4) Surat	85,612	12	10			
4. Income-tax on interest on Government papers	29,905	1	6				(5) Athani	18,086	1	7			
5. Brokerage for securities sold	828	10	0				(6) Khandesh (Banilla)	1,65,646	15	0			
6. Provision for Sinking Fund	16,050	10	0				(7) Khandesh (Jarilla)	87,718	8	9			
	1,18,997	9	11	20,76,448	4	4	(8) Deccan Canals (Banilla) ..	3,226	11	4			
Profit on conversion and sale of securities ..				3,47,382	12	2	(9) B. D. 8	29,611	4	8			
Sinking Fund Account				16,050	10	0	(10) Revised Jayawant and Gadag No. 1	1,90,265	11	1			
Miscellaneous Receipts				1,10,157	15	3	(11) Maintenance of nucleus of pure seed of improved varieties of cotton	9,664	6	3			
Refund from Provident Fund for contributions disallowed				3,391	1	11	(12) Scheme for control of Selection I.A	3,151	9	0			
General Suspense account				278	8	0							
Carried over ..				1,70,72,344	3	5	Total	6,98,896	2	9			

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,70,72,344	3	5	Brought forward ..	6,95,896	2	9			
							(ii) Madras :—						
							(1) Pay and allowance of Business Manager, Tiruppur ..	24,079	13	0			
							(2) Co. 2	41,286	2	9			
							(3) H. 1	3,932	2	9			
							(4) Maintenance of nucleus of pure seed of improved varieties of cotton ..	2,336	0	5			
							Total ..	71,654	2	11			
							(iii) Sind :—						
							(1) Seed Distribution	4,05,759	12	4			
							(2) Maintenance of nucleus of pure seed of improved varieties of cotton	9,999	2	8			
							(3) Financing of seed distribution	19,100	0	0			
							Total	4,34,858	15	0			
							(iv) Hyderabad	53,471	6	8			
							(v) Central Provinces :—						
							Maintenance of nucleus of pure seed of improved varieties of cotton	3,292	15	3			
							(vi) Baroda :—						
							(1) Navsari Seed Storage ..	24,309	8	2			
							(2) B. D. 8	8,828	15	7			
							Total	33,138	7	9			
							(vii) Lyallpur (Ginnery)	16,038	3	8			
							(viii) United Provinces C.402 ..	18,616	11	6			
											13,29,967	0	8
Carried over ..				1,70,72,344	3	5	Carried over ..				89,69,298	15	2

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,7		5	Brought forward ..				89,09,298	15	2
							D. Printing and Propaganda :—						
							(1) Publicity & Propaganda	1,50,555	15	0			
							(2) Printing & Distribution	1,07,474	18	9	2,64,030	12	9
							E. Statistical Research :—						
							(1) Studies of village consumption of Indian cotton	23,913	5	8			
							(2) Improvement of Cotton Forecast ..	30,772	9	0	54,685	14	8
							F. Travelling Allowance :—						
							Non-official Members				2,56,609	1	9
							II. Technological Research :—						
							1. Technological Laboratory—						
							A. (Capital expenditure)						
							(1) Land & Buildings	4,07,988	14	6			
							(2) Machinery	1,23,212	1	2			
							(3) Freight	7,502	2	8			
							(4) Apparatus & Equipment	41,068	5	7			
							(5) Machinery & Workshop	5,789	8	8			
							B. Working Expenses	26,81,568	10	9			
							(2) Provincial	1,96,963	13	0			
							(3) Development of alternative uses of Indian cottons :—						
							(a) Capital Expenditure	29,522	9	9			
							(b) Working Expenditure	30,771	14	5			
							(4) Investigation for improvement in the ginning of Indian cotton :—						
							(i) Capital Expenditure	34,072	13	9			
							(ii) Working Expenditure	5,444	1	9	35,70,504	15	7
							III. Research Studentships	2,82,446	2	4			
							Less : Refund from Mr. Taskhir Ahmad	2,439	0	0			
Carried over ..				1,70,72,344	3	5					2,80,007	2	4

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs. a. p.		EXPENDITURE.	Rs. a. p.		Rs. a. p.	
Brought forward ..		1,70,72,344 3 5	IV. AGRICULTURAL RESEARCH SCHEMES.				
			(i) Bombay :—				
			1.A. Surat Physiological	2,45,139 11 3			
			B. Surat Physiological Writing-up	5,814 7 8			
			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			
			B. Dharwar Wilt Writing-up	10,902 10 3			
			4. Khandesh	26,573 5 0			
			5. Co-ordination of Cotton Research	1,749 7 6			
			6. Jalgaon Cotton Breeding	68,168 5 9			
			7. Broach Cotton Breeding	94,394 5 5			
			8. Small Leaf Disease Survey	3,933 9 6			
			9. Survey of Gohari Cotton	4,199 5 0			
			10. Defibrating of Cotton Seeds	4,878 5 9			
			11. Plant Fuller Propaganda	21,940 1 3			
			12. Breeding of Wilt Resistant Cotton for Surat Area	12,231 1 6			
			13. Model Projects for improvement of cotton cultivation, etc.	735 0 0			
			14. Inclusion of Northern and Westerns in Dry Farming Research at Bijapur	6,956 15 4			
			15. Poona Wilt reeding	40,382 3 6			
			16. Improvement of Cotton Crop in Kaira District	1,285 8 0			
			17. Interspecific Hybridization at Surat	24,740 12 3			
			18. Dholleras Wagad Cotton at Yiramgam	23,134 0 8			
			Total	9,88,293 14 3			
			(ii) Madras :—				
			1. Herbaceum	1,42,466 13 1			
			2. Pemppheres and Physiological	1,92,738 11 1			
Carried over ..		1,70,72,344 3 5	Carried over ..	3,35,205 8 2		83,95,136 14 3	

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs. a. p.		Rs. a. p.		EXPENDITURE.	Rs. a. p.		Rs. a. p.	
Brought forward ..			1,70,72,344	3 5	Brought forward ..	9,88,293	14 3		
					Continued ..	3,35,205	8 2	83,95,186	14 3
					3. Fodder Cholam ..	19,517	9 4		
					4. Breeding of Nadam cotton ..	17,773	1 9		
					5. Improvement of Mungara cotton ..	20,636	7 4		
					6. Investigation of the possibilities for control of cotton stem weevil ..	6,165	7 6		
					7. Improvement of Cocanadas cotton ..	12,902	12 9		
					Total ..	4,12,200	14 10		
					(iii) Punjab :—				
					1. Botanical ..	6,08,822	18 3		
					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 ..	1,730	10 6		
					8. Physiological ..	3,11,887	4 10		
					9. Clean-up Campaign of Spotted Bollworm ..	59,743	1 3		
					10. Jassid Investigation ..	13,581	3 6		
					11. Improvement of Punjab-American 289F ..	9,910	5 0		
					Total ..	13,67,443	6 5		
					(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 ..	29,073	10 3		
					Total ..	5,36,540	10 10		
Carried over ..			1,70,72,344	3 5					

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,70,72,844	3	5							
							(v) United Provinces :—						
							1. Pink Bollworm	1,46,646	13	10			
							2. Rohilkhand and Bundelkhand Survey	18,061	14	4			
							3. Botanical	57,002	3	9			
							Total	2,21,710	15	11			
							(vi) Indore :—						
							1. Institute of Plant Industry ..	19,26,943	12	0			
							2. Cotton Genetics Research Scheme	69,211	6	11			
							Total	19,96,155	2	11			
							(vii) Sind :—						
							1. Physiological	2,63,945	12	10			
							2. Jassid Investigation	10,721	9	1			
							3. Black-headed Cricket	9,245	1	3			
							4. Scheme for investigation for production of long staple cotton	49,133	14	3			
							5. Bollworm Investigation and Clean-up Scheme	37,465	6	0			
							Total	3,70,511	11	5			
							(viii) Burma :—						
							1. Capital Expenditure	2,906	15	5			
							2. Cotton Improvement	47,790	3	9			
							Total	50,697	3	2			
Carried over ..				1,70,72,844	3	5	Carried over ..	50,43,558	15	9	88,95,186	14	3

BALANCE SHEET AS ON 31st MARCH, 1942—(contd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,70,72,844	8	5	Brought forward ..	59,48,553	15	9	88,95,136	14	3
							(ix) Hyderabad:—						
							1. Botanical	3,88,842	9	11			
							2. Cotton Survey	36,578	8	0			
							3. Pink and Spotted Bollworm ..	83,976	10	4			
							4. Improvement of Kumpta cotton	26,678	5	7			
							5. Inclusion of Northern and						
							Westerns in Dry Farming						
							Scheme at Raichur	1,096	15	0			
							6. Pink and Spotted Bollworm						
							Clean up Campaign	53,929	2	0			
							7. Improvement of cottons of the						
							Oomtas tract	5,571	0	0			
							Total	5,97,572	13	10			
							(x) Bikaner:—						
							Bengals Cotton Improvement ..	64,642	0	11			
							(xi) Baroda:—						
							1. Root Rot	87,732	9	5			
							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 Amrell and						
							Jagudan	17,842	12	5			
							Total.. .. .	1,46,252	9	6			
							(xii) Bengal:—						
							1. Comilla Scheme	37,263	5	9			
							2. Cultivation of Long Staple						
							Cotton	1,775	13	0			
							Total.. .. .	39,039	2	9			
							(xiii) Mysore Doddahathi	17,270	13	6			
							(xiv) Collection of Iran Cottons..	3,121	12	0			
Carried over ..				1,70,72,844	8	5							

BALANCE SHEET AS ON 31st MARCH, 1942—(concl'd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,70,72,344	3	5							
							(xv) Baluchistan—Co-ordination of research on Black-headed Cricket in Sind & Baluchistan	12,599	10	0			
							(xvi) Preliminary Scheme at Nawanagar	323	12	4			
							(xvii) Estimation of effects on cotton crop of the use of Plant Puller ..	4,143	12	5			
											68,28,520	7	0
							V. Marketing Schemes.						
							1. Grading and Marking of 1027 A. L. F. in Surat area	1,980	8	0			
							2. Punjab Cotton Marketing Survey ..	7,214	1	6			
							3. Baroda Better Marketing of 1027 A. L. F.	10,115	6	3			
							4. Extension and Marketing of V. 434	3,14,614	1	7			
							5. Distribution and Marketing of Burl 107 Cotton in Burhanpur Tahsil	16,147	2	0			
											3,50,071	3	4
							VI. Miscellaneous Schemes :—						
							1. Compilation of Manurial Trials ..	719	15	0			
							2. Compilation of Hand-book dealing with pests and diseases of cotton in the Empire	1,225	0	0			
											1,944	15	0
							By suspense account				5,458	12	7
							By Balance				14,01,211	15	3
GRAND TOTAL ..				1,70,72,344	3	5	GRAND TOTAL ..				1,70,72,344	3	5

PROVIDENT FUND ACCOUNT AS ON 31st MARCH, 1942.

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Subscribers' contribution account	4,12,860	8 0			Advance to subscribers	79,846	9 0		
<i>Less</i> : Payment made to subscribers resigned	1,45,922	4 0			<i>Less</i> : Recoveries made up to 31-3-1942 ..	67,262	11 0		
			2,00,437	15 0				12,083	14 0
Committee's contribution account	4,03,250	4 11			Accrued interest on Government Paper up to 31-3-1942 credited to subscribers for distribution			8,584	10 8
<i>Less</i> : Payment made to subscribers resigned and forfeitures for Committee's contributions disallowed	1,41,124	0 8			Investment Fluctuation account			12,953	12 7
			2,02,125	11 3	By Balance			5,24,828	7 8
Lapse and Forfeiture account			7,027	9 0					
Not interest received on investments etc. ..			16,078	11 11					
Suspense account—Amount due to subscriber deceased—Mr. N. Sircenivas			500	0 0					
Suspense deposit of Mr. Dutt's own contribution			1,275	12 4					
Suspense receipts			5	1 0					
Total.. ..			5,53,450	12 0	Total ..			5,53,450	12 6

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1942.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Opening Balance as on 1st April, 1941	16,79,495 13 8			Administration of Committee (Including Improvement of Cotton Marketing, Printing, Publicity and Distribution and Travelling Allowance of Non-Official Members)		1,63,385 6 7
Sinking Fund	14,661 14 0	16,94,157 11 8		Agricultural Research Grants-in-Aid (Including Research, Seed, Marketing and Miscellaneous Schemes)		4,77,914 1 7
Less—Refunds of Suspense Receipts received during 1940-41		492 5 0	16,93,665 6 8	Technological Research		2,31,481 15 10
Receipts under Section 12 of the the Indian Cotton Cess Act, 1923			5,92,500 12 1	Closing Balance :		
Other Receipts.				(Government Paper at cost).		
Sale of Publications, Sale of Cotton, Miscellaneous Receipts, Test Fees etc.	19,148 1 2			3% Government of India Defence Bonds 1946 of the face value of Rs. 6,73,500 ..	6,73,500 0 0	
Suspense Receipts ..	278 8 0			*3½% Government of India Loan 1947-50 of the face value of Rs. 4,50,000	3,93,314 1 0	
Sinking Fund Provision for 1941-42	1,388 12 0	20,815 5 2		4½% Government of India Loan 1955-60 of the face value of Rs. 26,600	25,004 0 0	
Interest on Investments ..		64,070 11 11		6% Bombay Municipal Debentures, 1954 of the face value of Rs. 10,000	3,950 0 0	
		84,886 1 1		6% Rangoon Municipal Debentures, 1955 of the face value of Rs. 3,83,500 ..	4,15,328 2 0	
Loss: Less on Sale of 4% Karachi Port Trust Bonds, 1943		1,600 0 0	83,286 1 1		15,11,096 3 0	
				(Market value on 31st March, 1942, Rs. 15,52,640 inclusive of Rangoon Municipal Debentures taken at cost)		
				*An overdraft of Rs. 24,558-13-9 with the Imperial Bank of India has been secured against the hypothecation of 3½% Government of India Loan 1947-50 of the face value of Rs. 1,50,000		
Carried over ..			23,69,452 3 10	Carried over ..	15,11,096 3 0	8,72,781 8 0

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1942—(concl'd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.	
Brought forward ..					23,69,452	8 10	Brought forward ..	15,11,096	8 0	8,72,781	8 0	
							<i>Imprests :-</i>					
							Committee's Account as certified by the Secretary including undischarged pay ..	1,520	10 0			
							Technological Research Laboratory as certified by the Director, Technological Research Laboratory ..	500	0 0			
							Director of Agriculture, Sind	725	0 0			
							Cotton Research Botanist, Lyallpur, as certified by the Cotton Research Botanist, Lyallpur	150	0 0			
							Plant Physiologist, Punjab, as certified by the Plant Physiologist, Punjab	100	0 0			
							Geneticist and Botanist, Indore, as certified by the Geneticist and Botanist, Indore	300	0 0			
							Director of Agriculture, Bombay Presidency, as certified by the Director of Agriculture, Bombay Prsidency ..	1,370	0 0			
							Suspense (Recoverable) ..			4,674	10 0	
										5,468	12 7	
										15,21,229	9 7	
							<i>Less: Overdraft Account with the Imperial Bank of India, Bombay, (against) hypothecation of 3½% Government of India Loan 1947-50 of the face value of Rs. 1,50,000</i>			24,558	13 9	
							**Total Closing Balance				14,96,670	11 10
Total ..					23,69,452	8 10	Total				23,69,452	3 10

**Includes Rs. 16,050-10-0 on account of Sinking Fund.
 We have examined the above Statement of Receipts and Payments of the 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.

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

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1942.

RECEIPTS.	Rs. a. p.		Rs. a. p.		Rs. a. p.	EXPENDITURE.	Rs. a. p.		Rs. a. p.	
Opening Balance as on 1st April, 1941	5,36,672	10 3				Investments Fluctuation Account:—				
<i>Less</i> —Payments to subscribers who have resigned in 1940-41	5,899	12 11				Net depreciation in Market Value of Securities	21,328	14 0		
Subscribers' contributions ..	26,087	10 0	5,30,772	13 4		<i>Add</i> —Amount transferred to Lapses and Forfeitures Account being profit on Sale of 4% Government of India Loan 1960-70 of the face value of Rs. 20,000 ..	3,391	6 0	24,720	4 0
<i>Add</i> —Recoversies against advances	7,314	14 0	33,402	8 0		Balance:—				
<i>Less</i> —Refunds to subscribers who have resigned ..	26,386	6 3	5,64,175	5 4		(Securities in Government Paper at Market Value).				
<i>Less</i> —Advances to subscribers	8,604	12 0	34,991	2 3		3% Government of India Defence Bonds, 1946 of the face value of Rs. 2,27,300 ..	2,21,901	10 0		
Committee's contributions received from Indian Central Cotton Committee ..			5,29,184	8 1		3% Government of India Loan, 1951-54 of the face value of Rs. 32,000 ..	30,100	0 0		
<i>Less</i> —Payments made to subscribers who have resigned, including transfers to "Lapses and Forfeitures" Account for contributions disallowed ..			26,087	10 0		3½% Government of India Loan, 1947-50 of the face value of Rs. 1,20,000 ..	1,17,150	0 0		
Interest received on investments	15,990	11 7	5,55,271	13 1		4% Government of India Loan, 1960-70 of the face value of Rs. 12,600 ..	12,978	0 0		
Interest received on advances to subscribers	152	8 5			5,29,577	13 11				
Refund of Income-tax deducted on interest received during 1940-41	1,394	14 0	25,693	15 2		2½% Government of India Loan, 1948-52 of the face value of Rs. 70,000 ..	65,100	0 0		
<i>Less</i> —Interest paid during the year to subscribers who have resigned:—						3% Government of India Loan 1949-52 of the face value of Rs. 35,000 ..	33,315	10 0		
On their own contributions ..	234	1 2				Savings Bank Account with the Imperial Bank of India, Bombay	4,80,545	4 0		
Carried over ..	234	1 2	17,538	2 0		Current Account with the Imperial Bank of India, Bombay	371	10 0		
						Carried over ..	43,911	9 3	5,24,828	7 3
										5,49,548 11 3

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1942—(concl'd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..	234	1	2	17,538	2	0	5,29,577	13	11	Brought forward ..				5,49,548	11	3
On Committee's contributions,	231	6	8													
Interest paid in advance at the time of purchase of Government Securities (since received)	233	5	4													
Incometax deducted from interest on investments (recoverable)	832	8	0													
Withdrawal charges for Securities sold	12	8	0													
Cost of stationery, etc. ..	34	6	0													
Bank's commission for collection of interest and cost of stamps	22	11	0	1,600	13	9	15,937	4	3							
Lapses and Forfeitures Account							4,028	8	1							
<i>Suspense Receipts.</i>																
Being excess contribution received from Mr. Verma							5	1	0							
Total ..							5,49,548	11	3	Total ..				5,49,548	11	3

Examined and found correct.

(Sd.) S. B. BILMORIA & Co.

Registered Accountants, Auditors.

BOMBAY, 18th June, 1942.

APPENDIX II.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

(1) PRESIDENT—

Mr. P. M. Kharegat, C.I.E., I.C.S., Vice-Chairman, Imperial Council of Agricultural Research, *ex-officio*.

(a) Dr. W. Burns, C.I.E., Agricultural Commissioner with the Government of India, *ex-officio*.

(2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS—

<i>Madras</i>	Mr. P. H. Rama Reddi, I.A.S., Director of Agriculture.
<i>Bombay</i>	Mr. W. J. Jenkins, C.I.E., I.A.S., Director of Agriculture.
<i>United Provinces</i>	Mr. C. Maya Das, I.A.S., Director of Agriculture.
<i>Punjab</i>	Mr. H. R. Stewart, C.I.E., I.A.S., Director of Agriculture.
<i>Central Provinces and Berar</i>	Mr. J. C. McDougall, C.I.E., I.A.S., Director of Agriculture.
<i>Sind</i>	Rao Bahadur K. I. Thadani, Director of Agriculture.

(3) THE DEPUTY ECONOMIC ADVISER TO THE GOVERNMENT OF INDIA, *ex-officio*.

(4) REPRESENTATIVES OF CHAMBERS OF COMMERCE AND ASSOCIATIONS—

The East India Cotton Association ..	Sir Purshotamdas Thakurdas, C.I.E., M.B.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. (<i>Vice-President</i> .)
The Karachi Chamber of Commerce ..	Mr. A. P. Darlow.
The Ahmedabad Millowners' Association	Mr. Chandulal P. Parikh.
The Tuticorin Chamber of Commerce ..	Mr. J. L. Hurschler.
The Upper India Chamber of Commerce ..	Captain S. R. Pocock, M.C., M.L.A.
The Empire Cotton Growing Corporation	Sir William Roberts, C.I.E.

(5) COMMERCIAL REPRESENTATIVES NOMINATED BY CENTRAL GOVERNMENT—

<i>Central Provinces and Berar</i>	{ Rao Saheb P. V. Deshmukh. Mr. Y. G. Deshpande.
<i>Madras</i>	
<i>Punjab</i>	Mr. J. M. Doak.
	Kanwar Raj Nath.

(6) *Bengal representative* Mr. Suryya Kumar Basu.

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

(8) REPRESENTATIVES OF COTTON GROWING INDUSTRY—

<i>Madras</i>	{ Rao Bahadur R. V. Ramasundaram Pillai, Mr. L. Madhava Reddi.
-----------------------	--

<i>Bombay</i> .. .. .	..	..	..	..	..	{ Mr. S. T. More, Vacant.
<i>United Provinces</i> .. .. .	..	..	..	..	..	{ Khan Bahadur M. Ahmad Hussain Khan, Rai Bahadur Kunwar Laxmi Raj Singh, M.L.C.
<i>Punjab</i> .. .. .	..	..	..	..	..	{ Khan Bahadur Ch. Riasat Ali, M.L.A., Rai Saheb Ch. Surajmal, M.L.A.
<i>Central Provinces and Berar</i> .. .. .	..	..	..	..	..	{ Rao Bahadur Sir Madharao Deshpande, K.B.E., Rao Bahadur Uttamrao Patil.
<i>Sind</i> .. .. .	..	..	..	..	..	Mr. Roger Thomas, C.I.E.

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

<i>Hyderabad State</i> .. .. .	..	..	..	..	..	Rai Saheb Kalidas Sawhney, Director, Agricultural Research.
<i>Baroda State</i> .. .. .	..	..	..	..	..	Mr. R. G. Allan, C.I.E., Commissioner of Agriculture.
<i>Gwalior State</i> .. .. .	..	..	..	..	..	Mr. N. M. Deshmukh, Director of Agriculture.
<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, Deputy Director of Agriculture, Northern Division, Surat,
2. Mr. T. G. Rama Iyer, Director of Agriculture in Mysore, Bangalore.
3. Rao Bahadur V. Ramanatha Ayyar Avl., Cotton Specialist and Geneticist, Coimbatore.
4. Musahib-i-Khas Bahadur M. A. Rashid Khan, Home Minister, Holkar State, Representative of the Holkar State.
5. Dr. Chellaram Shewaram, Representative of the Karachi Indian Merchants' Association.
6. Dr. B. L. Sethi, Economic Botanist (Cotton & Rabi Cereals) to the Government of the United Provinces, Cawnpore.
7. The Hon'ble Mr. V. Ramdas Pantulu, President, Madras Provincial Co-operative Bank, Madras.
8. Sir Shri Ram, Representative of the Cotton Millowners of Delhi.
9. Representative of the Karachi Cotton Association Ltd.—Vacant.
10. Dewan Bahadur Sir T. Vijayaraghavacharya, K. B. E.
11. Dr. P. J. Gregory, Second Economic Botanist, Bengal.
12. Sir Theodore Gregory, Economic Adviser to the Government of India.
13. Mr. Jamalulla Hussaini, Deputy Director of Agricultural Propaganda, Nampally Station, Hyderabad (Deccan).
14. Mr. Padampat Singhania, Senior Proprietor, Messrs. Jugilal Kamalpat, Cawnpore.
15. Mr. R. G. Saraiya, O.B.E., J.P., Messrs. Naraindas Rajaram & Co., Bombay.

· *Agricultural Research Sub-Committee.*—

- I. *The President*—Mr. P. M. Kharegat (*ex-officio*),
- II. *The Vice-President*—Sir Chunilal B. Mehta (*ex-officio*),
- III. *The Co-operative Banking Representative*—Sir Chunilal V. Mehta (*ex-officio*),
- IV. *Cotton Growers' Representatives*.—Sir William Roberts, Mr. Roger Thomas, Rao Bahadur Sir Madhaorao Deshpande,
- V. *Cotton Trade Representatives*.—Sir Purshotamdas Thakurdas, Mr. Chandulal P. Parikh, Mr. J. L. Hurschler, Mr. L. F. H. Goodwin, Dr. Chellaram Shewaram.
- VI. *Agricultural Officers*.—The Agricultural Commissioner with the Government of India (*ex-officio*), Mr. H. R. Stewart, Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. C. Mayadas, Mr. R. G. Allan, Rao Bahadur K. I. Thadani, Rai Saheb Kalidas Sawhney, Mr. N. M. Deshmukh, Mr. J. C. McDougall, Mr. T. G. Rama Iyer, Rao Bahadur S. S. Salimath, Rao Bahadur V. A. Tamhane.
- VII. *Additional Members*.—Dewan Bahadur Sir T. Vijayaraghavacharya, Sir Chunilal V. Mehta, 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. Appal, Dr. P. J. Gregory, Dr. H. K. Nandi.
- VIII. *The Secretary*.

Technological Research Sub Committee.—The President—Mr. P. M. Kharegat (*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, Mr. H. R. Stewart, Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. J. C. McDougall, Mr. Chandulal P. Parikh, Mr. L. F. H. Goodwin, Capt. S. R. Pocock, Mr. J. L. Hurschler, Rao Bahadur P. V. Deshmukh, Mr. E. F. G. Gilmore, Dr. Nazir Ahmad, Rao Bahadur V. Ramanatha Ayyar, Rai Saheb Kalidas Sawhney, Mr. Y. G. Deshpande, Mr. K. Ramiah, Mr. Roger Thomas, Dr. R. Sankaran, Dr. B. L. Sethi, Dr. K. Venkataraman, Rao Bahadur Uttamrao Patil, Mr. F. F. Bignell and Mr. A. D. Walwyn (Representing the Bombay Millowners' Association), Seth Himatlal Kalidas and Seth Chinubhai Chimanlal (Representing the Ahmedabad Millowners' Association) and Mr. R. G. Saraiya and Mr. Gatulal Rangildas (Representing the East India Cotton Association, Ltd.)

Wider Markets Sub Committee.—The President (Mr. P. M. Kharegat), The Vice-President (Sir Chunilal B. Mehta), Sir Purshotamdas Thakurdas, Dewan Bahadur Sir T. Vijayaraghavacharya, Sir Sorab Saklatvala, Sir Chunilal V. Mehta, Dr. W. Burns, Sir Theodore Gregory, Mr. H. R. Steawart, Mr. W. S. Jenkins, Sir William Roberts, Mr. P. H. Rama Reddi, Mr. Chandulal P. Parikh, Rao Bahadur K. I. Thadani, Rao Saheb P. V. Deshmukh, Mr. L. F. H. Goodwin, Mr. Roger Thomas, Kanwar Raj Nath, Dr. Nazir Ahmad, Mr. R. G. Saraiya, Mr. Y. G. Deshpande, Mr. C. Maya Das, Mr. J. C. McDougall, Rai Saheb Kalidas Sawhney and Mr. V. Ramdas Pantulu.

Cotton Forecast Sub Committee.—The President (*ex-officio*), The Vice-President, the Agricultural Commissioner with the Government of India (*ex-officio*), The Deputy Economic Adviser to the Government of India, 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, 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 Deputy Director of Statistics, Department of Commercial Intelligence and Statistics, the Statistical Officer, Department of Industries and Commerce, Madras, Sir Theodore Gregory, Mr. J. L. Hurschler, 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. P. M. Kharegat, the vice-President—Sir Chunilal B. Mehta (*ex-officio*), the Co-operative Banking Representative—Sir Chunilal V. Mehta (*ex-officio*), Sir Purshotamdas Thakurdas, Sir Sorab Saklatvala, Mr. J. L. Hurschler, Sir William Roberts, Mr. W. J. Jenkins, Rao Saheb P. V. Desamukh, Dr. Chellaram Shewaram, Capt. S. R. Pocock, Mr. Chandulal P. Parikh, Mr. L. F. H. Goodwin, Mr. J. M. Doak, Mr. J. C. McDougall and Dr. Nazir Ahmad.

Standards Sub Committee.—Mr. C. P. Bramble (representing the Imperial Council of Agricultural Research), Mr. Haridas Madhavdas and Mr. Jamnadas Ramdas (Representing the East India Cotton Association, Mr. W. S. Priestley, and Mr. Kisharam Lekhraj (Representing the Karachi Cotton Association, Ltd.), Rao Bahadur Sir Madhaorao Deshpande and Mr. Sagan Chand Tapadia (Representatives of cotton growers of *Oomras* tract), Mr. Y. R. Joshi and A. J. Kapadia (Representatives of cotton growers of Broach tract), Mr. Mulchand V. Shah and Mr. Bansilal Jivanlal Desai (Representatives of cotton growers of Dholleras tract), Rao Saheb F. B. Lokshmeshwar, Mr. S. T. Patil (Representatives of cotton growers of *Kumpla* tract), Mr. H. J. Vadodaria and Mr. Vrajlalbhai Narotamdas Trivedi (Representatives of cotton growers of Mathia tract) and Mr. Roger Thomas (Representatives of the Sind and Punjab cotton growers).

APPENDIX III.

STOCKS OF INDIAN COTTON ON 31st JANUARY, 1942, 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.				
	1938.	1939.	1940.	1941.	1942.	1938.	1939.	1940.	1941.	1942.	1938.	1939.	1940.	1941.	1942.
Tinnevellies	22	32	20	18	27	18	4	2	14	17	40	36	22	32	44
Salems.. ..	15	16	4	9	10	3	8	3	2	8	18	24	7	11	16
Cambodias	46	71	33	34	66	14	17	5	21	38	60	88	38	55	104
Northerns & Westerns.	24	19	15	23	25	12	18	2	16	10	36	37	17	39	35
Cocanadas	*	1	1	1	4	12	14	8	9	19	12	15	9	10	23
Outside Cottons ..	50	27	49	56	61	..	..	..	..	4	50	27	49	56	65
Total ..	157	166	122	141	193	59	61	20	62	94	216	227	142	203	287

* Less than 500 bales.

APPENDIX IV.

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.)

	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	†1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.
Bombay Island ..	485,426	542,036	766,375	664,540	611,006	565,084	491,709	687,287	664,199	636,720	782,815	750,317	634,149	982,084	1,057,745
Ahmedabad	298,075	318,983	844,021	321,503	322,257	348,009	373,845	320,558	320,082	304,398	346,269	346,375	305,459	341,800	414,870
Bombay Province ..	894,671	1,044,925	1,800,859	1,173,650	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
Madras Province ..	194,591	204,284	211,488	214,759	200,707	292,013	278,060	312,164	365,423	412,268	422,573	480,839	507,391	525,611	504,054
United Provinces ..	170,840	182,462	234,205	235,023	256,820	273,573	277,230	292,424	317,011	299,073	288,320	356,331	349,340	381,025	427,305
Central Provinces and Berar	116,888	121,301	123,146	118,492	115,018	111,208	112,660	125,014	130,298	122,987	146,587	164,616	142,868	153,825	178,791
Bengal	82,086	84,212	99,075	91,093	102,390	103,784	107,633	101,101	98,892	79,944	92,546	90,611	111,383	135,227	125,740
The Punjab and Delhi.	45,038	54,575	64,464	73,736	89,681	80,854	71,939	83,897	89,439	93,886	94,742	133,347	165,274	171,652	179,987
Rest of British India	15,040	22,189	24,458	27,101	30,342	31,935	35,139	38,575	38,010	35,823	46,840	49,806	44,867	47,316	64,641
Total—British India..	1,519,760	1,714,038	2,057,095	1,935,303	1,987,603	2,009,664	1,946,210	2,183,791	2,228,374	2,172,725	2,445,006	2,591,863	2,493,408	2,994,735	3,334,857
Total—Indian States.*	251,589	277,540	315,399	333,096	353,793	351,260	390,116	423,341	449,314	460,060	554,003	559,202	556,693	622,412	690,375
TOTAL—INDIA ..	1,771,349	1,991,578	2,373,094	2,268,399	2,341,396	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	4,025,232

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

† From April 1937 figures for Burma have been excluded.

INDIAN RAW COTTON CONSUMED IN MILLS IN INDIAN STATES.

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

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

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.
Hyderabad	16,097	19,067	20,823	23,074	31,200	33,488	33,231	45,588	51,771	49,981	63,093	68,156	67,995	72,860	83,725
Mysore	44,320	39,619	46,590	43,326	49,293	50,596	47,168	51,196	50,824	53,236	55,244	58,858	67,851	65,062	74,966
Baroda	46,884	48,852	59,043	62,578	58,534	50,587	53,612	57,146	51,963	51,761	70,686	78,278	65,573	91,519	90,642
Gwallor	25,716	36,708	41,468	45,207	45,892	43,306	49,362	56,318	72,163	79,079	89,243	94,090	88,688	95,517	94,300
Indore	65,391	76,070	83,026	88,620	95,296	91,036	111,430	114,229	113,379	106,454	147,766	140,792	120,186	138,795	148,867
Kathiawar States ..				20,283	18,849	18,868	26,606	35,438	37,397	42,717	48,545	44,109	43,703	50,479	60,628
Other Indian States ..	52,581	57,224	64,454	82,558	39,382	40,209	45,197	45,735	51,402	57,767	57,119	58,444			
Pondicherry				13,350	20,257	23,170	23,610	22,691	20,355	19,065	22,307	26,475	102,702	108,180	137,247
Total—Indian States.	251,589	277,540	315,399	333,996	358,793	351,260	390,116	428,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375

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

(Based on voluntary returns furnished by mills.)

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	†1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.
Bombay Province ..	24,970	27,324	24,361	54,409	74,979	80,092	74,868	58,355	75,617	67,219	74,750	80,164	86,687	96,215	102,965
Madras Province ..	39,560	52,188	46,582	55,717	99,389	96,340	110,875	123,260	147,044	173,102	156,075	162,489	175,540	189,257	230,691
United Provinces ..	10,308	13,878	20,441	18,496	14,367	19,236	17,871	10,090	10,405	10,659	15,719	17,532	20,279	29,127	26,293
Central Provinces and Berar	20,861	6,924	16,243	15,771	20,743	17,462	16,382	20,544	27,502	26,321	32,860	26,980	29,052	32,589	81,178
Bengal*										90			3		
The Punjab & Delhi †	4,739	3,760	4,361	4,307	2,317	2,149	..	5,535	3,110	28,385	23,873	25,960	33,079	28,627	30,988
Rest of British India*	..	..	..	..	..	..	..	..	..	19,262	17,160	23,916	12,734	15,529	21,280
Total—British India..	100,438	104,074	111,988	148,700	211,795	215,279	221,996	217,784	263,678	325,058	321,037	338,041	357,374	391,344	443,393
Indian States*	..	..	..	..	..	..	..	..	..	131,149	109,003	122,078	116,962	131,657	118,660
Total—INDIA*	..	..	..	..	..	..	..	..	..	456,207	430,040	458,119	474,336	523,001	562,053

* 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.

**BRITISH INDIA PRESS,
BOMBAY.**
