

**TWENTYSECOND
ANNUAL REPORT**

of the

**INDIAN
CENTRAL COTTON COMMITTEE**

for the year ended

31st AUGUST

1943

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CONTENTS.

PAGE.

CHAPTER I.

<i>Introductory</i>	1
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CHAPTER II.

<i>Progress in the Introduction of Improved Varieties of Cotton</i>	18—38
(i) Bombay	21
(ii) Sind	25
(iii) Punjab	27
(iv) Central Provinces and Berar	28
(v) Madras	29
(vi) United Provinces	33
(vii) Hyderabad State	34
(viii) Baroda State	36
(ix) Rajpipla State	38

CHAPTER III.

<i>Cotton Statistics</i>	39—47
Indian cotton situation—1942-43.	39
Report on the staple length of Indian cotton crop.	42
Demand for various types of Indian cotton	43
Stocks	43
Indian mill consumption	44
Exports	44
Statistics of cotton pressed	44
Unpressed (loose) cotton statistics	44
Statistics of cotton ginned	45
Improvement of cotton forecasts	45
Scheme for crop estimating survey on cotton in the Central Provinces and Berar.	46
Report on the accuracy of the all-India cotton forecast	47
Publications	47

CHAPTER IV.

<i>Cotton Marketing, Legislation and other Protective Measures</i>	48—53
(i) Cotton prices	48
(ii) Cotton baling hoops	48
(iii) Coal requirements of ginning and pressing factories	49

	PAGE.
(iv) Regulated cotton markets	50
(v) Agmarking	50
(vi) Universal standards	50
(vii) (a) Cotton Transport Act.	51
(b) Cotton Ginning and Pressing Factories Act	51
(c) Prevention of introduction of foreign cotton pests	52
(d) Cotton Control Acts	53

CHAPTER V.

<i>Research</i>	54—95
Research on Cotton Technology	54
Fundamental Research	56
Cotton Research in Provinces and States	62
(i) <i>Bombay.</i> —	
(a) Broach Cotton Breeding Scheme	62
(b) Jalgaon Cotton Breeding Scheme	64
(c) Scheme for breeding wilt-resistant cottons in Surat area	64
(d) Scheme for improvement of Wagad cotton at Viramgam and Jagudan	65
(e) Scheme for improvement of cotton crop in Kaira district	66
(f) Scheme for interspecific hybridisation in cottons at Surat	67
(g) Scheme for improvement of Dharwar-American cotton	68
(ii) <i>Sind.</i> —	
(a) Scheme for production of long staple cottons in Sind	69
(b) Scheme for Cotton Jassid Investigation	70
(c) Scheme for co-ordination of research on Blackheaded Cricket in Sind and Baluchistan.	71
(d) Scheme for bollworm investigation and clean-up campaign in Sind	72
(iii) <i>Punjab.</i> —	
(a) Punjab Botanical Scheme	73
(b) Scheme for improvement of Punjab-American 230 F/K. 25 cotton	75
(c) Physiological Scheme	75
(d) Root Rot Scheme	78
(e) Cotton Jassid Investigation in the Punjab	79
(f) Scheme for study of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds in the Punjab	80
(iv) <i>Central Provinces and Berar.</i> —	
Central Provinces and Berar Cotton Breeding Scheme	80

	PAGE.
(v) <i>Madras.</i> —	
(a) Pempheres Scheme	82
(b) Scheme for improvement of Mungari cotton in Madras Province.	83
(c) Scheme for Improvement of Cocanadas cotton in Madras Province	84
(vi) <i>United Provinces.</i> —	
The United Provinces Botanical Scheme	86
(vii) <i>Bengal.</i> —	
(a) Scheme for cultivation of long staple cotton in Bengal	87
(b) Comilla Cotton Scheme'	88
(viii) <i>Baluchistan.</i> —	
Scheme for co-ordination of research on Black-headed Cricket in Sind and Baluchistan.	88
(ix) <i>Hyderabad.</i> —	
(a) Botanical Research Scheme.	89
(b) Scheme for improvement of cotton of Oomras tract in Hyderabad State	90
(c) Scheme for improvement of Kumpta cotton	91
(x) <i>Baroda.</i> —	
(a) Root Rot Scheme	92
(b) Scheme for improvement of Mathio cotton at Amreli	92
(xi) <i>Bikaner.</i> —	
Bengals Cotton Improvement Scheme	93
(xii) <i>Mysore.</i> —	
Mysore (<i>Doddahathi</i>) Cotton Scheme	94

CHAPTER VI.

<i>Seed Distribution and Extension Schemes</i>	96—111
<i>Bombay.</i> —	
(a) Surat Seed Distribution Scheme	96
(b) Scheme for Selection 1A cotton	97
(c) Jarila Seed Distribution and Extension Scheme	98
(d) Deccan Canals (Jarila) Seed Distribution Scheme	99
(e) B. D. 8 Seed Distribution Scheme	100
(f) Revised Jayawant and Gadag No. 1 Seed Distribution Scheme	101
(g) Scheme for cultivation of 1027 A. L. F. cotton in Nawapur Taluka	101

	PAGE.
<i>Sind.—</i>	
(a) Seed Distribution and Extension Scheme	102
(b) Financing of Seed Distribution	103
<i>Central Provinces and Berar.—</i>	
(a) Verum Seed Distribution and Marketing Scheme	104
(b) Scheme for Distribution and Marketing of Buri 107 cotton	106
<i>Madras.—</i>	
(a) Co. 3 Seed Distribution Scheme	107
(b) Scheme for distribution of H. 1 strain in the Westerns area	107
(c) Maintenance of nucleus of pure seed of improved varieties of cotton Co. 2 and K. 1.	108
<i>United Provinces.—</i>	
Scheme for distribution and extension and marketing of Perso-American cotton in Western United Provinces	109
<i>Baroda State.—</i>	
(a) Baroda (Navsari) Seed Storage Scheme	109
(b) Baroda B. D. 8 Seed Distribution Scheme	110
(c) B. 9 Seed Storage Scheme	111

APPENDICES.

I. Members of the Indian Central Cotton Committee	112
II. Sub-Committees	114
III. Balance Sheet as at 31st March, 1943; statement of receipts and payments for the year ended 31st March, 1943	116
IV. Stocks of Indian cotton on 31st January, 1943, held by the mills and the trade in Madras Province	130
V. Indian raw cotton consumed in Indian mills	131

INDIAN CENTRAL COTTON COMMITTEE. ANNUAL REPORT.

CHAPTER I.

INTRODUCTORY.

THIS is the twentysecond Annual Report of the Indian Central Cotton Committee, covering the period 1st September, 1942, to 31st August, 1943. The Indian Central Cotton Committee was established by the Government of India in 1921, in pursuance of the recommendations of the Indian Cotton Committee of 1917-18. It was incorporated under the Indian Cotton Cess Act in 1923 and from that time 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 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, the underlying principle being that special expenditure for the benefit of a particular industry should be borne by that industry. Of the total receipts of the Committee up to 31st March, 1943, amounting to Rs. 1,76,01,830, Rs. 1,50,12,308 represent collections from the cotton cess. As explained in the previous reports, funds are allotted by the Committee for research into cotton problems, mainly of all-India importance and for 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 appropriate 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. In this connection, it may be mentioned that, whilst until 1937 practically the entire expenditure on the various schemes of research and development was met by the Committee, the provincial Governments and States have since borne an increasing share of expenditure on schemes in which they are specially interested.

Under the Indian Cotton Cess Rules, members, who are not *ex-officio* members, hold office for three years and one-third of their number retire each year in rotation. The term of office of additional members appointed by the Governor General under Section 4(xi) of the Indian Cotton Cess Act is three years or such lesser period as may be specified in the notification. A list of the members constituting the Committee and the various interests they represent as on 31st August, 1943, is given in Appendix I. The composition of the Sub-Committees as on 31st August, 1943, is given in Appendix II. The functions of the various Sub-Committees have been detailed in previous Annual Reports, and it is not proposed to repeat them here.

There was no change in the administration. The term of appointment of Mr. D. N. Mahta as Secretary of the Committee was extended by the Government of India for a further period of five years with effect from the 4th October, 1942. Dr. Nazir Ahmad continued as Director of the Committee's Technological Laboratory. The receipts during the year amounted to Rs. 5,29,765 and the total expenditure to Rs. 8,62,295. The receipts and expenditure of the Committee, as well as the Balance Sheet for the year as at 31st March, 1943, are given in Appendix III. 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 11 of the Rules under Section 16 of the Indian Cotton Cess Act, and is the principal executive body of the Committee.

The Committee learnt with deep regret of the death in England of Sir Bryce Burt, its former President and at its meeting held in January, 1943, passed a resolution of condolence placing on record its sense of deep sorrow at his death and its appreciation of the valuable services rendered by him over a period of 18 years of his close association with the Committee, first as its Secretary, then as member and finally as its President.

Sir Pheroze Kharegat (President), Sir Chunilal B. Mehta (Vice-President), Mr. W. J. Jenkins, Sir Chunilal V. Mehta and Mr. D. N. Mahta, Secretary, represented the Committee on the Board of Governors of the Institute of Plant Industry, Indore, during the financial year ending 31st March, 1943. Mr. Roger Thomas represented the Committee on the Imperial Council of Agricultural Research. Under Article 51, as amended, of the Articles of Association of the East India Cotton Association, the Committee is entitled to nominate, from amongst its growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts,

as Directors of the Association. Rao Bahadur Sir Madhaorao Deshpande, Mr. L. Madhava Reddi and Mr. S. T. More were elected by the Committee as its representatives for the cotton year 1942-43.

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

As usual, the Central Cotton Committee met twice during the year under review. At the first meeting, which was held at Bombay on the 29th and 30th January, 1943, and at which, His Excellency Sir Roger Lumley, Governor of Bombay, was present, the Committee was mainly concerned with the important question of the policy which should be followed in the matter of cotton production in India in the future. The existing position in this connection was set out in the following note prepared by the Secretary :—

“ This note is intended to serve as a basis for discussion on the important question of the policy which the Indian Central Cotton Committee should follow in the matter of cotton production in India in the future. The need for careful planning well in advance cannot be over-emphasised. Agricultural research, particularly plant breeding, is necessarily slow in the production of results owing to the long period involved in the selection, fixation and large scale testing of improved varieties ; a planned production would enable concentrated application of science in the desired channel from the commencement and thus ensure that there is no avoidable waste of effort. In order to obtain a clear understanding of the scope and importance of the subject, it is desirable first to take stock of the present position.

A better balanced production of the various types of cotton grown in the country has always been one of the main aims of the Indian Central Cotton Committee. Realising from the outset, however, that the Indian mill industry is potentially the most important customer of Indian cotton, its needs have

naturally been kept in the forefront of any plan of crop improvement. From what follows, it will be apparent that considerable success has already been achieved in these directions. It will be seen also that the War, while creating several new cotton problems, has actually helped the attainment of the objects in view by accelerating the rate of progress in the extension of superior varieties of cotton.

To go back some twenty years, that is, about the time when the Indian Central Cotton Committee was first established, India produced annually over six million bales of cotton, of which roughly two-thirds was of staple length $\frac{5}{8}$ " and less. About one-third of the crop was consumed by the mill industry and half-a-million bales were utilised for such domestic purposes as hand-spinning, making of quilts and mattresses, etc. The balance, consisting mainly of short staple varieties, was exported to Japan, the Continent and the United Kingdom, etc., the first two being the principal buyers. By the pre-war year of 1938-39, a considerable change had already taken place; the actual yield that year was some 6 million bales, but cotton of staple length $\frac{5}{8}$ " and below formed less than half of the total crop. The mill consumption had at the same time, gone up to 31.5 lakhs bales, and the exports to 33.7 lakhs bales. The season 1939-40, however, witnessed the loss of the Continental markets which on the average of the three pre-war years, accounted for an annual offtake of about $8\frac{1}{2}$ lakhs bales of Indian cotton. The advisability of recommending a reduction in the area under cotton, as a remedy to off-set this loss, was considered by the Committee, but, owing to the operation of several factors, no drastic action for the time being was considered necessary, as it was expected that the increased activity of the Indian mill industry to meet War requirements would most probably make up for more than half the quantity for which export markets had been lost. This expectation was not wide of the mark, as actually the consumption of Indian cotton in mills in India increased by nearly 6 lakhs bales in 1940-41. The position of Indian cotton, particularly of the short staple type, however, became serious early in the 1941-42 season when the Far-Eastern markets were also closed as a result of the entry of Japan into the War. The annual exports to Japan, on an average, used to be some 1.5 million bales, consisting mostly of the short staple varieties and the whole of this was now rendered surplus cotton for which there was no market. Various remedies were suggested to deal with the situation. In January 1942, the wider aspects of the question of

adjusting the supply of short staple cotton to probable demand were discussed by the Indian Central Cotton Committee and the following resolution was unanimously passed :—

“ 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.”

In order that there might be no ambiguity as to what constituted short staple cotton, the latter was defined as comprising the whole of the *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 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, was announced by the Government of India. The object of this measure was not merely to steady the market by making purchases of raw cotton of the types concerned as suitable occasion arose, but also to improve the future prospects by assisting

the cultivator to change over from short staple cotton to other more useful crops, preferably food grains. At the instance of the Committee, the specifications for goods required by Government were relaxed so as to enable more Indian cotton, particularly short staple cotton, to be used in the manufacture of such articles. At the same time, a "Grow More Food" campaign¹ was started on a country-wide scale, and the cultivator was advised to reduce the area under short staple cotton and to grow food grains in its place. 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, brought about a marked reduction in the total acreage under cotton and contributed in no small measure to the discouragement of cultivation of short staple cotton varieties. The difference, in price, between short staple cotton which was neglected and the better staple cotton for which the local demand was greater than ever, increased very considerably.

The cumulative effect of these measures is reflected in the phenomenal change in the character of the Indian cotton crop, as will be seen from the following figures (based on the third cotton forecast for 1942-43 issued on the 23rd December, 1942) of acreage under short staple varieties.

Short staple (varieties).	Third Cotton Forecast December 1942.		Percentage in- crease (+) or decrease (—) of Col. 2 on Col. 3.
	1942-43.	1941-42 (revised.)	
1	2	3	4
	(In thousand acres).		
Oomras (except Verum and Jarila)	2,324	5,114	—55
Bengals	1,820	2,816	—35
Comillas	148	151	..
Hyderabad Westerns	224	294	—17
Central India (excluding Malvi)	610	715	—15
Mathia	271	543	—50
Cocanadas and Warangal	189	174	+ 9
TOTAL—Short staple ..	5,586	9,807	—43
TOTAL—All staples ..	18,256	22,270	—18
Percentage of short staple on Total—All staples	31	44	

It will be noted that while the total acreage is down by some 18% as compared with the previous year, the reduction under short staple is as high as 43%, the largest decrease being under short staple *Oomras*, viz., 27.9 lakhs acres. The absolute reduction under all *Oomras* types, however, is only 11.9 lakhs acres, the balance having been diverted to better staple varieties, mostly *Jarila*, the spread of which in the Central Provinces and Berar and Khandesh has shown a phenomenal increase during the current season. The reduction in acreage under Punjab *desi* and Sind *desi* has been over 5.7 and 1.5 lakhs acres respectively. Taking the two provinces as a whole, no appreciable increase in the acreage under Punjab-American and Sind-American is anticipated. In so far as short staple cotton is concerned, it would seem that the goal aimed at by the Committee will be nearly reached, in as much as production of such cotton during the current season is likely to be just equal to the internal demand, with only a small balance for any possible exports.

To sum up the present statistical position of Indian cotton. According to the figures compiled by the East India and Karachi Cotton Associations, the stocks of Indian cotton held by the trade (excluding spinning mills) in Bombay and Karachi on the 31st August, 1942, were 391,000 and 95,000 bales, respectively. Complete data relating to stocks held at up-country centres are not available. On the basis of the figures of production, offtake by mills and exports, the probable carryover of Indian cotton with the trade (excluding spinning mills) on the 31st August, 1942, is estimated at 25.4 lakhs bales, including 14.7 lakhs bales of short staple cotton as shown below :—

	In lakhs of bales.	
	Total.	Short staple.
Stocks held by the trades on the 31st August, 1941 (vide Leaflet No. 2, 1940-41)	12.0	6.9
Probable production in 1941-42	65.0	22.7
Total supply during 1941-42	77.0	29.6
Estimated purchases by mills in 1941-42	42.9	9.9
Exports in 1941-42	8.7	5.0
Total distribution	51.6	14.9
Estimated stocks held by the trade on 31st August, 1942	25.4	14.7
Increase (+) or decrease (—) as compared with the stocks on 31st August, 1941	+13.4	+7.8

There was thus an increase in trade stocks of 7.8 lakhs bales under short staple and 5.6 lakhs bales under staple length group 'over $\frac{5}{8}$ ". The total stocks held in the country by the mills and the trade at the end of the season may be estimated at 42.5 lakhs bales, including 18.6 lakhs bales of short staple cotton, against 26.5 lakhs and 11.5 lakhs bales respectively, on the corresponding date of the previous year. The third forecast for the current season places the crop at 44.4 lakhs bales, showing a decrease of 10.5 lakhs bales or 19% on the corresponding revised estimates of the previous year. On this basis, the probable production (excluding extra-factory consumption) may be estimated at 52.6 lakhs bales (65 lakhs less 19% or 12.4 lakhs bales). The details by varieties given in the official forecasts indicate that the short staple crop in the current season will be less than that of the previous season by 8.9 lakhs bales or 39%. On this assumption, the probable production of short staple cotton during the current season may be estimated at 13.8 lakhs bales. The mill consumption of Indian cotton during the three months ending November, 1942, amounted to 9 lakhs bales, showing a decrease of 1.1 lakhs bales on the corresponding figure of the previous year. This decrease is mainly attributable to the closure of the mills in Ahmedabad during September, October and part of November, 1942. In view of the large increase in the volume of War orders, the total consumption of Indian cotton by mills during the current season may be estimated at 42 lakhs bales. Assuming that the purchases by mills would amount to the same figure, the offtake of short staple cotton may be estimated at 10.5 lakhs bales. The exports of Indian cotton would probably not exceed 4 lakhs bales, of which the share of short staple cotton may be taken at 2.5 lakhs bales. Taking the mill consumption in the current season at 42 lakhs bales, and exports at 4 lakhs bales, the stocks with the trade (excluding spinning mills) on the 31st August, 1943, may be estimated at 32.0 lakhs bales, or 6.6 lakhs bales higher than in the previous year. Half of these stocks may be expected to be of short staple varieties. It will thus be seen that the position of short staple cotton has improved considerably, production having come down to the level of internal consumption and possible exports. The emphasis now would appear to have shifted from the short staple to the medium staple varieties.

This briefly sums up the past and the present position and it is with this back-ground that the Committee has to consider the question of the policy that should be followed in the matter of cotton production in India in the

future. It would perhaps be best to divide the subject into two parts, *viz.*, (1) short range policy, that is, the policy for the duration of the War and (2) long range policy, that is, the policy that should be followed after the War.

In considering the policy that should be adopted during the War, the first question which suggests itself is whether any measures are necessary to stabilise the statistical position, and secondly to what extent the stocks should be allowed to accumulate. In this connection, it may be pointed out that although the carryover is large at present, Indian cotton position is by no means unhealthy; cotton is a much desired investment and, from what one can see, it certainly does not appear to be pressing on the market at the moment. Further, it should be remembered that the 1941-42 short staple *Oomra* crop, which constitutes no small proportion in the carryover, was of exceptionally good quality. After the War, there is bound to be a very large demand for cotton of any type, and particularly for the short staple varieties, and it may, therefore, be reasonably expected that there would be a very rapid decrease in the carryover directly the hostilities have ceased. It may be of interest to mention that Government owned or financed cotton in the U.S.A. on the 30th September, 1942, amounted to some 4,159,000 bales, as against 11,102,000 bales on the 31st January, 1941. The total stocks, that is, Government-owned and free stocks, were 12,956,000 bales on the 1st August, 1939, and 10,455,000 bales on the 1st August, 1942. The decrease in total stocks is much smaller than in Government-owned stocks, but the decrease in the Government-owned stocks shows how cotton is liked as an investment even in the U.S.A. where the prices to-day are relatively much higher than in this country. It would seem that the American prices can go down quite a lot after the War before India will have any need to fear a price drop. Nevertheless, it would appear to be a wise policy not to allow any increase, either in the proportion of the short staple varieties or in the total acreage as compared with the current season. There is some apprehension in certain quarters that the crop next year may increase owing to good prices and that short staple may possibly increase at the expense of the longer staple styles owing to the fact that, due to weather conditions in the *Oomras* tracts, short staple varieties have either fared better than the long staple ones, or the *ryots*, who almost exclusively planted the better staple seed, now believe that with short staple they would have done better. Having regard to the fact that adequate stocks of food grains are a matter of vital national importance, particularly

during the present emergency, it would seem desirable to curb, from the outset, any tendency to increase the area under cotton. The surplus from the current year's production is likely to be some 6 lakhs bales, mostly of cotton over $\frac{3}{8}$ " in staple, and it may even be desirable to examine whether a portion of the acreage under such cotton should be diverted to food grains during the next season. In doing so, the following figures regarding the curtailment in acreage effected in the major cotton growing provinces and Hyderabad and Central India States will be found helpful :—

	Third Cotton Forecast, 1942-43.		
	Area (Thousand acres).		% Decrease (in area.).
	1942-43.	1941-42.	
Bombay Province (including Bombay States and Baroda)	4,338	6,402	—32
Central Provinces and Berar	3,167	3,610	—12
Madras	1,931	2,036	—5
Punjab (including States and North West Frontier Province)	3,072	3,527	—13
Sind (including Khairpur State)	768	1,003	—23
Hyderabad State	2,776	2,912	— 5
Central India	1,309	1,620	—19

Coming now to the question of the long range policy, though it is difficult to forecast with any degree of accuracy what the requirements of the various markets for cotton after the war may be, it would seem desirable to lay down the broader principles that should be followed, so that research and extension work may be directed accordingly. India at present consumes annually over 6 lakhs bales of foreign cotton, mostly of staple above 1", while the production in the country of similar cotton up to 1 $\frac{1}{16}$ " in staple amounts at present

to only some 161,000 bales, and it may perhaps be well to consider whether the area under such varieties cannot be increased by the production, by hybridisation or acclimatisation, of suitable long staple varieties that would meet the requirements of the Indian mill industry for such cotton. If this could be done, it may help to ease, to some extent, the position of medium staple varieties. Some very good progress in this direction has already been made in the Madras Province where the varieties Co. 3 and Co. 4; with staple length of 1 1/32" to 1 1/16", are making headway in the southern districts of the province, the production in the past season being estimated at 19,000 bales. In the Punjab, too, there may possibly be further scope for increasing the area under Punjab-American 289F/K. 25 and Punjab-American 289F/43. Whatever policy is decided upon, it is of the utmost importance that the requirements of Indian mill industry, which, as has been stated above, is the best customer of Indian cotton, must be constantly kept in mind and efforts made to cater for it as fully as possible. In this connection, it may be mentioned that recently there has been a phenomenal increase in the area under *Jarila*; it may be well at this stage to make an estimate of the extent of the total requirements of the mills for this cotton so that, if possible, the production may be regulated accordingly. The question may perhaps also be examined as to whether it is desirable that the crop in excess of the mill requirements should consist of such qualities as are least likely to come into direct competition with the rest of the cotton producing world. Yet another question is whether a maximum limit on the total acreage should be placed, say, during the next five years. These are some of the points which suggest themselves; there may be several others which members may like to bring up in the course of discussion.

The meeting was presided over by Mr. P. M. Kharegat, C.I.E., I.C.S., and after a full dress debate the following resolution was unanimously passed:—

“ While the Indian Central Cotton Committee notes with satisfaction the decrease of four million acres in the current year's cotton crop, it is apprehensive, in view of the relatively high prices for short and fair staple cotton prevailing in the current year as compared with last year, that there will be a tendency to grow more cotton of that type in the coming season at the expense of food crops, despite propaganda to the contrary. As cotton growing must be considered in relation to the growing of other crops, and having regard to the seriousness of the food situation in the country in many areas in spite of an increase of about 8 million acres under Kharif food grains alone and in order to ensure, in the interests of the cotton grower, that the prices of cotton do not again fall to unremunerative levels as a result of over-production, the Committee recommends that

- (1) measures should be taken forthwith to restrict, compulsorily if feasible, the acreage under cotton in the coming season so that it does not exceed the present season's acreage. It should be ensured at the same time that the existing proportion of short to long staple is not exceeded,
- (2) a suitable fair price for food grains should be guaranteed and widely notified well before sowing time so that the grower may be encouraged to expand his acreage under food crops,
- (3) suitable concessions should be given as may be most effective according to local conditions in each province or state, such as the supply of seed and manure at cheap rates, reduction of land revenue and rent, etc., to encourage the production of food crops,
- (4) the advisability of removing or adjusting the existing maximum prices for food grains should be examined by Government,
- (5) a Central Crop Planning Board should be established together with Provincial Crop Planning Boards as early as possible to ensure planned production on an all-India basis. This Board should work in close co-operation with the Central Food Advisory Council."

The Second meeting of the year was held in July, 1943, at Bombay. In the absence of Sir Pheroze Kharegat, President, who was on deputation in the U.S.A. in connection with the United Nations Food Conference at Hot Springs, the meeting was presided over by Dr. W. Burns, C.I.E., Officiating Vice-Chairman of the Imperial Council of Agricultural Research. The principal subject considered at this meeting was that relating to the question of the desirability of re-opening trading in Hedge Contracts. It was pointed out that an organised 'futures' market had been recognised all over the world as being essential for the orderly marketing of large crops such as cotton, and the view was expressed that the elimination of the futures markets in respect of the Indian cotton crop would not be in the best interests of cotton growers unless Government were prepared to undertake the responsibility of purchasing the whole crop at fair and reasonable prices. The consensus of opinion was that the prohibition of hedge and futures contracts would not only take away what little protection the grower had but would seriously upset the whole system of distributing cotton in the country. It was pointed out that nearly 40 lakhs bales of cotton had to be marketed in a short space of time of three months, and that this could not be done effectively unless there was the usual facility of forward trading. The view was expressed further that much of the evils of speculation and excessive fluctuation would disappear if Govern-

ment were to take immediate steps to make trading in options a penal offence. After a very full discussion, the following resolution was unanimously passed :—

“ In view of the fact that the bulk of Indian cotton crop has to be marketed in the short space of three months, it is considered essential that Government should immediately re-open Hedge Contracts. This will avoid undue risks and will materially benefit the grower and mill interests generally. If any safeguards are considered necessary to this end, Government may devise these in consultation with the East India Cotton Association.

The Committee suggests that the Ordinance relating to advances against commodities should be suitably modified so that the distribution and carrying of the cotton crop is not hampered.”

During discussion, the question of the desirability of fixing minimum prices for cotton was raised. Attention was drawn to the present downward tendency of cotton prices and it was urged that in the interests of the growers, Government should fix equitable minimum prices for the various descriptions of cotton and that they should also be prepared to buy any cotton at the minimum prices when offered. After further discussion, the following resolution was passed by the Committee :—

“ To protect the interests of the cotton grower, the Committee strongly urges that Government should fix equitable minimum prices for the different descriptions of cotton in consultation with the Indian Central Cotton Committee and that Government should be prepared to buy any cotton whenever offered to it at the minimum prices.”

The financial position of the Committee was also reviewed at this meeting. A Special Sub-Committee, consisting of Dr. W. Burns, Sir Chunilal B. Mehta, Sir Purshotamdas Thakurdas, Mr. H. R. Stewart, Mr. W. J. Jenkins, Rao Bahadur Sir Madhaorao Deshpande, Rao Bahadur V. Ramanatha Ayyar and the Secretary was appointed to examine the existing schemes of the Committee to see if anything could be done to restore the prescribed minimum balance at Rs. 9 lakhs. The report of the Sub-Committee is given below :—

“ The Sub-Committee met at 4 p.m. on the 19th July, 1943. The President explained that the estimated closing balance of the Committee at the end of the current financial year was likely to fall short of the prescribed minimum of Rs. 9 lakhs by some Rs. 1,28,000, assuming that, in the meantime, no new schemes or extensions of old schemes will be sanctioned from the funds of the Committee. The position at present was that whilst the Government of India had agreed to finance from the Cotton Fund some of the schemes

submitted to them by the Committee, the proposal for a lump sum grant of Rs. 2 lakhs from the Cotton Fund had not been accepted by the Commerce Department which was responsible for the administration of that Fund. In view of this, the Government of India, in sanctioning the budget of the Committee for the current year, had suggested that an examination of all the existing schemes might be undertaken to see what can be done to restore the prescribed minimum balance at Rs. 9 lakhs. The task before the Sub-Committee, therefore, was to see whether by reducing expenditure on the existing schemes sufficient savings can be effected and, if in its opinion that is not possible, to suggest other means of getting over the difficulty. It was clear from the statement of Receipts and Expenditure for the last ten years prepared by the Secretary that even before the war, the annual expenditure of the Committee exceeded its receipts by some Rs. 1,50,000; whilst the closing balance on the 31st March, 1933, was Rs. 29,69,854, it had come down to Rs. 11,63,862 on the 31st March, 1943. He mentioned this merely to indicate that, sooner or later, the time would have arrived when the minimum balance of Rs. 9 lakhs would have been reached and the Committee faced with precisely the same position as that which confronted it to-day. The fact that the time had come somewhat sooner than was anticipated was due to the heavy fall in receipts, particularly in cess receipts from exports, during the past two years. The gulf between expenditure and receipts had thus further widened, and the excess expenditure during the current year was going to be in the neighbourhood of Rs. 4 lakhs.

The Sub-Committee had before it a statement showing the various schemes in operation at present, and after examination of these, it is unanimously of the opinion that no appreciable savings can be expected to be obtained from this source. In arriving at this decision, it desires to point out that all the schemes of the Committee are thoroughly vetted by expert Sub-Committees from time to time, and the expenditure on them is controlled by the Provincial authorities concerned and the Secretary's office. Unless, therefore, it is decided to close down a number of useful schemes, which it hopes is not the intention, the remedy for getting over the difficulty will have to be looked for in other directions.

The Sub-Committee feels that the Committee has a legitimate claim on the Cotton Fund created from the proceeds of an additional import duty imposed on raw cotton for the purpose of financing measures for the benefit

of growers of cotton in India. In its opinion, the Committee's request for a lump sum grant of Rs. 2 lakhs from this Fund should not have been turned down. It desires to point out that the competition of foreign cottons is directly with staple Indian cottons and, if the money from the Fund were spent on the improvement and extension of such cottons, the intention of the Ordinance will be fully covered. On these grounds, the Sub-Committee is of the opinion that the Government of India should be requested to reconsider the matter and make good the deficit of Rs. 1,28,000 in the current year from the Cotton Fund in addition to meeting the cost of new schemes and extensions of old schemes sanctioned by the Committee. In this connection, it should be pointed out that the Committee has on it, in addition to all the other interests concerned, nearly 30% or more responsible Government officers most of whom are technical experts; the technical and other schemes are thoroughly vetted by these officers before they are finally passed by the Committee. In the opinion of the Sub-Committee, therefore, no further examination of such schemes from the technical point of view is either necessary or desirable; in fact, it has always been understood that the acceptance by the Government of India of the schemes sanctioned by the Committee, in so far as the technical side is concerned, is purely a formal matter. During discussion, the view was expressed that diversion of money from the Cotton Fund for purposes other than those for which it was originally intended, *viz.*, for the benefit of the cotton grower, was not justified. The Sub-Committee recommends that it should be pointed out to the Government of India that the Committee is not in a position to make up the deficit even after effecting every possible economy in the existing schemes, and that unless assistance is given from the Cotton Fund, the Committee will be faced with the alternative of having to close down several of its very useful schemes. The Indian Central Cotton Committee is the one body which works primarily in the interests of the cotton growers of India. The work done by it during the last 20 years is well-known and universally recognised; it has enabled the Committee to attain a position which is unparalleled in the country. The Committee, therefore, has the first claim for assistance from the Cotton Fund which is primarily meant for the benefit of the cotton growers. In this connection, a suggestion was made that it would be a good gesture on the part of the Committee, at the same time while asking for assistance from the Cotton Fund, to reduce its liability in future by a re-orientation of its policy as regards financing of research and other schemes. It was argued that the Committee might

have been a little too generous in the past in meeting all the expenditure on research schemes, and it was suggested that the expenditure in future might be divided between the Provincial Governments concerned and the Committee on a 50 : 50 basis. Against this view, however, it was urged that some provinces might not be in a position to provide their share of expenditure when required and that this might result in work on many useful schemes being held up or not undertaken at all. As regards seed distribution schemes, it was pointed out that the growers in the provinces in which such schemes were in operation had derived great benefit from them, and, as bridging the gulf between the research stations and the cultivator, these were perhaps the most useful activities of the Committee. As regards research schemes, the Committee had already more or less come to the view that *omnibus* botanical schemes on which large sums of money had to be spent were no longer necessary and that, in future, it would sanction only specific schemes with definite objectives. The view was expressed also that in future the Committee should sanction schemes only after it was sure that the Government of India would make grants from the Cotton Fund for them, as it was a waste of time considering and passing schemes unless money was available for putting them into operation.

After examination of every aspect of the matter, while the Sub-Committee is unanimously agreed that the Government of India should again be requested to restore the minimum balance at Rs. 9 lakhs by requisite grants from the Cotton Fund and, at the same time, to meet from that Fund expenditure on new schemes and extensions of old schemes that may be sanctioned by the Committee, it recognises that this deals with the situation only in the present and the immediate future and that to put the finances of the Committee on a stable and sound basis, something more definite and permanent is required. The Sub-Committee accordingly recommends finally that the cotton cess, the incidence of which is two annas per bale at present, should be raised to 4 annas per bale, on the condition, however, that while the Cotton Fund is in operation the deficit in the minimum balance as well as the expenditure on any new schemes or extensions of old schemes that may be approved by the Committee shall be met from that Fund, and that the increased cess shall become operative only after the Fund referred to ceases to exist. The Sub-Committee further recommends that Mills in Indian States which at present pay no cess at all to the Committee on Indian cotton consumed by them

should fall in line with mills in British India. This will mean an additional cess income of about Rs. 86,000 per year to the Committee."

The view was expressed by practically all the interests represented on the Committee that the work of the Indian Central Cotton Committee was of such immense benefit to the cotton growers and the cotton industry in general that every effort should be made to increase its funds to enable more work to be undertaken. After a very full discussion, the report of the Special Sub-Committee was unanimously adopted.

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

CHAPTER II.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

The extension of the war and the consequent closing of the export outlets for short staple Indian cotton gave a great fillip to the efforts of the Committee in improving the quality of Indian cotton, and the year under review witnessed a phenomenal increase in the area under staple cotton, particularly *Jarila* in the *Oomras* tract. The area under improved cottons rose from 5,663,000 acres, or 24% of the total cotton acreage in 1938-39, to 10,382,000 acres, or 54% of the total in 1942-43. The improvement 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 in which an attempt has been made to classify the Indian cotton crop according to varieties and staple lengths.

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

Description of cotton.	Average 1922-27.	Average 1937-42.	1942-43.	% increase (+) or de- crease (-) of col. 4 over col. 2.
1	2	3	4	5
<i>Short staple—below 3/4"—</i>				
(1) Bengals	905	1,087	587	
(2) Oomras	1,890	1,250	400	
(3) Central India	324	258	229	
(4) Broach (Part)	65	244	159	
(5) Dholleras	525	357	269	
(6) Kumpta and Upland (Part)	(a)	37	80	
(7) Bijapur and Bagalkot Jowari. }	(b)	160	10	
(8) Westerns (Part) }			54	
(9) Warangal and Cocanadas	49	30	30	
(10) Salems	30	12	8	
(11) Chinnapathi	39	45	1	
(12) Comillas			42	
Total Short staple { Quantity	3,827	3,480	1,869	-51
{ % on "Total-All Staples."	70	62	40	

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

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

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

Description of cotton.	Average 1922-27.	Average 1937-42.	1942-43.	%increase (+) or de- crease (-) of col. 4 over col. 2.
1	2	3	4	5
<i>Medium & Long staple—$\frac{7}{8}$" & above.—</i>				
(13) Americans—Punjab and Sind (staple 1" and above) † ..	..	255	517	
(14) Americans—Punjab and Sind (staple below 1") ..	264	853	887	
(15) C. P. and Berar Verum ..	..	60	116	
(16) Hyderabad Gaorani ..	332	140	146	
(17) Broach (Part) ..	..	6	24	
(18) Surti ..	214	154	117	
(19) Kumpta and Upland (Part) ..	259	181	72.	
(20) Westerns (Part) ..	..	..	38	
(21) White and Red Northernns ..	251	52	17.	
(22) Tinnevellys (including Karun- gannies) ..	155	153	142	
(23) Cambodias ..	147	187	250	
(24) Jarila ..	..	65	423	
(25) Buri ..	..	11	84	
Total—Me- dium & Long staple. { Quantity	1,622	2,117	2,833	+75
{ % on "Total—All Sta- ple	30	38	60	
TOTAL—All Staples ..	5,449	5,597	4,702	-14

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

It will be seen that the proportion of cotton of staple length $\frac{7}{8}$ " and above to the total production increased from 30% in the quinquennium 1922-27 to 38% in the quinquennium 1937-42; the proportion in 1942-43 was 60% against 45% in 1941-42. The production of 'medium and long staple' cotton in 1942-43 increased by 1,211,000 bales or 75% as compared with 1922-27; under "short staple" there was a reduction of 1,958,000 bales or 51%. The production of cotton of staple length '1" and above', which was *nil* in 1922-27, amounted to 594,000 bales in 1942-43.

Improvement in quality has been accompanied by a noticeable increase in the yield per acre, as will be evident 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
„ 1942-43	19,203	4,702	98	+5,046	105

* 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 1942-43 was 105 lbs. per acre against 109 lbs. in 1941-42.

Although exact data regarding the total additional benefit derived by the cultivators by growing improved types of cotton are not available, there is little doubt that the gain has been considerable. In 1942-43 according to the figures furnished by the provincial and state Departments of Agriculture, the gross extra income realised by the grower of certain improved varieties of cotton, covering an area of 19.8 lakhs acres, amounted to Rs. 1.77 crores. This works out to Rs. 9 per acre on the average, and on this basis, the total

increased income, accrued to the cultivators in 1942-43, by growing improved cottons on an area of 10,382,000 acres may be estimated at about 9.3 crores of rupees. Steps are now being taken to increase the production of cotton of staple length over 1", of which over six lakhs bales are imported annually from abroad.

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

BOMBAY.

The total estimated area under cotton in Bombay Province during the year 1942-43 was 3,858,131 acres including the acreage (1,266,916 acres) for Indian States.

Broach tract.—During the year, the Agricultural Department controlled 30,731 acres including 757 acres grown with Surat Farm pedigree seed. Besides, the Department controlled 1,272 acres of new type of seed *viz.*, 'Suyog'; thus making a total controlled area of 32,003 acres. There is a slight increase in the controlled area during the year compared with that of the previous year due to the inclusion of the Nawapur Peta and a part of Nandurbar taluka of the West Khandesh District in the Surat protected area.

The Department purchased in all 16,53,696 lbs. of seed of which 11,560 lbs. were the produce of the Surat Farm. Out of the above stock, 11,36,099 lbs. were distributed in the District through 23 depots in the interior and 4,50,840 lbs. were supplied to Rajpipla and other States. 50,537 lbs. were distributed directly by the Hansot Co-operative Cotton Sale Society to its members. Thus the total seed distributed was 16,37,467 lbs., and the remaining quantity of seed was disposed of locally.

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

The Cotton Control Act of 1935, prohibiting the growing and trading in Goghari cotton was extended for a further period of one year in the area lying south of River Nerbudda.

Under the scheme for Grading and Marking of 1027 A.L.F. and 'Suyog' cotton (under the Grading and Marking Act of 1937) in Surat District, 4,606 bales of 1027 A.L.F. and 332 bales of 'Suyog' were agmarked. Of the agmarked bales, 2,754 of 1027 A.L.F. and 250 of 'Suyog' were sold at premiums varying from Rs. 10 to Rs. 25 for 1027 A.L.F. and Rs. 13 to Rs. 20 for 'Suyog' over local. As there was no trading in the local market since 17-5-1943, 1,852 bales of 1027 A.L.F. and 82 bales of 'Suyog' remained unsold. The position of 1027 A.L.F. variety remains almost the same as last year so far as its future spread, premium, marketing etc. are concerned.

Khandesh-Jarila—*Jarila* cotton which has been introduced for general cultivation in Khandesh is superior to local or *Banilla* in staple and is highly wilt-resistant. Its yield and ginning outturn are equal to those of the local type. It is suited to the conditions in Khandesh and is much appreciated both by the cultivator and the trade. The year under report is the sixth year of the scheme financed jointly by the Indian Central Cotton Committee and the Government of Bombay, for multiplication and distribution of seed of this variety. During the year 1942-43, 10,22,840 lbs. of *Jarila* cotton seed stocked by the Department and 43,77,100 lbs. stocked by the approved Co-operative Organizations, were distributed in the division, the area covered being about 3,00,000 acres. Out of this, an area of 94,717 acres under stages III, IV and V was organised for multiplication. In addition an area of about 178 acres was grown under this variety on Jalgaon and Bhadgaon Farms under stages I and II.

The total area under *Jarila* including natural spread, is estimated at about 7,71,000 acres during the year out of the total area of 8,89,042 acres in this division. It is estimated that in 1943-44, the area under *Jarila* will be about 95% of the *Oomras* area. Out of the pure seed produced on Government Farms and on the controlled areas, 74,29,500 lbs. of *Jarila* seed have been stocked by the Department, Co-operative Banks, Societies and Taluka Development Associations for distribution in the 1943-44 season. The production of *Jarila* including natural spread, is estimated at 1,54,000 bales or approximately on an average 80 lbs. of lint per acre. During the year under report, demand for *Jarila* cotton seed continued to be as great as before and cultivators realized high premiums for *kapas* as well as for lint.

A notable feature of the year is the application of Cotton Ginning and Pressing Factories Act, 1925, to the Khandesh tract. The provisions of this

Act prohibit the admixture of *Jarila* cotton with other cottons. It is gratifying to note that the New Indian Cotton Contract is now based on Khandesh Fine *Jarila* of staple length of $\frac{3}{4}$ of an inch. Another outstanding feature of the year is that the Government of Bombay have sanctioned a sum of Rs. 37,632 for a period of 3 years for the organization of Co-operative Cotton Sale Societies and for the marketing and 'Agmarking' of pure *Jarila* cotton in the East Khandesh Districts. Eight such societies were organised during the year and seven more are soon to be added. A similar scheme for West Khandesh and Nasik District has been recently sanctioned by the Government.

There was no controlled area under *Banilla* cotton during the year and this variety is now very much on the decline.

Sholapur District.—The monsoon started at the right time, but further rainfall was neither adequate nor timely. Due to shortage of water in the wells, stopping of pre-seasonal canal watering to cotton and the "Grow More Food. Crop" campaign, the area under cotton crop contracted very much. The total cotton area was thus 12,314 acres only during the year under report. Out of this, 2,068 acres were under irrigated *Jarila*, 562 acres under irrigated *Banilla* and 9,684 acres under local cotton.

Satara District.—*Jayawant* cotton is grown in the Walva and Tasgaon talukas of the Satara district, where 13,860 lbs. of *Jayawant* cotton seed, sufficient for about 3,300 acres, were supplied to the cultivators. The natural spread was estimated at 400 acres during the year 1942-43 bringing the total area under *Jayawant* cotton in the district to about 3,700 acres. The premium obtained for *Jayawant* cotton in the Sangli market over the local cotton ranged from Rs. 25 to Rs. 30 per cart. Reduction in cotton area in the Satara district is due to the increased area under food crops.

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

The total reserved area organized for multiplying pure pedigree seed of *Jayawant* cotton at different centres was 1,38,921 acres as against 96,371 acres in the previous year and that of Gadag No. 1 cotton 25,895 acres against

29,928 acres in 1941-42. The quantity of seed secured and stocked so far by the approved agents and Co-operative bodies from these reserved areas is about 88,94,900 lbs. of *Jayawant* and 16,52,800 lbs. of Gadag No. 1—sufficient to cover 8,89,490 and 1,65,280 acres, respectively, during 1943-44. In addition some seed is stocked by the cultivators themselves from their crop.

For distribution of the general pedigree seed stocked by the approved agents and the Co-operative bodies, a sufficient number of seed depots were opened in the interior of the tract at several places in each centre. The general area under pure *Jayawant* was 4,62,113 acres against 5,78,044 acres last year and that under pure Gadag No. 1 was 1,29,495 acres against 1,21,825 acres in the previous year. The total area under *Jayawant* and Gadag No. 1 was 6,01,034 acres and 1,55,390 acres against 6,74,415 and 1,51,753 acres respectively last year. Besides, an area of about 1,75,000 acres under *Jayawant* and about 50,000 acres under Gadag No. 1 was covered by natural spread, making in all 7,76,034 acres under *Jayawant* and 2,05,390 acres under Gadag No. 1 during the year under report. The estimated yield of *Jayawant* cotton was about 70,000 bales against 80,000 bales and that of Gadag No. 1 was 10,000 bales against 15,000 bales in the previous year. Due to intensive propaganda to grow more food crops, the area under cotton was reduced whilst the low yield on the average was due to the poor crop in famine stricken areas.

A premium of Rs. 15 per *nag* (1344 lbs.) of seed-cotton in the case of *Jayawant* cotton and Rs. 25 per *nag* in the case of Gadag No. 1 was obtained in auction sale over local cotton sold in the bazaar. Even in private sales, *Jayawant* cotton fetched Rs. 9 to Rs. 10 more per *nag* than the prevailing prices for *Kumpta* cotton. Similarly Gadag No. 1 cotton fetched Rs. 15 more per *nag* than the local rates for Dharwar-American cotton. The extra profit secured to the cultivators of improved cotton is, therefore, Rs. 13,00,000 during this year as against Rs. 12,30,000 in the previous year. Though the average yield was less, the cotton growers were benefitted to some extent due to the high prices for cotton.

The introduction of the marketing of pure *Jayawant* and Gadag No. 1 cottons under Agmark is the outstanding feature of the revised and extended scheme. Vigorous propaganda was made to induce the cotton buyers at Hubli, Bailhongal, Bijapur and Gadag in connection with Agmarking the improved cottons. During the year under report 6,566 bales of *Jayawant* cotton and 75 bales of Gadag No. 1 cotton were pressed under Agmark in the

above mentioned four markets. Besides, a good deal of cotton, purchased by the up-country mills, was ginned under the supervision of the Cotton Staff and was taken in loose condition due to the heavy pressing charges. Intensive propaganda was, however, carried on among the mill-owners. It is emphasised here that the success of the Agmark scheme for cotton depends upon the demand for Agmarked bales from the mill-owners. The object of affixing Agmark labels on the cotton bales is to ensure the purity of the improved cotton to the consumers. If the purity of improved cotton is guaranteed, adequate premium is quite essential, but due price was not paid for Agmarked bales during the season.

SIND.

1. *The total area under cotton in the Province.*—The area under cotton in Sind during the year 1942-43 was 758,436 acres against 990,000 acres in the previous year. The decrease was largely due to the loss of foreign markets, the Hur menace, and the "Grow More Food Campaign" launched by the Provincial Government.

2. *(a) Area under improved varieties.*—The following statement indicates the different varieties and strains of cotton grown during the year and the acreage covered by each :—

A.—*Sind American*—

1. Sind Sudhar	4,30,000	
2. 289F types including M4 ..	2,16,585	
3. Sind American 98	28,000	
4. Sind American 4F	12,000	
		6,86,585

B.—*Sind Desi*—

1. W. N. 27 or Sind N.R.	39,000	
2. Ordinary Sind Desi (Mixture) ..	32,851	
		71,851
Total		7,58,436

(b) *Short history of the improved varieties.*—

A.—*Sind Americans.*—There are three improved strains of this variety which are widely cultivated in different parts of the province.

(i) *Sind Sudhar* (*G. hirsutum* Linn).—This improved strain occupied an area of 4,30,000 acres. It is a selection from the Punjab 289F imported into Sind in 1924, and is now the standard American cotton in lower and East Sind. This variety is chiefly grown in the Tharparkar and Hyderabad Districts. It possesses a staple length of one inch, gins 29 to 30% and spins 45 H.S.W.C. It gives a good yield under widely varied conditions. The Department distributed 1,34,000 maunds of pure rogued seed of this strain during the year 1942-43.

(ii) *Sind American 98* (*G. hirsutum* Linn).—This strain covered an area of 28,000 acres compared to 50,000 acres in 1941-42. It was evolved by selection from ordinary 4F cotton originally imported from the Punjab. It has a staple of $\frac{7}{8}$ ", ginning outturn of 33% and a spinning value of 35 H.S.W.C. The Department distributed 8,000 maunds of pure seed of this strain during 1942-43. This has been found to be a more suitable type for cultivation in the newly opened areas of the Right Bank of the Indus and is grown in the districts of Dadu, Larkana and Upper Sind Frontier.

(iii) *M4* (*G. hirsutum* Linn).—This strain has been evolved recently from N.T. 21 Bulk. It has been under trial for some time and has been found suitable for growing in Eastern Sind. It is becoming very popular on the Right Bank too and is likely to replace S.A. 98 on account of its earliness. It is earlier than S.A. 98 by about 4 weeks and therefore escapes damage by frost which occurs sometimes very early on the Right Bank. It possesses a staple of $27/32$ ", a ginning outturn of 33% and spins 39 H.S.W.C. There is increasing demand for the seed of this cotton from *Zamindars* all over the province. The Department distributed 4,500 maunds of seed of this variety to certified growers during 1942-43.

More recently a strain known as M 116 has been evolved and is under test at different places during the current cotton season. It has yielded 12-14% more than M4. It is equal in spinning capacity to M4 but is a better ginner.

B.—*Sind Desi Cotton*.—*Sind Desi* cotton has a special market on account of its rough and bright white lint, which is used for mixing with wool. Its cultivation is confined to central Sind and it is grown chiefly in the Nawabshah district, Halla taluka of Hyderabad district and Sanghar taluka of Tharparkar district.

Sind N.R. or 27 W.N. (*Gossypium Arboreum* var. *neglectum* forma *Bengalensis*) is an improved *Desi* strain evolved by the Sind Agricultural

Department by selection in local *Desi* Bulk. It gives about 16 to 20% higher yield than the ordinary *Sind Desi*. It has a staple of $\frac{5}{8}$ ", a ginning outturn of 40% and spins 6 H.S.W.C. The Department distributed 12,000 maunds of pure seed of *Sind N. R.* for sowing during 1942-43.

3. *Quantity of seed of each improved variety controlled and distributed by the Sind Agricultural Department.—*

(1) *Certified Sind Sudhār seed.—*

Sold departmentally	84,000 maunds.
Sold by factories	50,000 "

(2) *Certified M4 seed.—*

Sold departmentally	2,500 "
Sold by factories	2,000 "

(3) *Certified S.A. 98 seed.—*

Sold departmentally	7,000 "
Sold by factories	1,000 "

(4) *Certified Sind N.R. seed.—*

Sold departmentally	5,000 maunds.
Sold by factories	7,000 "

Total ..	1,58,500 "
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PUNJAB.

The total area in the British districts was 2,319,567 acres which is 17% and 10% less than the actual area of last year and the decennial average respectively. Of the total area under cotton, Punjab-American varieties occupied 1,584,519 acres and the short staple *desi* varieties 7,35,048 acres. Medium and long staple American cottons thus constituted 68.31% of the total Punjab cotton crop, the highest proportion ever yet attained. The total baled crop according to press-returns was 10,90,345 bales of 400 lbs. each in the previous year.

Punjab Desi Cottons.—The campaign for the reduction of area under short staple *desi* cottons had a very salutary effect, a decrease of about 41% having been effected in the area of such cottons over the figures of last year. Of the three improved varieties under large scale distribution in different ecological regions, namely, 39 Mollisoni, M.60A2 and 119 Sanguineum, the first two

together occupied an area of 446,000 acres, which is roughly 61% of the total area under *desi* cottons in the Province.

Punjab-American cottons—Though the medium stapled variety 4F, was still the most extensively cultivated cotton, covering an area of roughly 6,55,000 acres, the recently introduced long stapled varieties *viz.*, 289F/43, 289F/K. 25 and L.S.S. continued to increase in popularity in different tracts of the Province. The total area under these improved varieties was estimated at 894,060 acres during the year under review as compared to 684,800 acres in the previous year. On this basis, these long-stapled cottons represented 56.4 per cent of the total Punjab American crop. The estimated acreage under each of the commercial American varieties during 1942-43 was as follows:—

4F	..	..	..	..	655,290 acres.
L.S.S.	..	..	..	..	414,190 „
289F/43	..	..	..	..	200,090 „
289F/K. 25	..	..	..	..	279,780 „
289F and 289F/K. 23.	..	..	..	..	3,030 „

In addition to the above, a new long stapled, high yielding and high ginning variety, *viz.*, 124F, is spreading on its own merits in the districts of Multan, Montgomery, Muzaffargarh and Dera Ghazi Khan.

A special feature of the year was the prevalence of very high prices for American cottons as compared to those of *desi*, the difference in the sale rate of the two being of the order of Rs. 15 to Rs. 20 per maund of *kapas* in the later part of the season.

1,10,995 maunds of cotton seed of improved varieties (*Desi* 8,955 maunds and American 1,02,040 maunds) were sold by the Agricultural Department to cultivators during the year.

CENTRAL PROVINCES AND BERAR.

The total area under cotton in the Central Provinces and Berar during the year 1942-43 was 31.8 lakhs acres.

Verum 434.—The area under *Verum 434* was 6.62 lakhs acres as against 4.10 lakhs acres in the previous year. This strain possesses a fine strong staple, about $\frac{7}{8}$ " in length and is capable of spinning up to 31's highest standard warp counts. The average premium obtained during the season 1942-43

was Rs. 37-8 per *khandi* of lint on *Jarila*. Over 60,624 maunds of seed were distributed for sowing purposes through departmental, co-operative and other agencies.

Buri 107.—The total area under this variety in the different parts of the province was 1.55 lakh acres out of which nearly $\frac{1}{2}$ lakh acres were grown in the Burhanpur *tahsil*, where a seed distribution scheme financed by the Indian Central Cotton Committee is in progress. This strain possesses a fine staple about 1" in length and is capable of spinning up to 40's highest standard warp counts. The average rates obtained at Burhanpur for *desi* and *Buri* were Rs. 14 and Rs. 20, respectively, per maund of *kapas*. The total quantity of seed distributed in the *tahsil* through the Government seed depot and *Tahsil Agricultural Association* amounted to 3,296 maunds. In addition, 2,790 maunds of seed were supplied to other parts of the province and adjoining states.

MADRAS.

The total area under cotton in the Madras Presidency during 1942-43 according to the final forecast report issued in April 1943 was 2,171,800 acres as against 2,541,400 acres in the previous year.

A. Cambodia cotton.—The total area under Cambodia during the year was 551,900 acres of which 328,412 acres were under improved strains (*vide* Table I). This works out to 59.5% of the total area under Cambodia cotton as against 52.1% recorded in the previous year. The largest concentration of the strains was in Coimbatore and Ramnad districts. The demand for the seeds was met by arranging seed farms, which were run by the Agricultural Department or by the Tiruppur Co-operative Sales Society. In both cases the crop was grown and ginned under expert supervision. The seeds were purchased, after testing their germination capacity, at a premium from the seed farm growers and then sold to farmers in sealed bags. Strains Co. 3 and Co. 4 were concentrated in Salem and Ramnad districts respectively. In the former region, a scheme financed by the Indian Central Cotton Committee for the multiplication and distribution of Co. 3 has been in operation.

TABLE I.

Cambodia cotton—Total area 551,900 acres.

Name of district.	Name of the strain.	Seed of improved strains distributed by		Total area under improved strains in acres.	
		Department. lbs.	Private Agency. lbs.		
Coimbatore	Co. 2	284,216	Not known.	181,674	
Salem		84,204*	do.	23,282	
Madura		79,447	do.	43,440	
Trichinopoly		25,647	do.	7,425	
South Arcot		15,891	do.	11,679	
Tinnevelly		536	do.	2,760	
Ramnad		4,214	do.	1,557	
North Arcot		2,511	do.	1,294	
Cuddapah		427	do.	188	
Anantapur		480	5,330	697	
Malabar		30	10,780	1,000	
Other districts		520	Not known.	37	
Total			498,203	..	274,823
Ramnad		Co. 3.	490	Not known.	2,550
South Arcot	23		do.	250	
Salem .. .. .	..		do.	2,440
Tinnevelly	1,772		2,480	215	
Other districts	212		Not known.	17	
Total		2,497	..	5,472	
Ramnad	Co. 4.	58,354	Not known.	19,747	
South Arcot		26,172	do.	4,406	
Tinnevelly		18,729	31,640	705	
Other districts		3,216	Not known.	333	
Total		106,471	..	25,191	
Coimbatore	920	59,534	Not known.	14,210	
Tinnevelly		443	do.	100	
Other districts		3,914	do.	363	
Total		63,918	..	14,673	
Coimbatore	x4463	23,809	Not known.	8,248	
Other districts		98	do.	5	
Total		23,907	..	8,253	
GRAND TOTAL		694,996	..	328,412	

* Includes Co. 3.

Amongst the several strains Co. 2 occupies the largest area as in the past. Strains Co. 4 and Co. 3 are rapidly replacing Co. 2 in the districts of Ramnad, South Arcot and Salem, while x4463 has to a certain extent replaced Co. 2 in Coimbatore district. Co. 3 and Co. 4 are getting popular with growers on account of their earliness, their suitability for sowing in summer and their getting higher premia for their lint.

B. Karunganni cotton.—The total area under Karunganni and Tinnies cottons is 529,600 acres of which 280,000 acres were sown to improved strains. This works out to 53% of the total area which is an improvement over that of last year when 27.3% of the total area was under improved strains. K. 1 was the main strain under distribution.

TABLE II.

Karunganni cotton.—Total area 529,600 acres.

Name of district.	Name of the strain.	Seeds of improved strains distributed by		Total area under improved strains in acres.
		Department. lbs.	Private Agency. lbs.	
Tinnevelly	K. 1.	272,816	86,000	115,250
Ramnad		58,267	Not known.	67,166
Coimbatore.. .. .		80,271	do.	76,220
Madura		20,848	do.	14,300
Trichinopoly		3,287	do.	577
Total		435,489	..	273,513
Ramnad	A. 10.	..	..	6,000
GRAND TOTAL		435,489	..	279,513

C. Northern.—The total area under this cotton was 175,000 acres of which 102,280 acres were under improved strains (*vide* Table III). The area under improved strains during the previous year was only 72,730 acres. Both the strains N. 14 and H. 1 under distribution have spread to a greater extent during the year.

TABLE III.

Northern tract.—Total area 175,000 acres.

Name of district.	Name of the strain.	Seeds of improved strains distributed by		Total area under improved strains in acres.
		Department. lbs.	Private Agency. lbs.	
Kurnool	N. 14	109,351	Not known.	66,200
"	N. 23	700	do.	510
Kurnool	H. 1.	2,336	do.	3,030
Cuddapah	H. 1.	1,300	do.	32,540
Total		3,636	..	35,570
GRAND TOTAL		113,687	..	104,280

D. Westerns.—The total area under this cotton was 727,000 acres against 871,000 acres in the previous year. The area under the improved strain is 243,328 acres as against 275,900 acres of last year. The reduction is due to the failure of rains in portions of Bellary and Anantapur districts.

TABLE IV.

Westerns tract.—Total area 727,000 acres.

Name of district.	Name of the strain.	Seeds of improved strains distributed by		Total area under improved strains in acres.
		Department. lbs.	Private Agency. lbs.	
Bellary	H. 1.	339,873	1,495,280	149,528
Anantapur		56,850	875,000	93,800
Total		396,723	2,370,280	243,328

E. Cocanadas.—The total area under this cotton was 123,400 acres, of which only 178 acres were sown to the improved strain—X20. For want of suitable seed multiplication and distribution arrangements, the strain has not spread further.

UNITED PROVINCES.

Sowings of cotton generally commenced in time. The rainfall during the year was characterised by continuous heavy showers in the months of July and August with comparatively dry weather after the first week of September. Considerable damage to the crop due to heavy rains was reported from a number of districts, specially in the Western Circle. Pickings of cotton, which commenced in the first week of October, were later by 10 days than the normal period. Slight damage to the Perso-American crop due to Leaf-Roller, Stem-Borer and Pink Boll Worm was reported from the areas growing this variety. In some areas Perso-American also showed symptoms of reddening of leaf etc., resulting in low yields. The quality of the lint and the maturity of seed are reported to be fairly satisfactory. Taken as a whole the outturn is roughly estimated at 69 per cent of the normal. The total area under cotton in the province during 1942-43 amounted to 309,161 acres against 428,620 acres (revised) last year, showing a decrease of 119,459 acres or 27.9 per cent. The total outturn of the crop was 90,749 bales compared with 105,445 bales (revised) last year, showing a decrease of 14,696 bales or 13.9 per cent. The decrease in the area of the crop this year is apparently due to the "Grow More Food" campaign launched by the Government.

The bulk of the crop in the United Provinces comprises of "U.P. Bengals," but interest is now being taken in the development of long-staple cotton of the Upland American types. As a result of wide-spread trials of improved strains all over the province for a number of years, C.520 a *desi* selection, and Perso-American, an American type have been found suitable for the cotton growing areas in the United Provinces. They are, therefore, being recommended for general cultivation by the Department of Agriculture. The area under these varieties and the amount of seed distributed by the Department are given in the following table :—

Variety.	Total area under the variety (including natural spread).	Amount of seed distributed by the Department.
C. 520	14,087 acres.	1,507 maunds.
Perso-American ..	10,938 „	2,736 „

C. 520 cotton is a pure line selection from the "roseum" type of U.P. Bengals, originally extracted from the material collected in Saharanpur and Bijnor districts as early as 1920-21. It yields high under irrigated and unirrigated conditions. When grown on a commercial scale at the Government Research Farm, Raya (District Muttra), the variety yields about 9 to 10 maunds of *kapas* per acre. With a staple length of about 0.73", a ginning outturn of about 35 to 37%, it is capable of spinning up to 10-12½ highest standard warp counts.

The variety has spread in general cultivation in the Middle and Upper Doab and is gaining ground in almost all the cotton growing areas in the United Provinces. Recently it has been in demand from many of the Central Indian States and Rajputana. When marketed pure its *kapas* is valued at about Re. 0-8-0 per maund more than that of ordinary *Desi*.

The Department in pursuance of the policy of curtailment of area under "short stapled cottons" is devoting considerable attention to the extension of the American variety under suitable soil and climatic conditions. A scheme for the distribution, extension and marketing of Perso-American, financed jointly by the Indian Central Cotton Committee and the Provincial Government is now under operation in the districts of Bulandshahr, Aligarh, Muttra and parts of Meerut and Etah.

Perso-American cotton is a selection from the American types of cotton imported from Persia (Iran) and acclimatized in the United Provinces. When grown on a commercial scale at Raya and other suitable areas, e.g., Budaun, etc., it gave an yield upto 13 to 14 maunds per acre. With a staple length of .85", a ginning outturn of 30-32%, it is capable of spinning up to 28-34 highest standard warp counts. The *kapas* of this variety ordinarily fetches a premium of Rs. 1-8-0 to Rs. 2 per maund over *Desi*, but during the last two seasons, it was sold at a price of about 35 to 50% higher than that of the local *Desi* cottons.

HYDERABAD STATE.

The total area under cotton in the State during the year 1942-43 was 29,73,167 acres compared to 32,83,391 acres during the year 1941-42, thus showing a decrease of 3,10,224 acres or 9.4% less than the previous year. The decrease is attributed to the "Grow More Food" campaign. The cotton affected by this reduction was of the short staple type.

Gaorani 6.—During the year 1940-41, the *talukas* of Hingoli, Basmat, Kalamnuri and Palam together with the Jagirs of Gangakhed and Shirdshapur of Parbhani District were added to the existing protected area. In the Gaorani Protected Area—parts of Nanded and Parbhani Districts—pure seed obtained from the reserve areas amounting to 95,87,598 lbs. was purchased and distributed to cultivators under departmental control both on *taccavi* and cash. An area of 5,75,442 acres in a block of about 1200 villages was covered with this seed.

Parbhani American.—In the Ghat areas of Aurangabad District, seed of Parbhani—American cotton, a selection from the local American variety amounting to 1,57,880 lbs., sufficient for 15,788 acres, was distributed to cultivators under departmental control.

* *Jarila Cotton.*—In the low lands of the Aurangabad District, which is predominantly a short staple cotton area, *Jarila* cotton seed of 3rd and 4th generations obtained from the Agricultural Department of the Bombay Presidency was distributed to cultivators. The total seed obtained amounted to 3,83,040 lbs., sufficient for 31,920 acres. The seed from this area will be utilised for distribution over a wider area during the coming years.

Jayawant cotton.—This cotton was introduced in the South-western portion of Raichur District in the year 1931 by importing the seed from the Co-operative Cotton Sale Society at Hubli, and it has made steady progress since then. During the year 1941-42, the quantity of seed distributed and the area covered were 5,51,046 lbs. and 44,315 acres respectively. The natural spread under this strain amounted to 1,54,224 acres. In 1942-43, however, the seed distributed amounted to 4,80,084 lbs. and the area covered decreased by 80% due to crop failure owing to the paucity of rain in the previous season. In January 1943, famine was declared in all *talukas* growing *Jayawant* cotton.

The Department of Agricultural Propaganda in the Nizam's Dominions has set up an organization for multiplication and distribution of seed and marketing of the produce. The predominant features of this organisation are as follows :—

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

(2) Special *taccavi* grants are provided both by Government and Co-operative Societies every year to purchase all the seed available from the reserve areas and to distribute it to the cultivators. The amounts of *taccavi* sanctioned during 1942-43 totalled nearly Rs. 6,75,000.

(3) Purity of the general as well as the reserve areas is guaranteed to the trade.

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

With this special organization in which both the cultivators and the trade collaborate, a rapid development of area under improved varieties is possible.

BARODA STATE.

Navsari District.—The total area under 1027 A.L.F. in this district was 1,99,800 acres. This included an area of 2,555 acres covered by 31,185 lbs. of farm nucleus product (A grade seed) and 26,100 acres covered by Societies and Unions from the 4,92,030 lbs. of seed issued to them. Of the remaining area, except for a small wilt affected area where B.D.8, a resistant strain, was grown, the whole of the district was under 1027 A.L.F. commercial cotton. During the season 37 bales of pedigree, 4,000 bales of certified and 1052 bales of standard (*i.e.*, guaranteed produce of the State commercial 1027 A.L.F. grown from Departmental seed) cotton were produced. Of these 2,707 bales were sold. The average premium over *Surti* for the Agmark certified produce was Rs. 16-7-7 while that for the standard was Rs. 8-2-8. The pedigree produce has not been sold so far. The total seed issued for the 1943-44 sowing is 1,984,800 lbs. including 30,800 lbs. to cover 2,200 acres of A grade, 3,43,200 lbs. to cover 24,700 acres of B grade and the rest for C grade or commercial sowing. Attempts to raise sufficient seed for various grades of Seg. 8-1 are made; the actual introduction of the new Segregate is proposed to be made in 1945 season. About 3,000 acres of Seg.8-1 are grown in this district.

Baroda District.—In this district the Cotton Control Act has been applied since May 1943, making B.D. 8 and B. 9 the standard cottons for the black and Gorat Soils of the District, respectively. B.D. 8 variety was cultivated

in seven *talukas*, *viz.*, Karjan, Shinor, Dabhoi, Sankheda, Tilakwada, Baroda and Padra while B. 9 was grown in Waghodia and Savli (Gorat area). The total cotton area in this district during the year was about 3,41,183 acres of which 28,000 acres were sown under B.D.8. Due, however, to the bad monsoon conditions the controlled area was reduced to 22,865 acres. The premium realized over the local was Rs. 65 more per *bhar* of cotton. The seed issued for 1943-44 sowing consisted of 6,840 lbs. of A grade, 2,27,820 lbs. of B grade and 4,75,880 lbs. of C grade or commercial crop to cover 676 acres of A, 23,843 acres of B and 47,190 acres of C respectively. The Department intend to switch over to 'Vijaya' cotton in the year 1945. Attempts are being made to bring substantial areas under the various grades. Owing to its higher ginning, fineness, wilt resistance and other good qualities, 'Vijaya' cotton is expected to be more attractive to the grower of this district. About 2,000 acres of 'Vijaya' were grown during the year, in addition to about 4,000 acres of 1027 A.L.F. grown in Bodeli area.

B. 9 has been selected as the standard cotton for the Gorat or light soil which covers an area of about 1,50,000 acres and is mainly confined to the Savli and Waghodia *talukas*. A scheme to expand this cotton has been recently started. The Department issued, during the year under report, 7,900 lbs. A grade, 80,880 lbs. B grade and 1,38,720 lbs. C grade seed for sowing about 775 acres under A, 9,000 acres under B and 14,175 under C or commercial grade respectively. But owing to bad monsoon the ultimate inspected and checked areas were found to be about 670 of A and 6,314 acres of B. The *kapas* fetched Rs. 5 to 7 more per *bhar*. The seed issued for the 1943-44 sowing was 20,884 lbs. to cover 2,117 acres of A, and 1,74,435 lbs. to cover 20,327 acres of B, and about 6,54,299 lbs. of C or commercial grade seed to cover 64,147 acres respectively. A small area of 35 acres has been sown to 'Vijaya' in this area also.

Mehsana District.—The Department is concentrating on Wagad 8 in this district and is building up a seed organization based on this variety. The area under Wagad cottons was about 75% of the total cotton area, *viz.*, 1,00,853 acres in the district. The seed issued for the 1943-44 sowing was 42,857 lbs. to cover 2,571 acres of A grade, 53,506 lbs. to cover 3,210 acres of B grade and 4,32,240 lbs. to cover 25,935 acres of commercial or C grade areas. The scheme sanctioned by the Indian Central Cotton Committee to expand this type will be put into operation during 1943-44. season. Wagad

cottons are in particular demand in Ahmedabad and Wagad 8 commanded a premium of Rs. 6 to Rs. 7 on ordinary Wagad.

Amreli District.—The cotton on which the Department is at present concentrating in this district is C.520. During the year the total area under seed organization was 5,350 acres. The seed issued for 1943-44 sowing in various grades was 90,600 lbs. to cover about 4,450 acres. The seed issued was less than that in the previous season owing to the switching over of some of the acreage to food crops.

RAJPIPLA STATE.

With a view to improving the variety of cotton grown in this State, a special enactment named the "Rajpipla Cotton Improvement Act" was passed in 1921, and made applicable throughout the State. Since the passing of this Act the sowing of *Goghari* or any other variety of short staple cotton is prohibited in the State. Best available quality seed of the 1027 A.L.F. variety is purchased and supplied to the cultivators by the State. A strict watch is maintained to see that no other variety is sown and in order to eliminate all possibility of admixture with short staple cotton, import of such cotton into the State is strictly prohibited. With a view to seeing that the purity and quality of the cotton is maintained, adequate control is also exercised in the ginneries and the pressing factories of the State, up to the stage at which the cotton is pressed into fully pressed bales with the prescribed marks. As a result, the cotton grown in the State has earned a high reputation in the market and is eagerly sought after by the merchants.

During the year under report, the best seed was purchased through the Cotton Superintendent, Surat and Commissioner of Agriculture, Baroda State and supplied as usual by the State to the cultivators. The total area under cotton cultivation in the State during the year was 121,148 acres and the total outturn 22,962 full pressed bales exclusive of about 3,200 bales taken by *bona fide* kheduts for sale outside the limits of the State. As usual the cotton secured ready custom and realised better prices than cotton available for sale during the season elsewhere.

CHAPTER III.

COTTON STATISTICS.

The total area under cotton in India during the year under review was 19,203,000 acres, showing a decrease of 4,948,000 acres as compared with the previous year. The decrease was largely due to the loss of export outlets for short staple cotton as a result of Japan's entry into the War and the 'Grow-more-food Campaign' started on a country-wide scale. The total estimated outturn for 1942-43 was 4,702,000 bales, against 6,127,000 bales in 1941-42.

INDIAN COTTON SITUATION—1942-43.

The season opened with a firm undertone in the cotton market owing to steady prices of yarn and cloth and the anticipation of a smaller Indian cotton crop, particularly as a result of the 'Grow-more-food Campaign.' *Jarila* January was quoted at Rs. 318 on the 1st September, 1942, and rose to Rs. 335 by the end of the month. The prices continued to improve under the influence of a steady demand in the spot market for desirable types of cotton which were scarce. The market was also beginning to be affected by the scarcity of wagon supply and difficulties in getting cotton to Bombay. Early in November, the order restricting the import of cotton into Bombay, except under a licence, was relaxed so as to permit any cotton which was tenderable against the Indian Cotton Contract to be imported without a licence and this had a steadying effect. Further, on the 19th November, the Government of India announced the constitution of the Cotton Movements Panel and a new scheme to ease the transport situation. For the first time after the commencement of the season, trading was resumed in the "Ring" on the 7th of December. The market became very firm owing to reduced crop estimates and better spot demand. Meanwhile the news of the bombing of Calcutta caused nervousness in the market, with the result that on the 23rd December, the quotation for *Jarila* registered a fall of Rs. 27, but the market again nearly recovered by the end of December. At this time owing to increased arrivals up-country and lack of fresh support, there was a short-lived setback in prices upto the middle of January, after which the market began to advance. The war news also showed improvement on all fronts and lent support to the market. From the 9th to the 22nd February trading in the Ring ceased to take place, though the market was officially open and from the 23rd February

to 3rd March, the market was officially closed. Private business was reported to have been done during this period for Indian Cotton Contract March Delivery around Rs. 490. During the first half of March, there was a hectic rise in cotton prices as a result partly of good spot demand, scarcity of desirable staples and soaring prices of cloth and yarn, which took Indian Cotton Contract May to Rs. 630 on the 13th March. On the 17th March, when the price was quoted at Rs. 609, the Hon'ble the Finance Member spoke in the Central Legislative Assembly regarding the advance in prices of cotton and threatened to take drastic measures and, this had a depressing effect on the market. The press communique issued by the Government of India on the 1st April declaring Government's decision to prevent forward trading in new crop being opened and their intention of liquidating the outstanding commitments on current contracts contributed to depress the market further. There was, however, a good recovery in prices from the middle of the first week of April which continued up to the end of that month. On the 1st May, the Cotton (Forward Contracts and Options Prohibition) Order, 1943, was published, prohibiting trading in options and also in any forward contract in respect of new crop. This order had a restraining effect. The Order was amended on the 15th May, excluding from its provisions forward contracts for *kapas* and cotton of specific qualities and types and for specific delivery at a specified price. This amendment coupled with the good spot demand contributed to a sharp advance in prices. On the 17th May, the quotation for Indian Cotton Contract May and July deliveries rose up to Rs. 660 and 674 respectively, the highest recorded for the season. The next day prices reacted sharply. On the 19th May, the Cotton (Forward Contracts in Current Crops Prohibition) Order, 1943, was published prohibiting trading in forward contracts in current crops after the 20th May. In pursuance of this Order, the Government of India fixed the rates of Rs. 565 and Rs. 568 for the Indian Cotton Contract May and July deliveries respectively on the 21st May, and all open business was closed out at the rates fixed by Government. Business in hedge contracts did not take place for the rest of the season. On the 27th May, the Government of India issued a communique advising mills not to pay more than the prices indicated by them for different styles of Indian cotton on the basis of Rs. 550 for Khandesh *Jarila* $\frac{3}{4}$ " staple. Further, in the absence of hedging facilities, anxious holders of cotton began to unload with the result that spot prices registered a decline. The position was further accentuated by the announcement on the 1st June by Mr. M. S. A. Hydari, Secretary to the Government

of India, Department of Industries and Civil Supplies, at the meeting of the Textile Control Board that Government would requisition, if necessary, cotton from whomsoever held at prices recommended by Government. This uncertain position continued until the end of June, after which the spot market was steady for sometime. By the middle of July, owing to poor enquiry, coupled with distress sales by weak holders, the spot market witnessed a sagging tendency which continued through August. About the middle of August, steadiness was imparted to the market by the concerted action of certain merchants not to sell below the agreed minimum rates. In the meantime, the announcement by the Textile Control Board of ceiling prices for 12 standard varieties of cloth had a favourable effect and the season ended with a steady undertone in the spot market.

As regards the statistical position of Indian cotton the season started with an estimated carryover of 25.3 lakhs bales (400 lbs. net each) with the trade excluding spinning mills. The actual crop of 1942-43 on the basis of cotton pressed and unpressed cotton consumed in mills amounted to 46.0 lakhs (excluding extra-factory consumption of 4.5 lakhs bales), of which 30.3 lakhs bales were estimated to have been of staple length $\frac{7}{8}$ " and above. The consumption of Indian cotton by mills, amounting to 42.8 lakhs bales, was 2.5 lakhs bales higher than in the previous season. The receipts at mills of Indian cotton on the basis of voluntary returns amounted to 41.5 lakhs bales (400 lbs. net each). The actual receipts, however, were estimated to have been some 43.6 lakhs bales, including 14.0 lakhs bales below $\frac{7}{8}$ " in staple. The total exports during the season amounted to 1.6 lakhs bales including 0.9 lakh bales below $\frac{7}{8}$ " in staple. A noteworthy feature brought out by the figures is the fact that the surplus left from the season's crop, after meeting the mill and export demand, was less than a lakh of bales.

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, is estimated at 26.1 lakhs bales as shown below :—

	In lakhs of bales of 400 lbs. net (excludes extra-factory consumption).		
	Total.	$\frac{7}{8}$ " and above.	Below $\frac{7}{8}$ ".
Estimated stocks held by the trade (excluding spinning mills) on 31st August, 1942	25.3	5.7	19.6
Probable production in 1942-43	46.0	30.3	15.7
Total supply	71.3	36.0	35.3
Estimated receipts by mills in 1942-43	43.6	29.6	14.0
Exports during 1942-43	1.6	0.7	0.9
Total distribution	45.2	30.3	14.9
Estimated stocks held by the trade on 31st August, 1943	26.1	5.7	20.4

REPORT ON THE STAPLE LENGTH OF INDIAN COTTON CROP.

A report on the estimated production of cotton according to staple length for 1942-43 season was issued in August 1943; the trade estimates of the crop were also presented in this report. Of the official revised estimate of 4,702,000 bales (compared with the trade estimate of 5,316,000 bales), 13% was of staple length 1" and above and 47% of staple $\frac{7}{8}$ " to 31/32". Towards the end of the year, a Special Sub-Committee consisting of the representatives of the East India Cotton Association, the Karachi Cotton Association, the Southern India Millowners' Association and the Indian Central Cotton Committee was appointed to go into the question of revising the existing staple length groups and classification of Indian cotton thereunder in the light of the experience gained during the last six or seven years, and the changes that have taken place in the character of the Indian cotton crop.

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 (1942-43). 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 higher than those of the previous year by 64,000 bales, while exports showed a shrinkage of over 7 lakhs bales. Mill receipts of Indian cotton of staple length " $\frac{7}{8}$ inch and above" rose by 4.5 lakhs bales during the year, the offtake of short staple cotton (below $\frac{7}{8}$ "") being lower by nearly 4 lakhs bales as compared with the previous year. The exports of "long and medium staple" and "short staple" cottons were some 20 and 14 per cent, respectively, of the corresponding varieties exported in the previous year.

STOCKS.

The information collected in respect of stocks of cotton held in the country on the 31st August, 1943, was published in Statistical Leaflet No. 2 (1942-43). Trade associations, market committees and other authorities gave valuable assistance in the collection of figures of stocks of cotton held in the country at the end of the season. Stocks of Indian cotton held in India by the trade at the end of the season 1942-43, on the basis of voluntary returns, amounted to 17.8 lakhs bales, showing an increase of 2.9 lakhs bales on the previous year. As remarked in the last year's report, the trade stock figures still do not cover certain areas, while the information collected for some of the other areas remains incomplete. On the basis of the figures of actual crop, exports, mill receipts, etc., the carryover of cotton held by the trade on the same date is estimated at some 26.1 lakhs bales; one important cotton firm estimates the stocks at 29 lakhs bales. The question of ensuring that the trade stock figures are as complete as possible is being pursued energetically and it is hoped that, with the co-operation of Provincial Governments and States, the statistics would ere long be placed on a sound basis.

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, 1943, together with comparative details for previous years, are given in Appendix IV.

INDIAN MILL CONSUMPTION.

Figures of consumption of Indian cotton in mills in British India and Indian States for the years 1928-29 to 1942-43, based on the monthly statements issued by the Committee, are given in Appendix V. The total consumption of Indian cotton in mills in India during the season under report, viz., 4,280,817 bales, showed an increase of 255,422 bales as compared with the previous season, and constitutes yet another record. Of the increase, 92% was accounted for by British India and the remainder by Indian States.

EXPORTS.

The exports of Indian cotton from British India during the season totalled 155,000 bales against 373,000 bales in 1941-42. On the average of the three financial years ending 1942-43, the value of cotton (including waste) exported from British India formed 28% of the total value of export of "Raw materials and produce and articles mainly unmanufactured" and 9% of the total value of all merchandise exported.

STATISTICS OF COTTON PRESSED.

During the season under review, 3,021,287 bales of cotton were pressed in British India and, 1,192,442 bales in Indian States, making a total of 4,213,729 bales for all-India; the corresponding figures for 1941-42 were 4,305,120, 1,769,398 and 6,074,518 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 393 lbs., against 391 lbs. in the previous season. Further consideration of the suggestion for the compilation of statistics of cotton pressed according to trade descriptions has been postponed during the present emergency.

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, 458,985 bales of unpressed cotton were consumed in mills in India against 562,013 bales during the preceding year. The relevant figures for 1928-29 to 1942-43 are given in Appendix V to this report.

STATISTICS OF COTTON GINNED.

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

At the instance of the Committee, the question of the desirability of compiling the statistics of cotton ginned according to varieties was taken up with the Provinces and States concerned but in view of the decision to postpone, during the present emergency, consideration of a similar proposal relating to cotton pressed, further action in the matter has been deferred as both the returns have to be compiled on the same basis.

IMPROVEMENT OF COTTON FORECASTS.

The all-India cotton forecasts of the 1941-42 season were, as usual, subjected to a post-mortem examination by the Cotton Forecast Sub-Committee of the Indian Central Cotton Committee, at the close of the season, with a view to detecting sources of errors and suggesting remedial measures. The actual crop for all-India during 1941-42 was estimated at 70.8 lakhs bales against 5,980,000 bales forecasted in May 1942. The discrepancy lay mainly in the forecast estimates of the Punjab, Sind, Bombay and Madras Provinces. With a view to improving the present estimates of actual crop, the desirability of taking a complete census of stocks of cotton held in the country on a particular date towards the close of the season was stressed and the matter is being explored in consultation with the Provinces and States.

During the year under report, the Sind Government issued a Resolution directing that in future the yields of all crops should be made in terms of *maunds* per acre and not according to anna valuation. This change is intended

to rectify errors in forecasts arising from incorrect anna valuation. The recommendation of the Committee that both systems of reporting yield should be continued in the case of the cotton crop was not, however, accepted by the Sind Government.

In accordance with the recommendation of the Committee, the February and April all-India cotton forecasts which were hitherto designated as the ' Final ' and ' Supplementary ' forecasts have now been named as the ' Fourth ' and ' Final ' forecasts respectively.

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

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

This scheme was sanctioned by the Committee in July 1942 for a period of one year and it came into operation on the 15th October, 1942. The object of the scheme is to provide a suitable technique for conducting crop-cutting experiments on cotton which form the most reliable direct basis for estimation of yield in any given season, as well as for the determination of the standard yield. The investigation was carried out in the Akola district of Berar, divided into six *tahsils* and ten random villages in each *tahsil* and two random cotton fields in each village were selected. The number of sampled villages formed $3\frac{1}{2}\%$ of the total. In each selected field, two plots, each $81' \times 162' = 3/10$ acre, were marked by a random procedure and each plot was sub-divided into six sections of $1/20$ acre size for picking.

The results of the experiments indicated that the official estimate of yield for the Akola district based on anna value was at least 50% higher than the figures obtained by the investigation. These results, however, cannot be regarded as conclusive, as on the basis of ginning returns the forecasted anna valuation was reported to be as nearly correct as possible. It was also found that if the yields were to be directly estimated each season, solely from crop-cutting experiments, the number of experiments required to be carried out would be very large and the cost very high. On the other hand, it is thought that a reasonably small number of experiments would suffice for determining standard yields.

With a view to supplementing the results already obtained and increasing their value for practical application, the scheme has been extended for another year. In 1943-44, the experiments would be repeated in Akola district and in the adjoining Buldana district. Side by side with the operation of the scientific experiments, it is proposed to ascertain accurately the actual production of cotton in the two districts on the basis of ginning and pressing returns, movement of cotton, etc., by the establishment of a special organisation.

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

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

PUBLICATIONS.

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

- (1) *Statistical Leaflet No. 2.*—Ninth Issue (1941-42), "Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1942."
 - (2) *Statistical Leaflet No. 3.*—Ninth Issue (1941-42), "Receipts at mills in India of raw cotton classified by varieties—1941-42 season."
 - (3) *Statistical Leaflet No. 4.*—Ninth Issue (1941-42), "Exports by sea of Indian raw cotton classified by varieties—1941-42 season."
 - (4) *Statistical Leaflet No. 1.*—Tenth Issue (1942-43), "Report on the staple length of the Indian cotton crop of 1942-43 season."
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CHAPTER IV.

COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

(i) **Cotton Prices.**—The position arising from the remarks made by the Hon'ble the Finance Member in the Central Legislative Assembly on the 17th March, 1943, regarding cotton prices and the press communique subsequently issued by the Government of India in this connection was considered by the Committee. Whilst the Committee agreed that the speculative element in the trading of raw cotton should be eliminated, as far as possible, it was emphatically against the adoption of any measures that would adversely affect the interests of cotton growers by unduly lowering the prices of cotton. Having regard to the prices of other commodities, the Committee did not think that the prices of cotton then ruling could be regarded as being excessive; nor did it consider it correct to assume that the rise in the prices of cotton was entirely or even in large measure, the result of speculation. The real reason, in its opinion, lay in the fact that, finding cotton to be the cheapest commodity, many people had rushed in to invest their money in it. Incidentally, however, this had helped, in no small measure, to maintain the position of cotton which, taking into account the fact that there was in the country a considerable carry-over of cotton, might not otherwise have been as happy as it was. In the opinion of the Committee, there was little doubt that much of the upward trend in prices was due to genuine demand. It was accordingly urged that the question of cotton prices should be considered in relation to the prices of other commodities. It was pointed out that unilateral control without effective control of other commodities, particularly yarn and cloth, was bound to have an adverse effect on the interests of cotton growers and, therefore, on the economy of the country as a whole. The views of the Committee were communicated to the Government of India.

(ii) **Cotton baling hoops.**—Under the scheme of distribution of cotton baling hoops, to which reference was made in the last Annual Report, 6,105.6 tons of Lease/Lend hoops and 3,140.1 tons of hoops manufactured or held in stock in the country were made available to cotton pressing factories through the agency of the Committee. This represented nearly three-fourths of the season's requirements of the pressing factories in the country. Towards the end of August, 1943, the Government of India announced that for the 1943-44

season, cotton baling hoops, whether imported under Lease/Lend or produced in India, would be distributed by the Iron and Steel Controller on the advice of the Baling Hoops Advisory Committee. Cotton pressing factories receiving baling hoops from the Iron and Steel Controller were required to execute a bond to the effect that they shall not, except with the prior permission of the Baling Hoops Advisory Committee, recover, in respect of any baling operation, baling charges exceeding the rates prescribed by the Government of India, any infringement of this condition rendering the factory liable to pay a penalty extending to ten times the amount of the baling charges received and debarring it from receiving further supplies of baling hoops. At the instance of the Government of India, the Baling Hoops Advisory Committee considered the question of the desirability of enforcing pressing rates during the 1943-44 season and recommended that the maximum rate for pressing should be fixed at Rs. 10 per bale. This rate was based on the prevailing high cost of coal, fuel, stores and labour and on the assumption that certain factories would probably have to use hoops purchased at higher prices to meet a part of their requirements. It was assumed that in areas where the cost of labour, etc., was relatively cheap, competition would ensure that the factories did not take advantage of the existence of a maximum pressing rate. The recommendation was accepted by the Government of India. The Baling Hoops Advisory Committee also considered a reference from the Government of India suggesting that used cotton baling hoops should be brought under control in order to prevent profiteering on used Lease/Lend hoops. In consultation with the Iron and Steel Controller, the Committee recommended that the purchase, sale and movement by rail, road, sea or any other means of used hoops should be prohibited except under licence issued by the appropriate authority.*

(iii) **Coal requirements of Ginning and Pressing Factories.**—The question of the arrangements for the grant of priorities for the transport of coal required for ginning and pressing factories was considered by the Local Sub-Committee, at its meeting held on the 2nd October, 1942, at which the Controller of Coal Distribution and the Honorary Adviser on Mill Stores, Cotton Textiles Directorate, Bombay, were also present. After a lengthy discussion, the Sub-Committee accepted the view of the Controller of Coal Distribution that advantage should be taken of the existence of a central organisation like the

* The Cotton Baling Hoops (Control of Movement) Order, 1943, was issued by the Government of India in October 1943, prohibiting the movement by road, river, sea or air of used or defective cotton baling hoops beyond the limits of the premises on which such baling hoops, for the time being, are situated except under a general or special order of the Iron and Steel Controller.

Indian Central Cotton Committee and that priorities in future should be granted only on the recommendations of the Committee working in conjunction with the Cotton Textiles Directorate, Bombay. The desirability of knowing the demand in a complete form so as to be able to determine the coalfields from which the supplies should be met and to correlate it with the requirements of other industries was emphasised, and it was decided that the Secretary, Indian Central Cotton Committee, in consultation with Mr. Greaves, Adviser on Mill Stores, should collect all the necessary data regarding the requirements of coal of the various ginning and pressing factories and draw up a plan for dealing with applications for priorities. Accordingly, a comprehensive questionnaire was sent out to all ginning and pressing factories and from the replies received a statement was prepared indicating the requirements of the various factories, and a basis was worked out for the grant of priorities for coal to them. Some 1,000 applications were received and disposed of during the year under report.

(iv) **Regulated Cotton Markets.**—Investigation into the financing and marketing of cultivators' cotton having established beyond doubt that cultivators obtain better prices for their cotton in tracts where regulated markets exist, Provincial Governments were requested by the Committee to establish such markets in all the more important cotton growing areas. Accordingly, legislation for the establishment of regulated markets has been enacted in the Provinces of Bombay, Madras, the Punjab and the Central Provinces, and the Hyderabad, Baroda, Indore and Sangli States. In the Province of Bombay, the Agricultural Produce Markets Act has been made applicable during the year to the cotton markets at Hubli, Gadag, Bavla, Sanand and Viramgam and, including these, there are now 12 such markets in the province. It is proposed to apply the Act to Nandurbar and Bagalkot markets in the near future. In the Punjab, the Punjab Agricultural Produce Markets Act is in force in 130 localities. In Madras three regulated markets continued to function at Tirupur, Adoni and Nandyal. In Hyderabad State, in addition to the 22 markets already established, the Hyderabad Agricultural Produce Markets Act was made applicable to Parbhani.

(v) **Agmarking.**—During the year, Agmarking was introduced at Hubli, Gadag, Bailhongal and Bijapur as a guarantee of purity of cotton by affixing Agmark labels to bales after supervision of ginning and pressing by the special staff.

(vi) **Universal Standards.**—As mentioned in previous reports, since 1934, with the co-operation of the East India Cotton Association and the

Karachi Cotton Association, Universal Standards common to both the markets have been prepared by a special Sub-Committee of the Indian Central Cotton Committee. At the instance of the Associations, however, it was decided during the year to drop the preparation of Universal Standards for the period of the war.

(vii) 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.

(a) **Cotton Transport Act.**—A brief account of the working of this Act is contained in previous reports. The Aundh State in Bombay Province has made the Act applicable to the State areas. In Madras and the Central Provinces, the Act worked satisfactorily. In the Southern Division of Bombay Province, 35 cases of illicit import of cotton by road were detected. In eight cases fines imposed ranged from Rs. 5 to Rs. 50. In the remaining cases warnings were given. There was no change in the protected areas.

(b) **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. Only important changes that have taken place during the year under report are dealt with here; for fuller details previous reports should be referred to.

It was reported last year that the Central Provinces Government had been requested to amend Sub-sections 9(1) and 9(1A) of the Cotton Ginning and Pressing Factories Act, 1925, in its application to the Province with a view to withdrawing the exemption granted to small factories under the proviso to these Sub-sections as it was being taken advantage of by some ginowners in the Central Provinces and Berar. The Provincial Government intimated that it did not consider that there was sufficient justification for the proposed legislation to delete the proviso, especially during the war time, when, owing to shortage of fuel oil, new factories of not more than four roller gins were not likely to be set up. The Committee, however, was not in favour of the amendment being shelved on this ground. It was pointed out to the Provincial Government that although the malpractice in question was not rampant at the moment, it might become so at any time and that preventive legislation

was therefore necessary. The Central Provinces Government, while agreeing that the legislation in question might be necessary if the malpractice became rampant, did not consider it necessary to undertake legislation of this kind in the present circumstances or during the present emergency.

Last year, the Committee made a recommendation that in those provinces where the malpractice of mixing old with new crop exists, it should be laid down that the pressowner 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. The recommendation was given effect to by the Government of Sind in the Cotton Ginning and Pressing Factories (Sind Amendment) Act, 1943. The necessary amendment in the existing legislation was also made by the Baroda Durbar. The Government of Bombay intimated that the extent of the malpractice of mixing old cotton with new crop was not such as to justify taking any action in the matter. The Madras Government did not consider that there was any case in that Province for undertaking legislation of the kind suggested.

Out of 67 Indian States which have enforced in their territories the main provisions of the Cotton Ginning and Pressing Factories Act as applied to British India, by legislation or executive orders, weekly returns of cotton pressed were received from 60; in the remaining 7 States, pressing factories did not work during the year.

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

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

(d) **Cotton Control Acts.**—Cotton Control Acts are in operation in the Provinces of Madras, Bombay and the Central Provinces and in the Baroda and Bhopal States. The aims and objects of these Acts in the areas where they are in force are stated in previous years' reports. In 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, 178 suspected samples were seized, of which 159 were certified to contain *Pulichai*. Prosecutions were launched against 147 owners, of whom 112 were convicted ; 35 cases are pending. The fines levied amounted to Rs. 965.

In Bombay, the spread of Selections 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 improved variety "Suyog" which is nearly as good as 1027 A.L.F. in staple and as Selection 1A in ginning, is being extended by the Agricultural Department. This is expected to solve the problem of the tract.

On account of the mixing of inferior cotton with superior types in the Southern Mahratta Country, a draft notification has been submitted to Government with a view to applying the Act to the tract in question. Government have notified their intention to apply the Act to East Khandesh District where *Jarila* is spreading rapidly. The question of applying the Act to the whole of Khandesh is under consideration.

In Baroda State, the Act worked very effectively during the year. In Navsari District 65 farmers were prosecuted and fined for contravening the Act. The Act was newly applied to the Baroda District during the year in nine out of eleven talukas and B.D. 8 and B. 9 were declared as standard varieties for 7 and 2 *talukas* of black and gorat soils respectively.

CHAPTER V.

RESEARCH.

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 issued as a separate publication.

There was a noteworthy increase in the use made by the cotton mills and firms of the facilities offered at the Laboratory for making fibre and spinning tests. The total number of samples received for tests was 1129, on which 234 reports were issued during the year. Among the agricultural samples tested were those cottons grown pure and in mixed cultivation in Hyderabad State and at Indore, samples of *Jayawant* and *New Jayawant*, samples of *Jarila* cotton raised in different localities and also from seeds of dry and irrigated crops, *Hirsutum* types grown in Bengal, samples grown from seeds exposed to X-ray treatment for different periods, samples grown in North-West Frontier Province and in Bikaner State, etc. etc. These tests enable the breeders to decide which of the varieties represent an improvement over the existing types and are thus likely to bring higher monetary return to the cultivators. Valuation reports made by an expert grader for estimating the acre-cash values of strains under trial in all the breeding schemes of the Committee were also supplied to the breeders. In addition, tests were made on

many representative trade varieties of Indian cottons, and the results of these tests were published for general information in the form of Technological Circulars and Bulletins.

The Testing House of the Laboratory received samples from various sources such as Government Departments, cotton mills, firms, etc., covering a wide range of fabrics including a large variety of materials for the use of the Army, the Navy, the Air Force and the War Hospitals.

On behalf of the Agricultural Marketing Department of the Government of India, tests were made on a large number of samples to find out suitable criteria for quality control for the purpose of applying AGMARK to 1027 A.L.F., V. 434 and Sind *Sudhar*. Similarly, the work on the scheme for the survey of the cellulose bearing materials of India, on behalf of the Council of Scientific and Industrial Research, was carried a stage further during the year.

In addition to the above tests, a number of technological investigations are in progress while some of them were completed during the year. These will be briefly mentioned. (1) In view of the difficulty in obtaining sufficient quantities of long-staple foreign cottons under the present war conditions, tests were made on the combing of good quality Indian cottons which gave interesting results which were published, (2) a special technique for spinning very small size samples, weighing, say 2 lbs., employing the ordinary cotton spinning machinery was evolved at the Laboratory, (3) the effect of using different front-roller speeds, roller settings and different weights on sliver in the draw-frame is under investigation, (4) the effect of employing different speeds of beater and fan in the Crighton Opener is being studied, (5) evolution of a method by statistical analysis by which it would be possible to combine different yarn strength results for accurately judging the significance of the difference between any two samples, (6) influence of swollen hair diameter on the spinning quality of *Arboreum* cottons, (7) influence of manurial treatment on the fibre properties of *Gaorani* 6 has been studied, (8) the work on the central problem of the Laboratory, namely, the prediction of the spinning quality of Indian cottons from their measurable fibre characters has been pushed a stage further by showing that better agreement with the actual results is obtained if the Indian cottons are divided into well defined groups.

Among the other activities, mention may be made of the work on Indian linters. After completion of the report on a survey of Indian linters work

was continued on the effect of different kier-boil and bleach treatments in order to find out the optimum conditions for the manufacture of various grades of chemical cotton possessing definite physical and chemical properties.

During the year two new devices were designed and made, which are expected to prove useful. These are :—

- (1) An attachment incorporating original ideas has been designed by means of which it is possible to maintain the density of seed-roll in a saw-gin at a constant and desired level. The density of the seed-roll is perhaps the most important factor in determining the quality of ginned cotton. The new device would ensure not only the smooth running of the saw-gin but also the production of a uniformly good quality lint.
- (2) A simple form of Quartz Micro-balance, with two ranges 0-0.5 mgms. and 0.5 mgms. has been designed which dispenses with the use of the low power telescope, and can be used either for the determination of fibre-weight per inch by the ordinary method or with a Balls Sorter or the Stapling Apparatus. It can also be used advantageously in micro-analytical work.

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 in the black soil areas of the Malwa Plateau. In April 1940, the working of the Institute was re-organised as a result of which fundamental research on genetics and plant breeding, physiology and field plot technique is carried out under a special scheme 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.

Fuzz grades in hirsutum cotton.—The F_2 s of crosses among different grades of fuzz (1-10) were grown during the year and except in one or two cases where the results indicated a mono-factorial inheritance, the general behaviour would rather support the multifactorial hypothesis. One point in support of the latter is the observation that the mean values of F_1 s and F_2 s are found to increase as the parents used belong to the higher grades of fuzz. Another point in support of it is the fact that different fuzz grades isolated from a local sample of *hirsutum* are found to breed true to the respective grades with very slight variation on either side of the mean. Further work in progress should decide the issue. Another interesting observation made in these hybrid progenies is that there is an association between the lower grades of fuzz and poorer ginning percentage a point which Silow has also observed in his studies.

Red leaf in G. hirsutum.—In the fuzz grade experiment cultures, a type of red leaf (uniform coppery red) at or soon after the onset of flowering appeared to segregate more or less sharply from green plants. The red leaf plants under Indore conditions do not appear to be at a disadvantage compared to the green ones in respect of seed and fibre maturity and, in addition, were invariably earlier than the green plants. From preliminary observations it is considered that this red leaf-green distinction has a single factor difference as its basis. The same material was also examined for incidence of jassid attack. It was found possible to score the plants for different degrees of jassid attack and next year's work should show how far this grading is dependable. Jassid attack is found to bring on another type of reddening of the leaf and this being patchy can be easily distinguished from the red leaf mentioned earlier. It is only where both the types of red leaf occur together that the situation becomes complicated.

Locular composition.—From an original mixture of *desi arboreum* cotton obtained from Dhar a few years ago, a strain is being isolated which is characterised by 5-locked bolls as distinct from the 3-locked condition. Preliminary results would indicate that the difference is heritable and is dependent on a single gene difference, the 5-locked condition being a recessive. This is confirmed by an F_1 plant of a cross between the two types which is 3-locked. It may, however, be mentioned that the 4-locked boll is a variation of either the 5-locked or 3-locked condition.

Single leaf mutant.—The F_3 data obtained during the year have confirmed the F_2 results reported last year that the abnormal segregation between the normal and mutant leaf is such as would be expected in a 7 : 3 gametic ratio instead of the usual 1 : 1. The cause of this abnormal behaviour is under cytological investigation. The single leaf gene is found to segregate independently of petal colour and lint colour genes.

Anthocyan genetics.—The allelism of a new green stem spotless member of the R_3 series is established. It has proved recessive to green stem, ghost spot. Its relationship with other members of the series is under investigation.

X-ray work.—The X-5 generation of the X-rayed Upland strain, M.U. 4, consisting of treatments B and C, (seeds exposed to 10 and 20 minutes respectively) has again scored over the control A in mean maximum halo-length and ginning percentage. The improvement effected by the treatments has thus been sustained for 5 generations. A fibre test report on the lint from last year's experiment has shown that C is 7% longer in staple than either A or B and both B and C are 12% less in fibre weight than A. Both B and C have, however, a slightly lower fibre maturity than A. Periodical observations on the three bulks were taken qualitatively on vigour of the plants by a number of persons independently in a small bulk trial and in every observation, the treated plots, B and C, appeared better than A. In the final yield though B and C showed a numerical increase over A, the differences were not significant. In the progeny row trials, one of the progenies from C has given an outstanding performance over M.U. 4 in yield, ginning percentage and halo-length.

To confirm the results obtained so far, fresh selfed seed of a single plant from M.U. 4 has again been exposed to X-rays for 10 and 20 minutes and sown during the year along with untreated control seed of the same plant.

Wilt work.—In the homozygosity test for wilt resistance, Dhar No. 43 (Family 2), which has proved as resistant as *Jarila* to wilt under field conditions, does show heterozygosity under intensive wilt conditions allowing scope for improving its resistance by further selection. Two of the progenies out of this showing the highest resistance are also found to be significantly better than the other progenies with regard to halo-length which still shows a fair amount of variability.

In the crosses between Malvi and *Jarila*, twenty-nine F_4 families were tested in progeny row trial against Malvi and *Jarila*. Of these, six have proved as good as Malvi in yield and as good as *Jarila* in ginning percentage

and halo-length. Some of the selected progenies were grown under controlled conditions of humidity and temperature in Glass House and the best of these in quality combined with a high resistance have been selected for further trial under controlled conditions.

Study of the potentialities of different ecotypes with regard to combination of economic characters.—Eleven selected quality *arboreum* strains had been crossed with each of 9 selected *Bengals* giving 99 sets of F_1 s. These F_1 s had been grown in a replicated trial with 5 replications last season along with the 20 parents. The object of the experiment was to study the behaviour of F_1 s in order to correlate it, if possible, with the performance of F_2 and subsequent generations. The F_1 data had been analysed during the year from the view point of (1) presence of heterosis and (2) value of different crosses for crossing. The characters studied in the F_1 s were growth (height), node number, ginning percentage, halo-length and fibre-weight. The indications obtained are (1) there is a significant general heterosis with regard to all characters except fibre-weight; (2) the F_1 values of the present crosses, with a few exceptions, follow the same order as that of the parental strains for all the characters. A replicated progeny row trial with F_2 s and parents of crosses selected on the basis of the above analysis has been carried out during the season and the data await analysis. Some of the selected F_2 s were also grown in replicated experiments at Lyallpur, Ganganagar, Akola, Nanded and Coimbatore with the co-operation of the respective Cotton Botanists and the data will be examined along with those obtained at Indore.

Physiology.

'Simple method of determining fibre weight in early stages of plant breeding.—Since next to fibre-length, fibre-weight is the factor contributing to quality, a simple method of determining fibre-weight which the Plant Breeder himself can adopt has been under investigation and such a method based on sampling bunches of fibres of definite lengths from individual combed seeds with a special cutter has been devised. The use of the technique has shown that an observer can carry out 10-12 determinations per hour. It can be said that in varietal and agronomical trials as well as in replicated progeny row tests, the fibre-weight can be determined with a standard error of 4% of the mean by examining a small number of bunches per plot, depending upon the number of replications. While the proposed technique has undoubtedly brought measurement of fibre weight within the range of Plant Breeder's work, more

work would appear necessary to increase the speed of work and to further simplify the technique.

Seed size and Plant Vigour.—A preliminary experiment begun in the previous year was repeated during the year with 3 *desi* and 3 American strains where the seeds separated into three groups, large, medium and small were grown in a replicated experiment. In the early stages of growth, it is found that the initial advantage of heavier seed is maintained in the fresh and dry weight of the seedlings and in initial height. The vigour due to heavier seed particularly in the *desi* strains can be visually observed right through the growth period. But in the Americans, the early differences in favour of heavier seed is not maintained in the later stages. In crude yield of *kapas* the heavier seed exceeded the smaller in all the strains. But in the adjusted yield of *kapas* and in the crude and adjusted yield of lint, the heavier seed succeeded significantly the smaller only in the case of *desi* cottons. It is found that it is the total number of bolls and not the seed number nor weight of *kapas* per boll that has contributed to higher yield in the case of heavier seed. In both *desis* and Americans the differences in the size of seed sown are maintained in the produce obtained. That the smaller seed sown gives a higher ginning percentage is due to the lower seed weight. The experiment has shown clearly that yield, particularly in the *desis*, can be increased by sowing heavier seeds. A feasible and easy method of separating out heavier and larger seeds has to be found, before the results can be translated into actual agronomic practice.

Experiment with coating cotton seed with Ammonium sulphate before sowing.—At the suggestion of Dr. Kalamkar who has obtained phenomenal increase in yields by sowing seeds coated with Ammonium sulphate, experiments were also undertaken at Indore. Seeds were first treated with adhesives like clay, gum and lanolin and were then coated with as much Ammonium sulphate as would stick to the seed. The experiment consisted of Ammonium sulphate coated seed and seed with enough Ammonium sulphate as had gone in the coating applied separately with the seed at the time of sowing. It was found that Ammonium sulphate coated seed suffered very much in germination, the seed where Ammonium sulphate was applied separate also suffering though not to the same extent as the former. Though the yield of cotton is definitely very high in the case of Ammonium sulphate treated seed either as a coating to the seed or applied at the side, so long as germination is affected, the practice

has no practical possibility. If ways and means can be found to so apply the Ammonium sulphate in the field at an optimal distance from the seed which will be far enough not to affect germination, but near enough for the young germinating seedlings to utilise it at the earliest possible moment, the practice can become useful. Experiments on this question are under way.

The other physiological experiments in progress during the year were concerned with (1) a study of germination in relation to time of sowing, depth of sowing and condition of seed—soaked or dry; (2) determination of a sounder criterion than node number of the plant for judging earliness as node number is found vegetatively correlated with plant vigour and (3) vernalising cotton seeds.

Application of discriminant function in cotton breeding.—To determine what relative weight was attached to the various phenotypic components of yield in order to consider their order of merit in selecting for higher yield, a replicated experiment was conducted with 32 strains of *G. arboreum* var. *neglectum* cottons collected from all over India. The yield components studied in the experiment were (1) No. of bolls per plant, (2) No. of seeds per boll, (3) Weight of seed cotton per boll and (4) ginning percentage. Quantitative observations on the above characters were taken on sample plants in the plots and the several analysis of variance and covariance were worked out. The coefficients of expressions which may best discriminate the genotypic yield potentialities of the varieties were :

	For yield of seed cotton.	For yield of lint.
No. of bolls per plant	+0.498	+0.447
No. of seeds per boll	+0.325	-1.569
Weight of seed cotton per boll	+3.093	+5.029
Ginning percentage	-2.041	-1.775

It would appear that weight of seed cotton per seed is of primary importance in selecting for higher yield of both seed cotton and lint. Higher ginning percentage has an adverse effect both on yields of seed cotton and lint. The

number of bolls per plant and the number of seeds per boll are of less importance.

In order to test whether the above results can provide any guidance in making selections within an indigenous cotton variety of a tract, another trial consisting of progenies of Malvi from random plants in the local mixed population has been carried out. Observations have been recorded as in the other trial and when these are analysed the results should give information on the question of a discriminant function.

Other miscellaneous studies carried out during the year were (i) determination of the suitability of any particular material for selection by studying the variability in the material and what part of that variability was genetic; (ii) a uniformity trial with cotton with a view to improving the technique for progeny row trial, and (iii) progeny row trials of crosses in *desi* (mainly involving *G. anomalum* and Upland material). In the last case one of the progenies from an S. L. D. type is outstanding in yield, halo-length and resistance to jassid attack though low in ginning percentage and might prove valuable as a parent in breeding work.

COTTON RESEARCH IN PROVINCES AND STATES.

BOMBAY.

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

The breeding of wilt-resistant types originally formed part of the Broach Breeding Scheme, but as it was considered desirable that this work should be done under optimum conditions of wilt infection, and as the required conditions, especially soil temperature in pots, were difficult to maintain at Broach, this part of the work was transferred to Poona in June 1935, together with similar work on cottons for the Jalgaon tract.

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

During the year under review, 13 strains, including 1-2 and 1-6, were tested against B.D.8 and Broach Local in wilt-free and wilt-sick soils. Of those in the wilt-free area, only one strain, 30-57, was found to significantly outyield B.D.8; the differences between the other strains and B.D.8 were not significant. In respect of lint yield, segregates 30-57, 54-59, 73-33, 1-6, 5-18 and 1-2 were significantly better than B.D.8. The ginning percentage of all the segregates is superior to B.D.8 while their lint length is more or less equal to that of B.D.8. On the wilt infected area, B.D.8 and all the strains except 76-1 and 6-22 were free from mortality. The good performance of the segregates on wilt-free soil was more or less corroborated on the wilt-sick soil.

Village trials of segregates 1-2 and 1-6, with B.D.8 as 'control', were conducted as in the past years, in 3 black-soil centres and one centre in *gorat* soil area. The segregates were, on the whole, as good as B.D.8 in point of yield; owing to their high ginning outturn their lint yields were 51 and 59 lbs. more per acre respectively. It is now proposed to distribute the 'Vijaya' segregates in replacement of B.D.8 and Broach Local in the Nerbudda-Mahi and Mahi-Sabarmati zones.

To introduce early maturity, the segregates 1-2 and 1-6 have been crossed with early Maktampore selections.

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 1-2, 1-6, 3-1, 5-18, 76-1 and 7-29. The former three showed a much higher degree of wilt-resistance than the two segregates 5-18 and 7-29. Of the last two cultures, 7-29 a derivative from the back-cross (B.D. 8 × G.A. 26) × B.D.8 was more resistant than 76-1, a selection from the straight cross, (B.D.8 × G.A.26). The study of the crosses between K.F. and 1027 A.L.F. indicated that the K.F. parent was homogenous as regards its reaction to *Fusarium* attack.

(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, five cultures—4-G-2-3, 4-G-2-5, 9-2-7-3, 9-2-7-5 and 9-2-8-3—of *Dokras* cotton were tested against *Jarila*; all of them proved inferior to the control in respect of yield; they were, with the exception of 4-G-2-3, however, superior to *Jarila* in ginning outturn. The promising cultures will be tested in the ensuing year.

Segregates from the following crosses were tested against *Jarila* for yield:—

1. (*Jarila* x N.R. 5 x New Million Dollar) F₄.
2. (*Jarila* x N.R. 5) F₅.
3. (*Jarila* x New Million Dollar x *Jarila*) F₄.

The cultures from the first and third crosses were found to be inferior to *Jarila* and hence work on them will be discontinued. Out of the five families tested from the second cross, four gave better yields than *Jarila* whilst the yield of the fifth was on a par with it. All these cultures, however, were superior to *Jarila* in respect of ginning percentage and wilt resistance.

Comparative yield trials of *Jarila* and local were conducted at Jalgaon, Dhulia and Bhadgaon farms. At the first two places, the net gain per acre realised by *Jarila* over local was Rs. 37-8-0 and Rs. 20-10-0, respectively. It is proposed to discontinue these trials as *Jarila* now occupies almost 86% of the total area in Khandesh.

Under the wilt-breeding part of this scheme, progenies of 8 plants of two cultures of *Jarila* were tested in pot culture under controlled conditions of infection. Twenty-four plants were transplanted into the infected field for further testing.

(c) **Scheme for breeding wilt-resistant cottons in Surat area.**—This scheme was sanctioned by the Committee in August 1936 and commenced work in April 1937. The object of the scheme is to obtain a strain of cotton

completely resistant to wilt and suited to the natural conditions obtaining in the Surat tract. This is sought to be achieved either by selection in 1027 A.L.F., or by crossing this cotton with B.D.8 or other wilt-resistant strains.

During the year under report the following crosses were tested in the wilt-sick plot at Shera and desirable cultures with good resistance were selected for further testing :—

- (1) 8-1 x K.F.
- (2) [8-1 x {(B.D. 8 x G.A. 26) x B.D. 8} F₆₋₁₋₆] F₄.
- (3) [1027 A.L.F. {x (B.D. 8 x G.A. 26) x B.D. 8} F₆₋₁₋₆] F₄.
- (4) (8-1 x 1027 A.L.F.) F₈.

Segregates 3 and 7-2 derived from (8-1 x 1027 A.L.F.) F₈ above are said to combine the agricultural characters of 1027 A.L.F. with the wilt-resistance of Seg. 8-1.

In the wilt-sick plot at Shera, the sibs of Seg. 8-1 recorded a mortality ranging from 0 to 10%, against 22.5 to 50% of 1027 A.L.F. Three cultures which showed nil mortality were retained for further study.

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

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

It is reported that during the year 45 families derived from crosses and selections were tested at Viramgam, Jagudan and Dholka, of which 16 promising ones were selected for further trials. Of these, four selections, E. 31-1, (1 x 99), 20-1, H. 8-1 and K. 61-3-1, were found to be early maturing, high ginning and at the same time to possess good fibre properties; the first three of these, however, are poor in respect of yield, whilst the last has a wider boll-opening than is desired in the Wagad tract. The remaining 12 families gave good yield and compared favourably with the controls in respect of other economic characters.

Varietal trials with eight close-bolled types at the three centres of experimentation did not reveal any significant yield differences. In the experiment at Jagudan, in the Lallo tract, the 'Vijaya' segregates 1-2 and 1-6 were tested against Segregate 7-1 and B. 9; the Broach segregates were found to be significantly poorer than the controls in respect of yield of *kapas* and lint.

(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 report, one hundred and sixteen selections were studied; of these 93 were found to be of the *Rozi* type whilst 23 appeared to be of hybrid origin. One hundred and thirtyfour single plants from both the groups were selected for further study. The trial of Broach segregates—76-1, 1-2, 1-6, 5-18, 7-29 and 3-1—showed that the yield of seed cotton per acre of the 'Vijaya' segregates 1-2 and 1-6 was, respectively, 76 and 129 lbs. more than Broach Local and 153 and 206 lbs. more than B.D.8. In respect of spinning value, the 'Vijaya' segregates were as good as B.D.8 and far superior to the Broach local and *Rozi*.

The local practice is to grow Kodra (*Paspalum scrobiculatum*) in the first year in between the rows of *Rozi* cotton and *Bajri* in the subsequent years. The results of the experiment undertaken to test the effect of the local mixed cropping on the yield of cotton, confirmed the finding of the previous year that cotton with *Bajri* yields less than cotton with *Kodra*. Amongst the exotic and indigenous perennial and annual varieties tested in the tract, Nadam from Baroda and Muthukolathur is said to be promising as regards economic characters.

(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 review, nine advanced cultures from three back crosses, 22, 68 and 125, were tried in randomised replicated compact family blocks against 1027 A.L.F. and Co. 2 as controls and the size of each plot was 50 sq. feet. Two cultures, B.C. 22-7-1-4F₅ and (B.C. 125 x Co. 2)-3-3. F₃, combining the characters of good yield, high ginning and long staple, are considered promising; four were high ginning and one culture—B.C. 22-7-1-3. F₃—had good staple length. It is stated that with a view to exploring the possibilities of obtaining outstandingly better combinations than has been possible hitherto, some long stapled American cottons like Meade and Cockerwils were used for back crossing with the F₁ hybrids. Attempts to induce doubling of chromosomes by treating the hybrids with colchicine were successful with the F₁ hybrid of *G. barbadense* x *G. Thurberi*, the treated shoots showing good setting of bolls. The synthetic tetraploids obtained by crossing hexaploids of cultivated American x cultivated Asiatic with diploids like *G. armourianum*, showed predominantly the characters of the wild cotton with none of the desirable characters. The tetraploids on crossing with Co. 2 are said to have recovered a good deal in general vigour, boll size, yield and economic characters. A few plants which seemed healthier than Co. 2 were used as parents in crosses with long stapled American cottons.

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

During the year under review, two strains, viz., 9766 and 4411, which were available from the promising material obtained as a result of hybridisation between the varieties Gadag 1 and Co. 2, were tested against Gadag 1 in a replicated trial. The results have shown that Gadag 1 is significantly better than the other two types in respect of yield but lower in ginning outturn. As regards maturity, 9766 was found to be later than Gadag 1.

SIND.

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

During the year under review, some 6,000 single plants belonging to the progenies of the F_2 and first back cross generation derived from the crosses between the two Sind American strains—Sind *Sudhar* and M4—with each of the six long staple Upland types imported from U.S.A., viz., Express, Wilds, Delfos, Acala, Missdel and Delta Type, Webber respectively, were studied in a replicated experiment. Of the six exotic types—Wilds and of the two Sind American strains—M4, hold out greater promise of producing economic biotypes. All the six exotics were found to be more susceptible to *Tirak* and Red-Leaf blight and poorer in yield than the two Sind American strains and consequently most of the ordinary F_2 progenies showed these undesirable traits. On the other hand, all the back-crosses gave higher yields and showed lower incidence of *tirak* than the F_2 s, in some cases, even equalling the two commercial strains. Plants possessing high yield, high ginning (32% and above) staple at least 3 mms. above the two commercial strains and showing only mild *tirak* attack were selected. A few plants possessing staple length

of $1\frac{1}{4}$ " with other desirable characters have also been obtained. Over 100 promising single plants will be introduced in a replicated F_3 progeny row trial in the coming season. Out of another lot of the F_3 population, 55 plants possessing a staple of $1\text{-}1/16$ " and over, were introduced into a replicated F_3 progeny row trial. Though the growth, vigour and productivity of the crosses were satisfactory, the bolls developed *tirak* to a very high degree and consequently the yield per plant was considerably reduced. It was, therefore, not possible to obtain a valid estimate of the inherent yielding capacities of the hybrid progenies tested in this experiment. The crosses were superior to Sind *Sudhar* in ginning outturn also. A large number of promising progenies will be further tested in a replicated trial 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, the incidence of jassid infestation is reported to have been more intense than in the previous year but it was not serious. Six varieties, *viz.*, Sind *Sudhar*, M₄, L.S.S., SLDI, Co. 4 and K. 25, were tested for jassid susceptibility. On the basis of the number of jassids attracted, M₄ was found to be the most resistant and Sind *Sudhar* and 289F/K. 25 the most susceptible, the rest occupying intermediate positions. This classification, however, was not corroborated by field observations on the development of the symptoms of damage. Co. 4 showed the least symptoms, notwithstanding its greater attractiveness to the jassid, while M₄ developed comparatively more intense symptoms in spite of fewer jassids being attracted to it. The infestation of the crosses and back-crosses with S. S. and M₄, raised in the long staple cotton scheme, did not differ significantly from one another.

The seasonal sowings are reported to have confirmed the observation of the previous year, *viz.*, that the late sown crop is more heavily infested

by the insect. There was no evidence, however, to show that heavy infestation reduces yield. Examination of the hairiness, and the anatomical peculiarities of the leaf vein indicated that the injury caused by the jassid is apparently not due to the destruction of plant cells by the pest, and that the density of hairs on the veins confers resistance to jassid attack.

It is reported that the different spacings—2, 3 and 4 feet between the rows—did not produce any significant difference in the jassid population. Unlike the Punjab, zones of differential jassid infestation do not appear to exist in Sind. *E. Devastans* is said to be the main species of jassid of any importance so far as Sind-American cottons are concerned.

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

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

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

During the year under review, the control work was carried out on the lines of the previous years. Owing to extensive *rabi* cultivation on the flooded

areas, the incidence of the pest is reported to have been very high in Sind and severe damage of grain in the threshing yards was observed. In parts of Dadu district where the pest used to appear regularly every year, there was little or no cotton cultivation. The bait material was distributed from four centres for controlling the pest in threshing yards and cotton fields in the other parts of the district. Cotton is said to have been sown on about 300 acres in Khirtar area of Larkhana district and this area was also cleared of the pest. Besides this area cotton was not grown anywhere else in this tract. It is stated that 10 to 20 seers of the bait are sufficient, according to the intensity of incidence, to control the insect in one acre.

It is reported that a complex sowing date cum varietal experiment was laid out at Shahdadkot in Sind and Ustamuhammad in Baluchistan. The trial at the former place was destroyed by floods in August last. In the test at the latter place, three varieties, viz., 4F-98, Sind *Sudhar* and M4, were planted each on 4 different dates—27th April, 15th May, 27th May and 15th June, 1942. The early sowings in April are stated to have given the best results in the case of all the three varieties; M4 matured earlier than the other two types. Ridge sowing of cotton was found to minimise the damage by *tid*, but this method of sowing is considered expensive. Trials carried out to find out a cheaper and a more suitable poison bait have indicated that rice bran and molasses, now being used, cannot be replaced. The experiment will be repeated.

(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 campaign area was increased to 700 square miles from 570 sq. miles in the previous year, by the inclusion of 130 sq. miles in the rice tract where the bollworm attack was most severe. As in previous years, the clean-up operations were undertaken in December and completed by the end of February, during which period 98.8% of the area

was cleaned, 93% of this being by means of *kudali* and 7% by the hatchet. The eradication of *patiteer* and other alternative host plants was also completed within the same time.

The study of the incidence of the bollworm in the cleaned and uncleaned areas revealed that while the cotton seedlings in the former area were practically free from the pest, those in the latter were infested to an appreciable extent. A later examination of the crop at the fruiting time of cotton showed that the bollworm attack in the uncleaned areas of the cotton zone, the area growing partly rice and partly cotton and the zone where rice predominated, was 2-3 times or 3-5 times greater than in the respective cleaned areas. The average attack in the uncleaned area of the rice tract was as high as 41.7%.

The night caging experiments indicated that the difference in yield between the caged and non-caged plants was more marked in the untreated area than in the treated area. On an average, five bolls more per plant were picked in the cleaned areas than in the uncleaned.

It is stated that in the absence of any rigid measures of control over a number of years, the rice tract would serve as the breeding ground for the pest and a total or partial failure of the cotton crop in the Hyderabad and Tharparkar districts might result.

PUNJAB.

(a) **Punjab Botanical Scheme.**—This is one of the earliest schemes of the Committee. Sanctioned in 1923 for a period of five years, it came into operation in August 1925, and has been extended from time to time, the last extension, which will expire on the 28th February, 1945, being approved by the Committee at its meeting held in January 1940. Until 31st March, 1936, the entire cost of the scheme was borne by the Committee, but since then, the expenditure is shared on a 50 : 50 basis between the Committee and the Provincial Government. The original object of the scheme was to investigate the causes of the periodic failures of American cotton in the Canal Colonies of the Punjab where a large area is annually grown under such cottons, and to obtain suitable types of American and *desi* cottons. In view, however, of the immediate economic importance of improved types of cotton, work was concentrated on breeding, and a separate physiological scheme was sanctioned for investigating the problem of periodic failures of American cotton. The Botanical scheme has thus been concerned mainly

with the improvement of both *desi* and American cottons. As more than half the cotton area in the Punjab lies in the Canal Colonies, attention was first directed to the improvement of the cottons of that area. The South-Western tract of the Province, comprising the arid districts of Multan, Muzaffargarh and Dera Ghazi Khan, were given attention next and a sub-station for this purpose was opened at Multan in 1935.

During the year under review the total area under cotton in British districts was 2,331,700 acres, of which 1,575,400 acres were under American and 756,300 acres under *desi* varieties.

The newly selected cultures from the improved varieties, 289F/43 and L.S.S., were tested in randomised and replicated blocks; three high ginning and good yielding selections—233F, 234F and 238F—from the former and five early maturing progenies—263F, 264F, 265F, 266F and 267F—from the latter have been retained for further study.

The district varietal trials carried out during the year confirmed the superiority of the new American strains—124F and 199F—over the commercial varieties now under distribution. 124F is said to be increasing in popularity in the lower Bari Doab Canal Colony and south-west Punjab and occupied roughly an area of 13,000 acres during the first year of its release for distribution. The second strain, 199F, is reported to be even more promising than 124F; it surpassed other varieties in most of the centres where it was tested for yield, staple length, ginning outturn and acre cash value. It is stated that this variety with its cosmopolitan habit may be found suitable for all the American cotton growing regions of the Punjab.

The F_2 of 19 progenies from two different backcrosses—(920 Cambodia x 58F) x 289F/43 and (920 Cambodia x 58F) x 124F—were tested for jassid resistance and a large number of single plants has been selected for study in the coming season. Amongst the *desi* hybrid strains, Jubilee was found to be highly promising at Risalewala and Lyallpur and is said to be particularly suited to the Lyallpur Colony.

At the Hansi sub-station, one set of five new *desi* strains and another set of nine American varieties were tested in replicated experiments against Mollisoni 60A2, which is now under extensive cultivation in the south-east Punjab. Amongst the *desi* selections, 231 Rosea was better than the Control in respect of yield and ginning percentage; of the American varieties, 216F, 124F, 157F and 199F gave significantly higher yield than Mollisoni 60A2.

At the Jhang station the yields of 199F and 224F are reported to have been statistically on a par with 4F.

(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.

The incidence of jassid and *tirak* during the year was negligible and the yields obtained were consequently high; the crop at the B.C.G.A. Farm gave an average yield of 16.17 maunds of *kapas* per acre against 9.86 maunds in 1941-42. There was practically no difference in respect of yield between the mass selected strain and the B.C.G.A. strain; the former was, however, significantly superior in ginning outturn. Of the 220 single plant progenies in the row test, five selections, combining the desirable characters, have been retained for further testing. Amongst the hybrid families under observation, ten from 289F/K. 25 x 289F/43 and its back-cross and one from the cross between 124F x 4F Sakrand (a jassid resistant variety) appeared promising in respect of jassid resistance, ginning percentage and lint length and it is proposed to test their yielding capacity in the coming season. With a view to creating fresh hybrid material for the isolation of jassid resistant types, the new Cambodia strains—Co.3 and Co. 4—were crossed with 289F/K. 25 at Lyallpur and the first generation hybrids will be grown at Khanewal in the ensuing season.

Varietal tests of American strains evolved at Lyallpur and Multan, conducted at Khanewal, showed 124F and 199F to be superior to 289F/K. 25 in respect of yield; the differences, however, were not statistically significant. The average yield per acre of 124F from a plot of 16 acres on the Khanewal farm was 23.5 maunds.

(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, 1944.

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

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

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

During the year under report, the results obtained from the field experiments confirmed the previous finding that June sowing is the best practical ameliorative measure against *tirak* and closer spacing than the one usually adopted is necessary for obtaining higher yields. June sowings did much better than May sowings on rice-reclaimed areas. Two schedules, A and B, have been prepared on the basis of experiments conducted during the past few seasons. Schedule A furnishes particulars about the changing seed rates and spacings with advancing dates of sowings. Schedule B contains the optimum sowing periods for the commonly grown varieties in each district. The previous finding that June-sown crop, if spaced closely, suffers less damage from jassids than if spaced widely has again been confirmed for the 3rd year in succession. The new strain (289F/124) was found particularly suitable for June sowings in Multan and Montgomery districts. When sown in May it was affected by *tirak* but later sowings showed little or no *tirak* and gave very high yields when closely spaced. It is proposed to include 289F/124 amongst the varieties recommended for these two districts. June sowings were adopted by private *zamindars* on a large scale in 1942. On a majority of these farms record yields were obtained. On some of these farms the yields

of May-sown and June-sown crops were recorded separately and in all cases, except one, June-sowings out-yielded May-sowings.

The study of the physiological chemistry of *tirak* affected plants has shown that nitrogen influences the boll number per plant while potassium affects the seed maturity. The deficiency of potash in the bolls of *tirak* affected plants is found to cause immaturity of seeds by adversely affecting the synthesis of proteins. On light sandy soils potassium deficiency occurs as a result of nitrogen deficiency. The uptake of potash by plants has found to increase when sulphate of ammonia was added to light sandy soils. On soils with saline sub-soils the condition of physiological drought brought about a depression in the potash uptake. The net result is stated to be the same on both soil types, viz., immaturity of seeds, though there are differences in the symptoms exhibited.

During the year a date of sowing experiment with Sea Island cotton was tried. The Sea Island cotton was sown in March, April, May, June and July. The results indicated that March-April was the optimum sowing time for this variety. The following table gives the yields obtained at Iqbal Nagar for the different sowings.

Sowing date.	The effect of sowing date on yield of Sea Island cotton.					
	28th March.	18th April.	8th May.	28th May.	18th June.	10th July.
Yields in maunds per acre . .	11.03	12.05	9.4 S. E.	3.02 0.75	Not bearing at all.	

The experiment conducted with oil cakes and the sulphate of ammonia on light sandy soils indicated that *toria* cake could successfully be substituted for ammonium sulphate as it gave nearly as great increases in yields as the sulphate of ammonia. The cotton cake did not give sufficient increase in yield either at Lyallpur or at Iqbal Nagar.

(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*. The scheme terminated on the 28th February 1942.

As a result of the investigation carried out, it was found that the simplest method of control of root rot in affected fields is to sow cotton mixed with *moth* (*Phaseolus aconitifolius*). The *moth* crop forms a thick mat on the bare ground in the rows between the plants and has proved very effective in reducing the incidence of the disease to a very great extent. In certain cases fields affected as severely as 80-100% were found to bear a cotton crop absolutely free from the disease when grown in this manner. It is stated that the Punjab Department of Agriculture is now recommending *Moth* sowing in fields known to be affected with root rot.

(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.

Though jassid infestation during the season under review was less severe than in the previous year, it is considered to have been of sufficient intensity to enable a correct evaluation to be made of the differences in varietal resistance. Among the new types tested in randomised blocks, 124F was found to be most susceptible and 199F the most resistant; in view of this and its good field performance and technological properties, 199F is expected to become the most important commercial variety of American cotton in the Province in the near future. As regards the commercial varieties, the previous findings that 289F/43 was very resistant while 289F/K. 25 was highly susceptible, were confirmed.

The study of the relative importance of the species of *Empoasca* as pests of cotton revealed that *devastans*, which predominated at all the places, is the main species responsible for the damage in cotton; the other species, *viz.*, *Kerri*, var *motti* and *minor*, though abundant in certain localities, do not affect cotton to any great extent. The investigation of jassid resistant characters such as moisture content, hairiness, pH of cell sap, thickness of leaf vein cuticle etc. indicated that resistance is closely linked with the density of hairs on the leaf vein.

The addition of Selenium to plots of 289F/K. 25 enclosed in a field cage and infested artificially with jassids, made no improvement in the resistance of the variety.

(f) **Scheme for study of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds in the Punjab.**—This scheme was sanctioned by the Committee in January 1942, for a period of two years. It came into operation on the 1st September 1942.

The object of this scheme is to investigate the alleged disparity in nutritive value of *desi* and American cotton seeds, with a view to ascertaining whether the differences between the market prices of *desi* and American cotton seed is due to prejudice or to inherent differences in their feeding value.

The investigation was carried out with 12 buffaloes, which were divided into 3 groups, A, B, and C with four animals in each. Group A was fed on fuzzy American cotton seed 289F/K. 25, group B on delinted American cotton seed 289F/K. 25, and group C on *desi* cotton seed. The animals were each given daily as much cotton seed as they could eat, in addition to other fodder and one lb. each of ground gram and wheat bran. The buffaloes in group A ate regularly about 6 lbs. per head per day, throughout the period, and those in group C about 8 lbs., of the four buffaloes in group B, two ate 8 lbs. and the other two 4 lbs. All the animals, except one which died after 4 months, are reported to have maintained normal weight, health and yield of milk.

The results obtained to date indicate that in so far as the quality of the milk, *ghee* and butter produced from the group, fed on fuzzy cotton seed is concerned, there is no distinguishable difference in characteristic taste or palatability from similar products from the buffaloes fed on ordinary rations. In fact, the experiments have confirmed the previous finding that the food value of fuzzy cotton seed is higher than that of other cotton seed.

CENTRAL PROVINCES AND BERAR.

Central Provinces and Berar Cotton Breeding Scheme.—The Central Provinces and Berar Cotton Breeding Scheme was sanctioned by the Committee for a period of five years with effect from the 1st April, 1939, and replaced the Central Provinces Botanical Scheme which terminated on the 31st March, 1939. The object of this scheme is to evolve, by selection or hybridisation, suitable new strains of cotton which can compete successfully with the local *Oomras* in point of ginning outturn and yield and which, at the same time,

possesses a staple capable of spinning between 20s and 25s highest standard warp counts. The scheme is worked at Nagpur and at Akola, to suit the special requirements of the Central Provinces and Berar, respectively.

The Central Provinces Cotton Breeding Scheme is concerned with the breeding of improved strains of cotton suitable for Nagpur, Wardha, Chanda and parts of Chhindwara districts and capable of replacing the ordinary short staple mixed cotton of these areas. The scheme at Akola is concerned with the production of high-yielding superior strains of cotton suitable for the Berars and possessing a staple of at least $\frac{3}{4}$ " with the softness, colour and strength of V. 434 and a ginning percentage above 33. Breeding of high ginning new strains of Buri cotton for the Burhanpur *tahsil* also forms part of this scheme.

A considerable increase in the area under American cottons is reported to have taken place both in the Central Provinces and in Berar. Buri 107 covered an area of 155,399 acres, the area in the Burhanpur *tahsil* alone being 49,409 acres. The total area occupied by Cambodia cotton in the province was about 347,828 acres. Buri 107 gave an outturn of 512 lbs. per acre on the Nagpur farm and 453 lbs. per acre on the Akola farm.

During the year under review, V. 434 was grown on an area of 6.62 lakhs acres in the Central Provinces and Berar against 4.10 lakhs acres in the previous year. It is reported that the spread of *Jarila* has been even more remarkable, the area of 2.74 lakhs acres under it in 1941-42 having increased to 13.68 lakhs acres in 1942-43. On the Akola farm, V. 434 and *Jarila* gave on an average 354 lbs. and 302 lbs. per acre respectively. The performance of H. 420 is stated to have been highly promising; not only did it withstand water-logged conditions well but it gave an outturn of 451 lbs. per acre on the farm, which is 149 lbs. and 97 lbs. more per acre than the yield of *Jarila* and V. 434, respectively.

Districts trials were carried out, as in the previous years, with H. 415, H. 420, V. 434, *Jarila* and Local *Jadi* in 31 different places in the Central Provinces and 34 representative localities in the Berars. The results showed that in respect of yield, H. 420 is on a par with Local *Jadi* in the Central Provinces; on the cultivators' fields in Berar neither H. 415 nor H. 420 was better than Local *Jadi*. The H. strains—420 and 415—were adjudged suitable for spinning up to 27's highest standard warp counts against 23's of V. 434. The demand for the seed of H. 420 is said to have been very great.

MADRAS.

(a) **Pempheres 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.

Two generations of plants were raised during the year under report, one in the summer months at Srivilliputhur and the other in the cool season at Coimbatore. At the former centre, 22 promising cultures selected in the previous year were tested in replicated preliminary yield trials against Co. 3; of these one was significantly better and four others equal to the control in respect of yield. The superior strain was, however, found to be susceptible, but two of the equal yielders, derived from X-102-2-4, combined high resistance with the desirable economic characters of good staple, high ginning outturn and early maturity; their only defect was the smallness of the bolls. At the Coimbatore centre, 60 cultures were tested against two strains, Co. 2 and 4463. Judged from the results, the derivative X-82-1-5 from the cross, 7178/1 x 4463, alone was found to possess the desirable combination of characters. The progenies of the strain, X-102-2-4, which looked promising at Srivilliputhur in the summer season, proved to be both susceptible and poor yielders under Coimbatore conditions.

The experiment to study the effect of crop mixtures on pest incidence was repeated both in the summer and the cold weather. The results of the summer trial showed that mortality of cotton was the lowest in cotton-*tenai* mixture, but *tenai* was found to affect the growth of cotton adversely. *Ragi* is considered a more desirable millet for cultivating in association with cotton. Further experiments with cotton-*ragi* mixture during the cold season at Coimbatore indicated that there was no differential response to pest incidence.

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

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

During the year under review, the yield trials conducted on the red and light black soil areas showed that H. 1 variety was on a par with the local in respect of yield on both types of soil. Judged from its past performance, 6042, though late maturing in habit, is considered to be the most desirable type. It is proposed to confine yield tests in the ensuing year to 6042, H1, 882, *Jarila* and local. Of the district trials, which were programmed to be conducted at 12 centres in the districts of Anantapur, Bellary and Kurnool, seven could not be carried out owing to unfavourable seasonal conditions. Of the remaining five, one had to be abandoned on account of poor growth of the crop, while the results from another were not statistically significant. The trials have shown, however, that V. 434 and Co. 4 are unsuitable for late sowing and that 6042, 882 and P. 710 are the best of those tested. *Jarila*, owing to its earliness, is considered to be suited to the *Mungari* tract; in one of the experiments it was found to be as good as the local in respect of yield but further testing is considered necessary before it can be recommended for cultivation in the area.

Of the hybrid cultures under trial, the most promising types, combining a staple of 24 mm. with 33% ginning outturn, were derived from the cross between *Mungari* selection, M. 3 and Parbhani type P. 26-4. The cultivation of V. 434 and Co. 4 as a mixed crop is stated to have shown no differences either in the degree of incidence of the small leaf disease or in respect of yield

compared with the local variety grown singly. Two hundred and twenty-four varieties were tested with the object of determining their susceptibility or otherwise to the small leaf disease, of these 45 did not develop the symptoms. It is stated, however, that no safe conclusions can yet be drawn, as, owing to late sowing, the incidence of the disease was low. Further trial, during the season, with cucumber belt as a measure of control against the red hairy caterpillar, did not yield any definite results.

(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 ginnig percentage of Cocanadas cotton, preserving at the same time the light pinkish colour of its lint owing to which it is in great demand for the manufacture of dyed yarns.

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

Colour improvement being one of the objectives of the scheme, greater attention was paid to investigate the limits of variation in the different standard lint colour grades. Seeds of plants representing five standard grades were sown in six agricultural research stations. When the *kapas* of each plant was analysed, it was observed that grades 2 and 3 were not different from one another. Grades 4 and 5 were likewise similar. All the above four grades showed dilution in colour, the dilution being greater at Coimbatore than at other places. It was further noticed that the colour was not influenced by the time of sowing and that wide variations were present in the colour of the lint produced on the same plant even after removing the effect of exposure. Studies of the effect of exposure showed that all grades except No. 1 deepened in colour within certain limits peculiar to each grade. It was clear from the observations that the standard grades needed regrouping based on the ranges of variation in each, and that the upper limit of improvement of lint colour in Cocanadas cotton by the method of single plant selection could only be grade 3. Further intensification in colour is possible only by crossing it with imported varieties. It is stated that amongst the Asiatic cottons the highest grade of lint recorded so far was 5, while in the Americans the depth reached grade 7. Arrangements were made to cross the standard strain in the Co-

canadas variety, *viz.*, x20 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 fifty-six cultures from deep lint colour group and one hundred and seventeen selections from light coloured progenies were tested in replicated row tests. Fifteen cultures recorded better yields than x20 and all hybrid selections were shy yielders. Among the prolific list of cultures, 123, 129 and 805 possess colour and ginning. In the other promising one character types, 1386 and 1626 may be particularly mentioned. The variability in bulks and progeny rows indicate that types possessing single attributes of 30 mm. length, 38% ginning and colour grade 3, can be selected and purified.

The colour problem has been practically solved and all selections in row yields are of a colour grade equal to the reputed Palnad standard. Profound environmental effects on the main lint characters were observed. Differences in ginning percentage between July and August are wider than those between August and September.

The environmental studies on lint colour have yielded valuable information on the influence of place and season on colour shade and with this knowledge revised standards have been proposed.

Messrs. Volkart Bros. and Ralli Bros. who are buyers of Cocanadas cotton are reported to have been consulted as to what in their opinion constitutes a good sample of this cotton. According to Messrs. Ralli Bros. the property required to be maintained is the power of absorbing dye; the colour is a secondary matter, since only a fraction of the consuming mills prefer it; the desired staple length is between 0.80" and 0.82". All the progenies under yield trials are said to possess this minimum lint length. Samples have been sent to the Committee's Technological Laboratory for carrying out tests on dye absorption.

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 area under cotton in the United Provinces, during the year under review, was 309,161 acres against 428,620 acres in 1941-42 and the total production was 90,749 bales compared with 105,445 bales last year.

The work on breeding of improved varieties was carried out at Cawnpore, Raya, Nagina and Belatal research stations representing the Central, Western Rohilkhand and Bundelkhand cotton growing tracts of the province. Seven strains including A and D, isolated from the original survey collections, were tested against C. 520 at all the four research stations in replicated trials. At Cawnpore, the strains 35/6, 35/3 and 35/1 gave significantly higher yield than the Control; at the other three centres, the differences in yield were not significant. It is stated that 35/6 at Cawnpore, 34/4 at Raya, 36/5b at Nagina gave, on the basis of acre cash values, Rs. 59, Rs. 9 and Rs. 39 respectively over C. 520.

In the district trials conducted under irrigated conditions at 10 centres, C. 520/2 significantly outyielded C. 520 at three centres and D at one centre. The performance C. 402/8 and Perso-American was poor. Under irrigated conditions, the average yield of strain D was found to be the highest. It is reported that the increased profit realised from the improved strains—A, D and C. 520/2 over C. 520, was about Rs. 37, Rs. 18 and Rs. 9 respectively. Strain D is said to have given a higher acre cash value than C. 520 for the fourth year in succession.

Replicated experiments designed to study the behaviour of certain Punjab-American varieties—L.S.S., 289F, N15, 100F and 83F—in comparison with Perso-American and C. 520, under the United Provinces conditions, were conducted at five farms. L.S.S. and 100F were found to be the best in respect of yield,

confirming the previous year's observation regarding the likelihood of the Punjab-American varieties giving a higher profit than Perso-American. These results have opened up the possibility of breeding a long stapled cotton, capable of spinning 35s to 40s, against 30s of Perso-American.

BENGAL.

(a) **Scheme for cultivation of long staple cotton in Bengal.**—The object of this scheme is to test the possibilities of introducing long staple cottons in the well drained highland soils of Bengal. It is financed jointly on a 50 : 50 basis, by the Provincial Government and the Bengal Millowners' Association and it came into operation in April 1938. In January 1941, the Indian Central Cotton Committee agreed to provide a supervising officer for the scheme for a period of two years. In addition to supervising cotton cultivation work at the different centres, the officer will also undertake botanical work.

The season in the past year is stated to have been favourable for cotton in the Eastern and Northern parts of the Province; on the Western part, however, as the result of a cyclone in October last, the experimental plots in the Midnapore farm were washed away and no produce from them could, therefore, be collected.

Six varieties, *viz.*, D. 289F, D. Co. 2, D. Parbhani, D. Buri, D. Dharwar and D. Kampala, were tested during the year in a randomised and replicated experiment. The size of each plot was 1/60th acre. The boll opening in D. Parbhani and D. Kampala was good but in D. 289F, it was bad. D. Kampala and D. Dharwar gave the highest yields, *viz.*, 661 lbs. and 645 lbs. per acre, respectively, against 540 lbs. of D. Parbhani and 561 lbs. of D. 289F. The differences in the yields of the six varieties were, however, not statistically significant. The results of the sowing date cum spacing experiment, tried during the year for the first time, showed that the sowing on 15th May spaced either 4' × 2' or 4' × 3', was significantly better in respect of yield than later sowings and wider spacing. It is proposed to repeat the experiment in the ensuing season.

Cultivation trials were undertaken, as in the previous year, at six centres; of these, three were badly affected by the cyclone while one had to be abandoned owing to the indifference of the cultivator. At the remaining two centres—Ghoraghat and Badkulla—43 and 50 *bighas* were sown and D. Parbhani is reported to have given on an average 740 lbs. and 620 lbs. of

kapas per acre, respectively. Co. 3, which was included in these trials, gave at Ghoraghat more than 850 lbs. of seed cotton per acre.

(b) **Comilla 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 scheme terminated on 31st March, 1943.

The scheme has yielded seven improved, high ginning strains; of these, strain 9(1) is considered to be the best in respect of ginning percentage (47·1% against 42·06% of the local) and yield of seed cotton. A very large number of cotton samples, about 15,000 to 16,000, was collected during the survey of the hill tracts of Chittagong, Lushai, Garo, Naga and Jayantia and examined for their economic characters. Since the entry of Japan into the war, and the closing of the best market for "Comillas" the price of this cotton has gradually dwindled to Rs. 2 to Rs. 3 per maund from the pre-war rate of Rs. 10 to Rs. 12 per maund.

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 in Baluchistan consisted in preventing the migration

of the pest from the strip of land known as 'Pat' along the Khirtar Canal, by destroying the insects at the canal bridges. In addition, poison-baits were extensively distributed in 16 villages in the Usta *tahsil*. It is stated that the *zamindars* have become 'tid minded' but that their attitude is still 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 review, main varietal tests were carried out with three improved *Gaorani* varieties—G. 4M-11, G. 12F-2 and G. 6—at Nanded, five types—G. 6E-3, G. 145, G. 165, G. 168 and G. 6—at Madhol, and three strains—G. 4M-11, G. 12F-2 and G. 16C—at Latur. *Jarila*, which was included in the test as a control along with the local at Nanded and Latur, was found to be distinctly poor at the latter place. G. 4M-11 was late maturing while G. 12F-2 is considered a good all-round type. The strains test at Nanded had to be abandoned due to severe damage by rain. At Madhol, G. 6E-3 and II-40-6162 showed good performance in a similar strains test; at Latur the results showed that the strains, II-40-61-07, G. 4M-11, L-II-40-405 and L-II-40-415, were worthy of further trial.

The experiment designed to study the factors affecting the yield of cotton in Hyderabad State, did not show any significant differences in yield of the standard variety, G. 6. The data obtained during the season confirmed the findings of last year that one weeding and one hoeing of cotton crop give optimum yield of seed cotton per acre.

District trials of 3 or 4 improved varieties, including *Jarila* were laid out on the cultivators' fields at 13 places in *Gaorani* area and 13 in the Telingana tract. The differences in yield between the varieties were significant at all the places except in four centres in each of the areas. The superiority of 12F-2 was observed at a number of places. The results were, however, not conclusive.

(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.

It is reported that the strain G. 12F-2, an early maturing sib of G. 12F, maintained its high standard of yield, spinning capacity, earliness and wilt resistance. Low ginning outturn, which is its chief drawback is being remedied by selecting plants with a high ginning capacity. In the preliminary wilt test, some 1,113 selections were tested in single rows in highly wilt infected plots; 18 progenies showed no deaths, while the mortality in 49 varied from 1-5%. Seventyeight wilt-resistant strains were tested for yield in wilt-free soil against the local varieties of Parbhani and Aurangabad and the imported variety, *Jarila*. Only nine types were significantly better in respect of yield than *Jarila*. One of these—a derivative of G. 16C II-41-6838—is reported to be very promising.

Amongst the American strains tested against *Jarila*, G. 16C and the local variety, none was as early as the controls; six strains gave significantly

better yield than Parbhani-American 1. Four strains with the desirable combination of characters are proposed to be studied in the ensuing season.

The district trials confirmed the superiority of G. 16C over *Jarila* in respect of yield of seed cotton; G12F-2 was found to significantly outyield *Jarila* at two centres. In the Ghat area, both these strains proved to be superior to Parbhani-American and *Jarila*.

The object of the Hyderabad Section of the Cotton Wilt Breeding Scheme at Poona is to evolve a cent percent wilt resistant type from the material available at Parbhani. During the season, progenies of 9 *Gaorani* strains were tested in the glass house under controlled conditions of soil and air temperatures. The results showed that none of the cultures was completely free from wilt.

(c) **Scheme for improvement of Kumpta Cotton.**—This scheme was sanctioned for a period of five years and it came into operation in November 1937. The object of the scheme is to develop certain strains of *Kumpta* cotton bred from the local variety of Raichur which, in the preliminary tests conducted at the Government Experimental Farm, Raichur, prior to the starting of the scheme, had given better yields of both seed-cotton and lint than either the local variety or improved *Jayawant*. After two years' work, the strain Raichur-*Kumpta* 15 was selected for further development. It was sown in 1939-40 on an area of about 40 acres in a cultivator's field, and an average yield of 293 lbs. of seed cotton per acre was obtained. Though this yield was a good deal better than the average of the local variety in the adjoining fields, the Committee, at its meeting held in August 1940, suggested that this strain should not be distributed on account of its susceptibility to wilt, and that strain R. K. 19 should be tested instead and attempts made at once to produce a wilt-resistant *Kumpta* type.

During the year under review, the varieties—Raichur *Kumpta* 15, 19 and 25—were tested against the local and Hagari in a replicated trial; the differences in yield of seed cotton were statistically insignificant. R.K. 19 and 25 were found to be fairly drought resistant but late maturing. In another experiment, four new cultures proved to be promising in respect of yield and wilt-resistance. The wilt test conducted on Hunsihalhuda showed that 65 (out of 724) single plant progenies were highly resistant to wilt. District trials conducted at 3 centres in Raichur district and 2 centres in Gulbarga district did not reveal any significant differences in yield between the five

varieties tested—R. K. 15, 19 and 25, Hagari and local. It is stated that in view of the consistently uniform spinning and agricultural performance of R. K. 19, it is proposed to multiply its seed for large scale cultivation.

The material tested at Poona under ordinary glass-house conditions of temperature and moisture consisted of eleven wilt resistant R.K. strains. The results showed that only one culture (derived from R.K. 19 x N.S. 12) recorded 60% mortality against 96-100% of the rest of the nine cultures.

BARODA.

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

During the year under report, attention was mainly concentrated on the breeding of highly resistant *karkhadi* material under uniform conditions of infection. It is reported that as in the preceding year, *karkhadi* cultures were distinctly less susceptible than Broach 9, the average mortality in the former being 38.2% against 58.9% in the latter. Differences in mortality between the various *karkhadi* families were not significant. One hundred and eightyfive cultures, comprising 160 fresh *karkhadi* selections from the district and 25 resistant survivors from the glass-house, were tested against Broach 9, in a replicated experiment; of these, 13 progenies which suffered a mortality of 35% or less were selected for further trial. In another experiment, Rozi, a perennial variety noted for its resistance to root rot, was found to be more susceptible than *karkhadi*, having recorded a mortality of 66%.

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

During the year under review, 16 families were tested against the local *Mathio* and C. 520 in a progeny trial; of these, 13 types were considered to be on a par with C. 520, in respect of yield. Type S-31 is said to be particularly outstanding in fibre-properties. Four selections—S. 20-2-12, S. 21-2, S. 24-2 and S. 31—are considered worthy of trial on a large scale. The results of the variety trials conducted with 8 isolates from the local *Mathio* confirmed

the promising behaviour of the three types—S. 21-2, S. 24-2 and S. 31. There was no significant difference between these three types or between the types and the controls as regards yield. S. 31 topped the list with a yield of 522 lbs. of seed cotton per acre, but, owing to low ginning outturn, it was inferior to C. 520 in lint yield. It was adjudged suitable for 32's highest standard warp counts compared with 12s of C. 520 and 13s of local *Mathio*. In the trial with four imported types—R. 18, C. 520 x Shan, C. 520 x *Bani*, Mollisoni x Shan—undertaken at the suggestion of the Geneticist and Botanist, Indore—R. 18 was found to be significantly superior to C. 520 as regards yield. R. 18 is, however, very poor in respect of fibre properties.

BIKANER.

Bengals Cotton Improvement Scheme.—The opening of the Gang Canal under the Sutlej Valley Scheme resulted in the colonization of a new and virgin area, known as the Gang Canal area, with immigrant peasants, mostly from the Punjab, who were accustomed to the cultivation of the Punjab *desi* and American types of cotton. These cultivators found it difficult to successfully cultivate cotton under local conditions, evidently because the new environment was not quite the same as they were accustomed to in the Punjab. This scheme was, therefore, started in January 1931, for the purpose of studying the local problems of the agriculturist and for obtaining by selection and hybridization one or more superior types of cotton suitable to the locality. The poor stand of the cotton crop under the Ganganagar conditions was reported to be due to (1) poor germination of seed and (2) mortality of the plants at all stages of growth due, chiefly, to whiteant attack. Until 1934, the botanical work was confined to the testing out of a large number of outside varieties, both *desi* and American. After that year, however, extensive survey of the Rajputana tract was undertaken to collect breeding material, at the same time, extensive trials of the few selected cottons from outside were continued to test their suitability to the tract. Agronomic work was pursued intensively from the beginning of the scheme. At the end of the first five years, it was found that C. 520 was the most profitable cotton to grow in the tract and that the American cottons were generally unsuitable because of their low yield and susceptibility to disease. Also the staple of Punjab-American cottons was found to deteriorate both in length and strength when grown under Ganganagar conditions. A large amount of data and useful information regarding sowing times, seed rate, frequency and distribution of

irrigation, optimum spacing for the *desi* and American cottons, rotation and manuring have been collected. Since 1934, greater attention has been paid to selection and breeding problems.

During the year under review, the new strain R. 18 is reported to have once again out-yielded C. 520, the strain so far recommended for the Colony. In the demonstration plots at Padampur where the soil is said to be particularly good for cotton, R. 18 gave over 15 maunds of seed cotton per acre. In respect of ginning outturn, it was found unequalled by any other strain tried in Ganganagar. Three cultures, B-1, SBH and B-17, whose yields were on a par with that of R. 18 in the varietal test, have been retained for further trial. Amongst the Punjab-American varieties, *viz.*, 289F/43, L.S.S., L.S.S. early and 124F, tested in another experiment, there were no significant differences in yield of seed cotton; the trial is proposed to be repeated next year to see if any other American strain can replace 289F/43 (which had previously been found to be the best suited American cotton for the Colony and the seed of which was being distributed to the cultivators) owing to its low ginning.

Fifty-eight progenies from the various crosses were tested with R. 18 and C. 520 as checks; of these ten families with a ginning outturn comparable to that of C. 520 and with a halo length 10-12% longer than either R. 18 or C. 520, were selected for trial in the coming season. Experiments were undertaken to test the efficacy of the various pre-treatments of seed, such as, soaking in water for different periods, delinting and coating the seed with dung. Very satisfactory germination is stated to have been obtained in the case of delinted seed soaked in water for 6 hours.

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.

It is reported that in the seasonal-varietal trials conducted during the year at the Irwin Canal farm with the improved Mysore-American strains and Co. 4, the highest yields were recorded for the May sown crop. Of the seven varieties tested, M.A. VI, VII and VIII proved to be inferior to M.A. II, M.A.V., Co. 4 and M.A. IX, in respect of yield; the differences in yield between the latter four strains were not statistically significant. At the Babur farm, May planting was again found to give the highest yields, 952 lbs.

and 983 lbs. per acre being obtained from Co. 4 and M.A. V, respectively. Under rainfed conditions, at the Hebbal farm, M.A. II was found to be superior in respect of yield to M.A. IV, V, Co. 4 and Co. 3.

Work on crosses was confined to Co. 2 x Kampala, 289F/38 x Uganda and two *purpurascens* crosses with M.A. II and Co. 2. Homozygous strains from the former two crosses are being multiplied for testing in the ensuing season.

In the trials of Egyptian and Sea Island varieties, Giza 12 gave 600 lbs. and 770 lbs. per acre on the Irwin Canal and Babbur farms, respectively, while in the Agricultural Colonies, Ashmouni proved to be the best with an acre yield of 450 lbs. Of the two strains of Sea Island under observation, V. 135 was better in all respects than Montserrat Sea Island.

Seed of three new strains, *viz.*, M.A. V, VI and IX, has been distributed to cover an area of about 100 acres, with the object of collecting sufficient material for testing the strains later in the Irwin Canal tract and in the rainfed tracts of Hassan and Chitaldurg districts. It is proposed to substitute M.A. IX, a superior quality strain, for M.A. II, the present standard variety of the dry tract.

CHAPTER VI.

SEED DISTRIBUTION AND EXTENSION SCHEMES.

From the point of view of the grower, special significance attaches to the Seed Distribution and Extension Schemes of the Committee, as they form the real link between the Experiment Station and the cultivator. The total amount so far spent by the Committee on such schemes amounts to some Rs. 15 lakhs. During the period under review, there were seventeen 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 30,731 acres (including 757 acres grown with farm pedigree seed), against 31,543 acres (including 1,300 acres grown with farm pedigree seed) last year. An area of 1,272 acres under *Suyog* (Segregate 8-1) was also controlled. It is reported that compared with the previous year, there was no improvement in the position regarding the demand for 1027 *A.L.F.* in Surat district, as many of the co-operative societies and the 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 also did not help much in the expansion of 1027 *A.L.F.* in Surat district. The Agricultural Department handled 16,37,476 lbs. of seed, of which 11,86,636 lbs. were distributed in British areas, and 4,50,840 lbs. supplied to States, the corresponding figure for the previous year being 2,534,690 lbs. of which

10,38,837 lbs. were distributed in British areas and 14,38,497 lbs. in the States. Field inspection of the cotton area in Surat which was continued during the year under review showed that the controlled area under 1027 *A.L.F.* was purer to a greater extent than in the previous year.

Guaranteed pure cotton of 1027 *A.L.F.* and *Suyog* was sold under two Agmarked labels—red for pedigree cotton and black for certified cotton, and 111 bales of Agmark (red label) and 2,588 bales of Agmark (black label) 1027 *A.L.F.*, 10 bales of Agmark (red label) and 304 bales of Agmark (black label) *Suyog* cotton were pressed and disposed of at premiums varying from Rs. 11 to Rs. 22. The premium obtained last year from 1027 *A.L.F.* ranged between Rs. 15 and Rs. 27.

The following table shows the comparative figures for 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 per candy of lint. (800 lbs.) Rs.	Price of lint yield per acre. Rs.
1027 <i>A. L. F.</i>	260	33.3	86.5	820	88/6
Selection 1A.	300	37.0	111	800	111/0

From the above table it will be seen that the cultivator of 1027 *A.L.F.* gets Rs. 22-10-0 less per acre than the grower of Selection 1A.

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

During the year under report, due to the lateness of the season, only four check stations (including one permanent) against, ten in the previous year, were established on the Tapti river from the 1st March, 1943. Ginned cotton was allowed to be transported, under licence, to Surat for being pressed and marked 'Olpad' before sale; this work was supervised by the Agricultural Overseer. 7,801 half-pressed bales were pressed into 12,094 full pressed bales by the end of May 1943 after import under licences into the Surat protected area.

The survey of Selection 1A in the Surat and South Surat areas was discontinued during the year.

An analysis of the prices obtained for 1027, Selection 1A and Local mixed Surti revealed that during the season, pure 1027 realised Rs. 12 premium over local and Rs. 15 over Selection 1A marked 'Olpad' against Rs. 10 to Rs. 18 over Local and Rs. 12 to Rs. 24 over Selection 1A marked 'Olpad' last year. The position of 1027 *A.L.F.* is in no way better than in the previous years.

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

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

Stages I and II.—Out of 350 lbs. of selfed seed produced in the previous year, about 250 lbs. were used for sowing on 15 acres of the Farm area and 2 acres of tenant lands; the remaining 100 lbs. will be used for sowing in 1943-44. It is reported that due to poor yield the quantity of pure seed obtained from the above 17 acres was only 1,976 lbs. The quantity of seed produced

from the 123 acres of the tenants' area was 13,280 lbs. which were 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. 22-2-0 per *candy* over Bombay quotation for *Jarila*.

Stages III, IV and V.—During the year under report, 53,21,550 lbs. of *Jarila* seed were distributed by the Department and approved stockists over a controlled area of 2,99,306 acres (including a reserved area of 94,717 acres). This falls short of the stipulated area of 3,15,000 acres by 15,694 acres, and is attributed to (i) the 'Grow More Food' campaign, (ii) the higher seed rate in some cases and (iii) stock of seed remaining unsold particularly in Nasik district. The area under natural spread is estimated at 4,72,033 acres, bringing the total area to 7,71,339 acres against 5,99,000 acres last year.

During the year under report, 3103 *bojas* of lint were sold at an average premium of Rs. 18 over Bombay *Jarila* quotation. On an average, *Jarila* is stated to have fetched Rs. 4-10-0 more per maund than Local. The gross extra income realised by cultivators by growing *Jarila* is estimated at Rs. 1,06,54,119.

For sowing in 1943-44, the Agricultural Department has stocked 12,54,370 lbs. of seed, sufficient for 67,543 acres. The approved stockists have stocked 61,75,000 lbs. to cover an area of 3,32,500 acres. In addition to the above, it is reported that 9,10,000 lbs. of seed, sufficient for 49,000 acres, have been retained by growers and merchants.

With a view to prevent the admixture of *Jarila*, and other cottons of inferior type in ginning and pressing factories, the Government of Bombay issued a notification making the mixing of cotton a penal offence. The Provincial Government have informed the public of their intention to apply the Cotton Control Act to East Khandesh district with a view to encouraging the spread of pure *Jarila*.

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

The original object of the scheme was to distribute seed of *Banilla* to enhance general cotton yields and to improve the quality of the cotton in the Deccan Canals tract in the Poona, Sholapur and Ahmednagar districts. In

view, however, of the susceptibility of *Banilla* to the wilt disease, the Committee, at its meeting held in January 1942, approved of the proposal to replace *Banilla* by *Jarila*, which gives a bigger return per acre and is, at the same time, capable of resisting wilt to a great extent.

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

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

During the year, owing to the high premium received for B.D.8 last year and the adoption of the new Indian Cotton Contract (which discouraged the cultivation of short staple cottons), the area under this variety in the Broach district (excluding Ankleshwar taluka) rose to 27,339 acres from 13,178 acres in the previous year. The Agricultural Department controlled, 5,747 acres for seed multiplication, including 367 acres grown with pedigree seed from the Broach Farm and from registered seed farms. 4,55,839 lbs. of seed, including 1,93,680 lbs. of seed supplied outside Broach district, were distributed during the year.

B.D.8 cotton was ginned under departmental supervision and 1,871 bales of pure cotton from the controlled area were pressed, out of which 1,669 bales were sold at a premium varying from Rs. 122 to Rs. 204 per candy. The seed cotton from the general area also fetched a premium varying from Rs. 25 to Rs. 75 per bhar (1,020 lbs.) over local.

Trials of Segregates 1-2 and 1-6 were made during the year. Their performance in comparison with B.D.8 is as under :—

<i>Name of variety.</i>	<i>Ginning percentage.</i>	<i>Staple length.</i> <i>mm.</i>
Seg. 1—2	38·4	21·6
Seg. 1—6	38·5	21·5
B. D.8	30·2	21·9

During the year, 6,418 acres were under Segregates 1—2 and 1—6, and 3,076 bales were produced, out of which 1,202 bales were disposed of at a premium of Rs. 122 to Rs. 170 per *candy*.

(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 of acres, within a period of five years.

During the year under report, the Department organised an area of 1,38,921 acres of *Jayawant* and 25,895 acres of *Gadag No. 1*, of which 81,262 acres and 22,588 acres, respectively, were rogued, 42,931 bags of *Jayawant* and 15,539 bags of *Gadag No. 1* seed, to cover an area of 6,01,034 acres and 1,55,390 acres, respectively, were distributed. In addition, the area under natural spread is estimated at 1,75,000 and 50,000 acres, under *Jayawant* and *Gadag No. 1*, respectively. Thus the total area under *Jayawant* was 7,76,034 acres while that under *Gadag No. 1* was 2,05,390 acres.

The produce of improved cotton was pooled and 27,156 *docras* of *Jayawant* and 10,858 *docras* of *Gadag No. 1* were sold by auction at a premium of Rs. 10 per *naga* for *Jayawant* and Rs. 15 per *naga* for *Gadag No. 1*, over the *bazaar* rate.

For sowing in the next season, 64,065 bags of *Jayawant* and 18,720 bags of *Gadag No. 1* are proposed to be stocked, of which 47,832 and 13,695 bags, respectively, were purchased up to 1st May, 1943.

Propaganda was undertaken in connection with the Agmarking of improved cottons. 6,000 bales of *Jayawant* and 75 bales of *Gadag No. 1* were pressed under Agmark. It is reported, however, that Agmarked bales did not fetch adequate price due to the indifference of mills for pure cotton.

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

During the year under report, 24,854 lbs. of seed of 1027 A. L. F., obtained from Surat, were distributed over an area of 1,228 acres (including a certified area of 1,113 acres). The produce was pooled and marketed by public auction at Rs. 300 and more per *bhar* of *kapas* against Rs. 250 to Rs. 275 received by the cultivators in the past. It is reported that 1027 A. L. F. gave a return of Rs. 60 per acre against Rs. 53/9 by the local.

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

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

The total area under cotton in Sind (British Districts) during the year was 7,25,500 acres against 9,38,365 acres in the previous year—a decrease of 22%, which is stated to be due to lawlessness, martial law and the “Grow More Food” campaign. The area under improved strains comprised 65% of the total cotton area against 51.5% in 1941.

The introduction of M.4 (an improved American type) is stated to have solved the problem of replacing *desi* with American cotton in Nawabshah district. This variety is said to yield well and to be in great demand.

The estimated area and yield per acre of the principal improved strains and the relative acre cash values are reported to be as follows:—

Name of improved variety.	Estimated area.	Estimated yield per acre.	Relative acre cash value.
	Acres.	Maunds.	Rs.
Sind Sudhar	4,30,000	9	128-0-0
M. 4	17,000	9	128-0-0
Sind N. R.	39,000	9	76-8-0
Sind 98	28,000	5	70-0-0

The extra gross income to the growers of improved varieties is estimated at Rs. 42,03,500.

For sowing in 1943-44, 64,300 maunds of Sind *Sudhar* 29,000 maunds of M. 4 (excluding 30,000 maunds sold by factories) and 4,200 maunds of Sind N.R. were distributed by the Department.

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

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

During the year under report, out of about 3,00,000 acres grown under departmental seed, the areas rogued were as follows:—

Sind Sudhar.	Sind-98.	M. 4.	Sind N-R.	Total.
Acres.	Acres.	Acres.	Acres.	Acres.
64,300	4,350	3,270	900	72,820

64,800 maunds of Sind *Sudhar*, 29,000 maunds of M.4, 4,200 maunds of Sind N.R. and 6,500 maunds of 4F-98—in all 1,04,500 maunds of seed—were purchased for distribution.

Ginning and pressing were supervised by the Department and certificates of purity of full pressed bales were issued to ginners. It is reported that certified full pressed bales fetched a premium of about Rs. 4 per maund of cotton. The growers got from the ginners about 8 annas per maund extra premium for certified *kapas*.

The following table shows the standards of purity, soundness, germination and weight (100 seeds) of the cotton seed during 1942-43 :—

	Sind <i>Sudhar</i> .	M.4.	Sind N.R.	4F-98.
Purity	97%	95%*	99.5%	Not known.
Soundness	77.5%	68%	85%	
Germination	66%	60%	80%	
Weight of 100 seeds ..	7.4 gms.	7.4 gms.	5.8 gms.	

It is stated that difficulty was experienced in disposing of the Sind *Sudhar* cotton seed purchased by the Department, as the cultivators preferred M.4 variety.

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

* Attended after hand-picking of off-type seeds.

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 38,278 maunds of seed through the agency of Government seed stores, *talug* agricultural associations and seed farmers. An area of 256,295 acres (165,193 acres under departmental spread and 91,100 acres under natural spread) was covered against 291,103 acres last year. The decrease in area is attributed to the rapid spread of *Jarila* and *Buri 107*. It is reported that in addition to the above, 22,346 maunds of seed were distributed outside the selected *taluqs*. The total amount of seed distributed in the Central Provinces and Berar was thus 60,624 maunds. 47,366 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 7,169 bales, of which 5,514 were of V. 434, the special areas contributing 3,507 bales. The average premium obtained was Rs. 37-8-0. The total extra income derived by the growers of V. 434 in the year under report is estimated at about Rs. 47 lakhs.

The area under Verum 434 fell short both in Berar and Nimar on account of the rapid expansion of *Jarila* in the former and *Jarila* and *Buri 107* in the latter. In 4 *taluqs* of Berar particularly Mehkar and Chikhli which adjoin Khandesh the area fell from 2,08,168 acres in 1941-42 to 1,86,055 acres in 1942-43 showing a fall of 10.6% on the previous year's figures. It stood at 40.95% of the area aimed at *viz.*, 3.50 lakhs acres. In Khandwa and Harsud *talhils* of Nimar district the area had increased from 53,383 acres in 1941-42 to 70,248 acres in 1942-43 as against the area of 1.50 lakhs acres aimed at. *Jarila* had gained a footing in the province in the previous year, particularly in areas bordering Khandesh and it also spread to the selected blocks. The previous year's field performance of *Jarila* and the good premium that *Jarila kapas* fetched, and also the efforts the Government made to eliminate *Oomra*, and replace it by medium staple cotton resulted in increasing the *Jarila* area to 1,368,048 acres of which 3,22,000 acres were in the Verum selected blocks. *Jarila* has a higher ginning percentage on account of which it fetched a premium on Verum 434 *kapas* in the local markets. The premium in Berar had been

particularly high amounting to Rs. 10 per *khundi* of *kapas*, which made it a strong competitor there with Verum. In Nimar the premium was not equally high but there was strong competition from Buri 107 cotton which increased in selected blocks there to 35,000 acres during the last three years. During the year the cotton outturns were poor in general and *Jarila* did not fare nearly so satisfactorily as in the previous year; however, the premium on *Jarila kapas* obtained was sufficient inducement for cultivators to continue to grow it. The performance of these two varieties is being closely watched.

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

During the year under report, 3,296 *maunds* of seed were distributed by the Department over an area of 26,409 acres; in addition 4,600 *maunds* of seed, obtained from *kapas* ginned under departmental supervision, were sown over an area of about 23,000 acres. In all, 49,409 acres were covered under Buri 107, thus practically achieving the object of raising an area of 50,000 acres under this variety.

The significant achievement of this scheme is that local Buri is now practically non-existent. The gross extra income derived by the growers of Buri 107 is estimated at Rs. 4.41 lakhs. With a view to securing sufficient pure seed for sowing in the next year, a total area of 22,587 acres was under supervision, of which, 6,455 acres were rogued. 3,133 *maunds* of seed have been purchased by the Department, 415 *maunds* stocked by *Tahsil* Agricultural Association and 6,000 *maunds* collected by *dalals* from rogued areas. In all about 9,550 *maunds* of certifiable Buri 107, sufficient for 50,000 acres, will be available for sowing in the next season.

MADRAS.

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

During the year under report, the Marketing Society at Tiruchengode, which has been entrusted with the running of the seed farms, under the control of the Agricultural Department, purchased 31,886 lbs. of seed from the Agricultural Department and distributed 31,079 lbs. to 343 members of 17 village co-operative societies, and also to the Tiruchengode Marketing Society; the remaining 807 lbs. were mostly utilized for gap-filling. Owing, however, to unfavourable seasonal conditions, the area sown under seed farm conditions was only 1,250 acres, against 1,500 acres arranged for; it is stated that the seed obtained will be sufficient to cover an area of 8,500 acres. The Society has stocked 170,262 lbs. of seed for distribution during 1943-44. It is proposed to increase the seed farm area in the ensuing year to 5,300 acres (4,500 acres at Tiruchengode, Salem and Rasipuram and an additional area of 800 acres) so as to produce sufficient seed for an area of 40,000 acres in 1944-45.

Premia ranging from Rs. 15 to Rs. 27/8 per *pothi* (305 lbs.) of *kapas* over the local were obtained by the seed farm growers; a profit of Rs. 13,260 was realised from the sale of 633 *pothies* of *kapas*. In addition, the cultivators are reported to have benefited to the extent of Rs. 25 per acre from the higher yield of Co.3. The total gain to the growers of Co.3 during the year under report is estimated at Rs. 55,310, which works out to Rs. 44 per acre.

(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. The object of the new scheme is to organise the multiplication and distribution of H.1 cotton seed over 2,00,000 acres in the 4th year, in the three areas of Adoni, Guntakal and Bellary of the Westerns tract of the Madras Province.

The Agricultural Department has been maintaining an area of 3,000 acres for the multiplication of H.1 seed and the seed obtained from it is distributed annually to cover an area of 30,000 acres. For purposes of large

scale production and distribution of pure seed, the tract is divided into three convenient areas with centres at Adoni, Guntakal and Bellary. Under Departmental supervision the seed-farms in the areas in question are sown, rogued, the produce collected and ginned, and the lint sold through the Co-operative Societies. The cleaned seed obtained from the produce is handed over to the societies for sale. During the year under review, seed farms covering over 5,111 acres were arranged for against 7,500 acres originally programmed, the reduction being solely in the Bellary area where owing to adverse seasonal conditions sowings had to be restricted. The crop is stated to have suffered from drought in the Adoni and Guntakal areas, the yield being only a third of the normal. 1,86,600 lbs. of seed have been obtained from the seed farms so far and a further quantity of about 26,400 lbs. is expected; the total seed from the farms is considered to be sufficient to cover only 15,000 acres in 1943-44. At Adoni the lint of H. 1. variety was sold at a premium of Rs. 6 per 312 lbs. In the ensuing season, it is proposed to arrange seed farms of 5,000 acres in each of the three divisions, Adoni, Guntakal and Bellary.

(c) **Maintenance of Nucleus of pure seed of Improved Varieties of cotton, Co. 2 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 selfed and the quantity of selfed seed produced of each variety during the year are given below :—

Name of variety.	Area selfed Acres.	Quantity of selfed seed produced. lbs.	How disposed of.
Co.2	1	131	Utilised for sowing the inner seed farm area at Tirupur.
K.1	2	327	Utilised for multiplication plot sowings of A. R. S., Koilpatti.

The low production was due to adverse seasonal conditions.

UNITED PROVINCES.

Scheme for Distribution and Extension and Marketing of Perso-American Cotton in Western United Provinces.—This scheme was sanctioned in January 1942 for a period of four years. The agricultural and marketing part of the scheme came into operation on the 6th May, 1942, and the co-operative organisation is expected to start in 1943-44.

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

During the year under report, despite unfavourable seasonal conditions, the yield of Perso-American is reported to compare favourably with the varieties intended to be displaced. The average yield of Perso-American is estimated at 4 maunds against $3\frac{1}{2}$ maunds and $2\frac{1}{2}$ maunds for C. 520 and *desi*, respectively. 5,264 maunds of *kapas* obtained from stage III and IV were purchased by the Department at a premium of Re. 1 per maund over the market rate. It is stated that the cultivator got Rs. 4 to Rs. 6 per maund of *kapas* over *desi*. The quantity of 2,974 maunds of seed secured in the fourth stage would suffice for an area of 11,886 acres next year.

340 bales produced from the *kapas* purchased by the Department were sold at a premium of Rs. 20 over *Jarila*. Perso-American lint fetched a price of Rs. 25 to Rs. 35 per maund more than *desi*. The gross extra income to the growers is estimated at Rs. 38,819 from an area of 1,320 acres.

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 period of five years and again in July 1943, for a further period of one year from the 16th April, 1944.

During the year under report, the total area under 1027 A.L.F. was estimated at 2,10,000 acres of which the controlled area was 31,655 acres, the corresponding figures for the last year being 2,52,863 and 46,955 acres, res-

pectively. The reason for the reduction in area might be due to the vagaries of the monsoon. The total quantity of seed distributed was 26,56,500 lbs. against 37,47,942 lbs. in the previous year.

Owing to the unexpected behaviour of the cotton market, it is reported that individual growers preferred to sell their cotton direct, making it increasingly difficult to pool cotton for ginning under departmental supervision. The certified cotton from checked fields was pooled, ginned and baled under departmental supervision, and given 'Agmark' labels. The bales produced by societies from areas which were not of the requisite standard for seed supply were given "green label." The bales produced by societies from other areas of the state which fetched a premium of at least Rs. 5 over local, were given a stencil stamp of "1027 A.L.F. Baroda State Produce." Up to the 31st March, 1943, 1,417 bales (Agmark 828, Green label 130 and stencil stamped 459) were ginned. The gross extra income received by the cultivators of 1027 A.L.F. was estimated at Rs. 3,15,000 at the rate of Rs. 1-8-0 per acre for an area of 2,10,000 acres.

To meet the demand for seed in the ensuing year, 28,87,500 lbs. of seed will be purchased and stored.

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

During the year under report, 4,22,240 lbs. of B.D. 8 seed (consisting of 15,320 lbs. A grade, 1,03,560 lbs. B grade, and 3,03,360 lbs. C grade) were stocked, of which 3,01,213 lbs. of seed was issued for sowing over 28,515 acres (1,015 acres of A grade, 9,500 acres of B grade, and 18,000 acres of C grade). Owing, however, to the vagaries of the monsoon, only 23,710 acres were under controlled area. As a result of field checking for purity standards, the controlled area was further reduced to 22,865 acres (A 1,010 acres, B 8,090 acres and C 13,765 acres). About 5,000 acres were under natural spread. Out of an expected crop of 5,500 *bhars*, nearly 3,500 *bhars* were pooled at an average premium of Rs. 65 over local, an additional income of Rs. 2,27,500 being realised by growers. In addition, the non-certified growers were reported to have received Rs. 80,000 extra.

For sowing in 1943-44, 6,400 lbs. of A grade seed, sufficient for 500 acres, 1,20,320 lbs. of B grade seed, sufficient for 11,000 acres, and 5,32,480 lbs. of C grade seed sufficient for 50,000 acres, have been stocked.

In the interests of the cultivators, the Baroda Government have decided to apply from the 1943 season, the provisions of the Cotton Control Act, making the sowing of B.D. 8 compulsory in specified areas.

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

During the year under report, the Department issued 2,27,500 lbs. of seed (7,900 lbs. of A grade, 80,800 lbs. of B grade and 1,38,720 lbs. of C grade), for sowing over 23,950 acres (775 acres of A grade, 9,000 acres of B grade and 14,175 acres of C grade). Owing to the vagaries of the weather, however, only 670 acres of A grade and 6,314 acres of B grade were of certifiable purity standards. Against an expected crop of 1,000 *bhars* of seed cotton, only 484 *bhars* (89 of A grade and 395 of B grade) were pooled up to 31st March, 1943. For nearly 780 *bhars* that were pooled, an average of Rs. 50 per *bhar* was received as 'ON,' thus giving an additional income of Rs. 39,000 to certified growers. In addition, it is estimated that non-certified growers received an average of Rs. 40 per *bhar* more and made Rs. 1,20,000 extra thereby.

21,780 lbs. of A grade seed sufficient for 2,000 acres, 1,99,680 lbs. of B grade seed sufficient for 16,000 acres and 2,52,800 lbs. of C grade seed sufficient for 25,280 acres have been stocked for sowing in 1943-44. Owing to its ginning and staple qualities, B 9 is reported to have maintained the same level of prices as 1027 and B.D. 8. The Baroda Government have decided to enforce under the Cotton Control Act, the growing of B 9 only in Savli and Waghodia talukas.

D. N. MAHTA.

Secretary.

APPENDIX I.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

(1) PRESIDENT—

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

(a) Mr. H. R. Stewart, C.I.E., Agricultural Commissioner with the Government of India, *ex-officio*.

(2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS—

Madras	Mr. P. H. Rama Reddi, I.A.S., Director of Agriculture.
Bombay	Mr. W. J. Jenkins, C.I.E., I.A.S., Director of Agriculture.
United Provinces	Mr. C. Maya Das, I.A.S., Director of Agriculture.
Punjab	Malik Sultan Ali Noon I.A.S., Director of Agriculture.
Central Provinces and Berar	Mr. J. O. McDougall, C.I.E., I.A.S., Director of Agriculture.
Sind	Mr. V. Isvaran I.C.S., 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. Ramanlal Lallubhai.
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—

Central Provinces and Berar	{ Rao Saheb P.V. Deshmukh. Mr. Y. G. Deshpande.
Madras	Mr. J. R. Marshall.
Punjab	Sardar Bahadur Sardar Ujjal Singh.

(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—

Madras	{ Mr. K. V. Othimalai Gounder. Mr. L. Madhava Reddi.
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<i>Bombay</i>	{ Mr. S. T. More, Rao Saheb F. B. Laxmeshwar.
<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 Madhaorao 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 of Agriculture (Research.)
<i>Baroda State</i> .. .. .	..	..	..	..	..	Mr. R. G. Allan, C.I.E., Commissioner of Agriculture.
<i>Gwalior State</i> .. .. .	..	..	..	..	..	Mr. N. M. Deshmukh, Director of 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. M. J. Narasimhan, Director of Agriculture in Mysore, Bangalore.
3. Rao Bahadur V. Ramanatha Ayyar Avl., Cotton Specialist and Geneticist, Coimbatore.
4. Muntazim-i-Khas Bahadur Capt. H. C. Dhanda, Commerce Minister, Holkar state, Representative of the Holkar State.
5. Representative of the Karachi Indian Merchants' Association.—Vacant.
6. Dr. B. L. Sethi, Deputy Director of Agriculture Western Circle, Aligarh.
7. 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. Camar Tyabjee, Managing Agent, Osman Shahi and Azamjahi Mills, Hyderabad (Deccan).
14. Sir Padampat Singhania, Senior Proprietor, Messrs. Jugilal Kamlatpat, Cawnpore.
15. Mr. R. G. Saraiya, O.B.E., J.P., Messrs. Naraindas Rajaram & Co., Bombay.

APPENDIX II.

SUB-COMMITTEES.

Standing Finance Sub-Committee.—Sir Chunilal B. Mehta (Vice-President), Chairman; Sir Pheroze 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. R. G. Saraiya.

Local Sub-Committee.—President (Sir Pheroze 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. R.G. Saraiya; Mr. W. J. Jenkins; Mr. A. P. Darlow; Rao Bahadur Sir Madhaorao Deshpande and Mr. S. T. More.

Agricultural Research Sub-Committee.—

- I. *The President*—Sir Pheroze 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. R.G. Saraiya, Mr. J. L. Hurschler, Mr. L. F. H. Goodwin,
- VI. *Agricultural Officers.*—The Agricultural Commissioner with the Government of India (*ex-officio*), Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. C. Mayadas, Mr. R. G. Allan, Rai Saheb Kalidas Sawhney, Mr. N. M. Deshmukh, Mr. J. C. McDougall, Mr. M. J. Narasimha Iyengar, 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. Uppal, Dr. P. J. Gregory, Dr. H. K. Nandi, Dr. Nazir Ahmad, Mr. P. D. Gadkari, Dr. B. S. Kadam.
- VIII. The Secretary.

Technological Research Sub Committee.—The President—Sir Pheroze 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, Sir Padampat Singhania, Mr. W. J. Jenkins, Mr. P. H. Rama Reddi, Mr. L. F. H. Goodwin, Capt. S. R. Pocock, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Rao Saheb P. V. Deshmukh, 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, the Director of Industries, Bombay, The Principal, Victoria Jubilee Technica

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

Cotton Forecast Sub-Committee.—The President (*ex-officio*), The Vice-President, the Agricultural Commissioner with the Government of India (*ex-officio*), The 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, (Research), H.E.H. the Nizam's Government, the Commissioner of Agriculture, Baroda, the Director of Statistics, H. E. H. the Nizam's Government, the Director of Land Records, Central Provinces and Berar, the Director of Statistics, Calcutta, the Statistical Officer, Department of Industries and Commerce, Madras, 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—Sir Pheroze 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, Mr. R. G. Saraiya, Sir William Roberts, Mr. W. J. Jenkins, Rao Saheb P. V. Deshmukh, Capt. S. R. Pocock, Mr. L. F. H. Goodwin, Rao Saheb F. B. Laxmeshwar, Mr. J. C. McDougall and Dr. Nazir Ahmad.

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

APPENDIX III.

BALANCE SHEET AS ON 31st MARCH, 1943.

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Cotton Cess Receipts	1,50,12,308 0 4		I. A. Administration		23,22,501 4 0
Less: Refunds of cess to Burma	42,369 10 9		B. <i>Improvement of Cotton Marketing</i> :—		
		1,40,69,938 5 7	1. Cost of exhibits, travelling allow- ance of representatives on the Board of East India Cotton As- sociation and members of Stand- ards Sub-Committee and cost of Standards	1,83,080 7 9	
<i>Interest account</i> :—			2. Enquiry into cost of cotton pro- duction in India.. .. .	2,71,968 8 9	4,55,044 0 6
Amount received on investments	22,29,097 6 3		O. <i>Seed Distribution & Extension</i> <i>Schemes</i> :—		
Add: Refund of incometax from interest, ..	26,949 15 0		(i) <i>Bombay</i> :—		
	22,56,047 5 3		(1) Hubli	44,048 8 3	
<i>Less</i> :—			(2) Gadag	41,700 15 1	
1. Interest paid in advance at the time of purchasing Government papers (since recovered), interest on temporary over- drafts and Bank's commission for col- lection of interest	63,491 15 6		(3) Gadag (Supplementary)	20,187 11 4	
2. Interest credited to Provident Fund ..	4,886 6 2		(4) Surat	90,201 9 10	
3. Bank's withdrawal charges	5,536 6 0		(5) Athani	18,086 1 7	
4. Incometax on interest on Government papers	30,227 13 3		(6) Khandesh (Banilla)	1,65,580 4 0	
5. Brokerage for securities sold	828 10 0		(7) Khandesh (Jarilla)	1,13,543 10 9	
6. Provision for Sinking Fund	17,517 8 0		(8) Deccan Canals (Banilla)	3,333 7 4	
	1,22,488 10 11	21,33,558 10 4	(9) B. D.8	35,427 9 8	
Profit on conversion and sale of securities ..		3,47,382 12 2	(10) Revised Jayawant & Gadag No. 1	1,97,856 11 1	
Sinking Fund account		17,517 8 0	(11) Maintenance of nucleus of pure seed of improved varieties of cotton	9,664 6 3	
Miscellaneous Receipts		1,29,829 8 4	(12) Scheme for control of Sele- ction 1A	4,202 11 0	
Refund from Provident Fund for contributions disallowed		3,391 1 11	(13) Collection of 1927 A. L. F. cotton in Navapur Taluka	876 0 0	
General Suspense account		212 14 3			
Carried over ..		1,76,01,830 12 7	Total ..	7,44,689 9 9	27,77,545 4 6

BALANCE SHEET AS ON 31st MARCH, 1943—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		1,76,01,830 12 7	Brought forward ..	7,44,689 9 9	27,77,545 4 6
			(ii) Madras :—		
			(1) Pay and allowance of Business Manager, Tiruppur	24,079 13 0	
			(2) Co.2	41,286 2 9	
			(3) H.1	7,007 2 9	
			(4) Maintenance of nucleus of pure seed of improved varieties of cotton	2,747 8 8	
			(5) Co.3 in Salem District	3,001 14 0	
			Total	78,122 9 2	
			(iii) Sind :—		
			(1) Seed Distribution	4,11,251 12 4	
			(2) Maintenance of nucleus of pure seed of improved varieties of cotton	9,862 13 5	
			(3) Financing of seed distribution	35,000 0 0	
			Total	4,56,114 9 9	
			(iv) Hyderabad	58,471 6 3	
			(v) Central Provinces :—		
			Maintenance of nucleus of pure seed of improved varieties of cotton	3,274 11 0	
			(vi) Baroda :—		
			(1) Navsari Seed Storage	29,452 10 10	
			(2) B. D.8	12,522 11 9	
			(3) B. 9	1,555 0 0	
			Total	43,530 6 7	
			(vii) Lyallpur (Ginnery)	16,038 3 3	
			(viii) (1) United Provinces C. 402	18,616 11 6	
			(2) Perso-American cotton in western district	9,715 0 0	
			Total	28,331 11 6	
					14,23,573
Carried over ..		1,76,01,830 12 7	Carried over		42,01,118 7

BALANCE SHEET AS ON 31st MARCH, 1943—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		1,76,01,830 12 7	Brought forward —		42,01,118 7 9
			D. Printing & Propaganda :—		
			(1) Publicity & Propaganda ..	1,56,555 15 0	
			(2) Printing & Distribution ..	1,21,253 10 0	2,77,809 9 0
			E. Statistical Research :—		
			(1) Studies of village consumption of Indian cotton ..	23,913 5 8	
			(2) Improvement of Cotton Forecast ..	30,772 9 0	
			(3) Crop estimating survey on cotton in Central Provinces ..	4,361 0 0	59,046 14 8
			F. Travelling Allowances :—		
			Non-official Members ..		2,69,855 10 9
			II. Technological Research :—		
			1. Technological Laboratory—		
			A. (Capital expenditure—		
			(1) Land & Buildings ..	4,07,938 14 6	
			(2) Machinery ..	1,23,212 1 2	
			(3) Freight ..	7,502 2 8	
			(4) Apparatus & Equipment ..	41,668 5 7	
			(5) Machinery & Workshop ..	5,789 8 3	
			B. Working Expenses ..	28,58,137 11 11	
			(2) Provincial ..	2,17,286 11 0	
			(3) Development of alternative uses of Indian cottons :—		
			(a) Capital Expenditure ..	29,006 7 9	
			(b) Working Expenditure ..	43,199 11 5	
			(4) Investigation for improvement in the ginning of Indian cotton :—		
			(i) Capital Expenditure ..	34,072 13 9	
			(ii) Working Expenditure ..	11,540 1 9	37,79,404 9 9
			III. Research Studentships ..	2,82,549 10 4	
			Less—Refund from Mr. Taakhir Ahmed ..	2,737 8 0	2,79,812 2 4
Carried over ..		1,76,01,830 12 7	Carried over ..		88,67,047 6 3

BALANCE SHEET AS ON 31st MARCH, 1943—(contd.)

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..				1,76,01,830	12	7	Brought forward ..				88,67,047	6	3
							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	71,273	3	9			
							7. Broach Cotton Breeding	99,208	0	11			
							8. Small Leaf Disease Survey	3,938	9	6			
							9. Survey of Goghari Cotton	4,199	5	0			
							10. Defibration of cotton Seeds	4,878	5	9			
							11. Plant Puller Propaganda	21,940	1	3			
							12. Breeding of Wilt Resistant Cotton for Surat Area	15,479	0	0			
							13. Model Projects for improvement of cotton cultivation etc.	1,098	0	0			
							14. Inclusion of Northern & Westerns in Dry Farming Research at Bijapur	6,953	12	7			
							15. Poona Wilt Breeding	48,495	3	6			
							16. Improvement of Cotton Crop in Kalra District	2,846	2	6			
							17. Interspecific Hybridisation at Surat	33,804	1	3			
							18. Dholleras Wagad Cotton at Viramgam	30,215	5	11			
							19. Improvement of Dharwar-American cotton	2,964	0	0			
							Total	10,28,602	8	3			
Carried over..				1,76,01,830	12	7	Carried over ..	10,28,602	8	3	88,67,047	6	3

BALANCE SHEET AS ON 31st MARCH, 1943—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,76,01,830	12 7	Brought forward ..	10,28,602	8 3	88,67,047	6 3
					(ii) Madras :—				
					1. Herbaceous	1,42,466	13 1		
					2. Pemphera and Physiological ..	1,99,800	15 1		
					3. Fodder Cholam	19,517	9 4		
					4. Breeding of Nadam cotton ..	17,727	2 6		
					5. Improvement of Mungari cotton	27,238	3 9		
					6. Investigation of the possibilities for control of cotton stem weevil	6,165	7 6		
					7. Improvement of Coconadas cot- ton	22,142	7 8		
					Total ..	4,35,124	10 9		
					(iii) Punjab :—				
					1. Botanical	6,31,864	15 9		
					2. Entomological	2,25,908	7 11		
					3. White Fly	48,721	4 1		
					4. Root Rot	71,048	10 10		
					5. Spraying Trials	9,977	0 6		
					6. Defibrating and Delinting ..	6,112	8 9		
					7. Survey of Disease of Malformation	1,730	10 6		
					8. Physiological	3,56,399	15 7		
					9. Clean-up Campaign of Spotted Bollworm	60,025	9 3		
					10. Jassid Investigation	16,377	6 6		
					11. Improvement of Punjab- Ame- rican 289F	12,898	8 3		
					Total ..	14,41,065	1 11		
						29,04,792	4 11		
Carried over ..			1,76,01,830	12 7	Carried over ..			88,67,047	6 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 ..			1,76,01,880	12 7	Brought forward ..	29,04,792	4 11	88,67,047	6 3
					(iv) Central Provinces :—				
					1. Botanical	4,93,449	9 4		
					2. Entomological	12,344	13 6		
					3. Investigation of Heliothis Obso- leta	1,672	9 9		
					4. Central Provinces & Berar Cotton Breeding	37,847	2 8		
					5. Model Projects for extension of improvement in cultivation of crops	1,242	0 0		
					Total ..	5,46,556	2 10		
					(v) United Provinces :—				
					1. Pink Bollworm	1,46,616	2 10		
					2. Rohilkhand & Bundelkhand Sur- vey	18,061	14 4		
					3. Botanical	74,353	5 9		
					4. Model Project for extension of improvement in cultivation of crops	866	0 0		
					Total ..	2,39,897	6 11		
					(vi) Indore :—				
					1. Institute of Plant Industry ..	19,56,943	12 0		
					2. Cotton Genetics Research Scheme	1,08,228	0 2		
					Total ..	20,65,171	12 2		
Carried over ..			1,76,01,880	12 7	Carried over ..	57,56,417	10 10	88,67,047	6 3

BALANCE SHEET AS ON 31st MARCH, 1943—(contd.)

RECEIPTS.	Rs. a. p.		EXPENDITURE.	Rs. a. p.	
	Rs.	a. p.		Rs.	a. p.
Brought forward ..		1,76,01,830 12 7	Brought forward ..	57,56,417 10 10	88,67,047 6 3
			(vii) Sind :—		
			1. Physiological	2,63,945 12 10	
			2. Jassid Investigation	14,682 8 1	
			3. Black-headed Cricket	9,245 1 3	
			4. Scheme for Investigation for pro- duction of long staple cotton ..	73,218 5 10	
			5. Bollworm Investigation and Clean up Scheme	51,897 11 6	
			Total ..	4,12,989 7 6	
			(viii) Burma :—		
			1. Capital Expenditure	2,906 15 5	
			2. Cotton Improvement	47,790 3 9	
			Total ..	50,697 3 2	
			(ix) Hyderabad :—		
			1. Botanical	4,06,013 5 11	
			2. Cotton Survey	36,578 3 0	
			3. Pink and Spotted Bollworm ..	83,976 10 4	
			4. Improvement of Kumpta cotton	33,349 15 10	
			5. Inclusion of Northern and Westerns in Dry Farming Scheme at Raichur	2,000 4 0	
			6. Pink and Spotted Bollworm Clean- up Campaign	53,929 2 0	
			7. Improvement of cottons of the Oomras tract	14,765 10 0	
			Total ..	6,32,613 3 1	
Carried over ..		1,76,01,830 12 7	Carried over ..	68,52,717 8 7	88,67,047 6 3

BALANCE SHEET AS ON 31ST MARCH, 1943—(contd.)

RECEIPTS.	Rs.	a. p.	Rs.	a. p.	EXPENDITURE.	Rs.	a. p.	Rs.	a. p.
Brought forward ..			1,76,01,880	12 7	Brought forward ..	68,52,717	8 7	88,67,047	6 8
					(x) Bikaner :—				
					Bengals Cotton Improvement ..	67,651	9 11		
					(xi) Baroda :—				
					1. Root Rot	91,838	2 2		
					2. Comparative Tests	4,251	5 3		
					3. Survey of Goghari cotton ..	3,891	14 7		
					4. Plant Puller Propaganda ..	32,538	15 10		
					5. Mathio cotton at Amrell and Jagudan	28,752	11 9		
					Total ..	1,56,263	1 7		
					(xii) Bengal :—				
					1. Comilla Scheme	44,668	1 9		
					2. Cultivation of Long Staple cotton	5,814	13 0		
					Total ..	50,482	14 9		
					(xiii) Mysore Doddahathi	20,675	12 9		
					(xiv) Collection of Iran cottons	3,121	12 0		
					(xv) Baluchistan—Co-ordination of research on Black-headed Cricket in Sind and Baluchistan	22,181	10 5		
					(xvi) Preliminary Scheme at Nawanagar ..	323	12 4		
					(xvii) Estimation of effects on cotton crop of the use of Plant Puller ..	4,148	12 5	71,77,561	14 9
Carried over ..			1,76,01,880	12 7	Carried over ..			1,60,44,609	5 0

BALANCE SHEET AS ON 31st MARCH, 1943—(concl'd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		1,76,01,830 12 7	Brought forward ..		1,60,44,609 5 0
			V. Marketing Schemes :—		
			1. Grading and Marking of 1027 A.L.F. in Surat area	2,119 2 9	
			2. Punjab Cotton Marketing Survey ..	7,214 1 6	
			3. Baroda Better Marketing of 1027 A. L. F.	11,653 6 3	
			4. Extension and Marketing of V. 434 C. P.	3,35,943 1 7	
			5. Distribution and Marketing of Buri 107 Cotton in Burhanpur Tahsil..	19,323 5 0	3,76,253 1 1
			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	2,975 5 0	
			3. Survey of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds ..	12,800 0 0	
			4. Spread of Jarila cotton in Central Provinces	611 5 0	17,106 9 0
			By suspense account	3,496 7 5	
			BY BALANCE ..	11,60,365 6 1	11,63,861 13 6
Carried over ..		1,76,01,830 12 7	GRAND TOTAL		1,76,01,830 12 7

PROVIDENT FUND ACCOUNT.

Balance Sheet as on 31st March, 1943.

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Subscribers' contribution account	4,52,093 6 0		Advance to subscribers	1,02,051 1 0	
<i>Less:</i> Payment made to subscribers re- signed	1,54,271 8 2	2,97,821 14 4	<i>Less:</i> Recoveries made up to 31-3-1943 ..	78,719 3 0	23,331 14 0
Committee's contribution account	4,42,303 9 4		Accrued interest on Government Paper credited to subscribers for distribution up to 31-3-43		3,809 4 8
<i>Less:</i> Payment made to subscribers resigned and forfeitures for Committee's contribution disallowed	1,49,275 12 0	2,93,027 13 4	By Balance as per details attached		6,07,094 13 10
Lapse and Forfeiture account		7,117 4 8			
Net interest received on investments		17,133 11 0			
Investment and fluctuation account		17,238 6 1			
<i>Suspense receipts :-</i>					
Amount due to subscriber deceased—Mr. N Sreenivas	500 0 0				
Suspense deposit of Mr. Dutt's own con- tribution	1,309 7 1				
Contribution received from Capt. Kharkar ..	87 8 0	1,896 15 1			
Total ..		6,34,236 0 6	Total ..		6,34,236 0 6

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1943.

RECEIPTS.	Ra. a. p.	Ra. a. p.	Ra. a. p.	PAYMENTS.	Ra. a. p.	Ra. a. p.
Opening Balance as on 1st April, 1942	14,80,620 1 10			<i>Administration of the Committee.</i> —(Including Improvement of Cotton Marketing, Printing, Publicity, and Distribution, and Travelling Allowance of non-official members)		1,65,238 11 3
Sinking Fund	16,050 10 0	14,96,670 11 10		<i>Agricultural Research Grants-in-Aid.</i> —(Including Research, Seed, Marketing and Miscellaneous Schemes)		4,88,157 2 1
<i>Less</i> —Adjustments of Suspense Receipts received during 1941-42		278 8 0	14,96,392 3 10	<i>Technological Research</i>		2,08,899 10 2
Receipts under Section 12 of the Indian Cotton Cess Act, 1923			4,51,298 5 10	<i>Closing Balance</i> :—		
<i>Other Receipts.</i>				(Government Paper at cost).		
Sale of Publications, sale of cotton, miscellaneous receipts, tests fees, etc...	19,671 9 1			3% Government of India Defence Bonds, 1946 of the Face Value of Rs. 3,97,500 ..	3,94,234 11 0	
Suspense Receipts	212 14 8			*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 1942-43	1,466 14 0	21,851 5 4		4½% Government of India Loan, 1955/60 of the Face Value of Rs. 26,600 ..	25,004 0 0	
Interest on Investments ..		57,115 6 0	78,466 11 4	6% Bombay Municipal Debentures, 1954 of the Face Value of Rs. 10,000 ..	3,950 0 0	
				6% Rangoon Municipal Debentures, 1955 of the Face Value of Rs. 3,83,500 ..	4,15,328 2 0	
					12,31,830 14 0	
				(Market value on 31st March, 1943—Rs. 13,34,283-3-0, inclusive of Rangoon Municipal Debentures, taken at cost) ..		
				*An overdraft of Rs. 76,118-4-11 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 ..			20,26,157 5 0	Carried over ..	12,31,830 14 0	8,62,295 7 6

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH, 1943—(concl'd).

RECEIPTS	Rs. a. p.	Rs. a. p.	Rs. a. p.	PAYMENTS	Rs. a. p.	Rs. a. p.
Brought forward ..			20,26,157 5 0	Brought forward	12,31,830 14 0	8,62,295 7 6
				<i>Imprests:—</i>		
					Rs. a. p.	
				(1) Secretary's Office	1,577 13 0	
				(2) Director, Technological Laboratory	500 0 0	
				(3) Director of Agriculture, Bombay	1,270 0 0	
				(4) Director of Agriculture, Sind	725 0 0	
				(5) Cotton Research Botanist, Lyallpur	150 0 0	
				(6) Plant Physiologist, Pun- jab	100 0 0	
				(7) Geneticist and Botanist, Indore	300 0 0	
				(8) Agricultural Chemist, Lyallpur	30 0 0	
				Suspense (Recoverable) ..	4,652 13 0 3,496 7 5	
					12,39,980 2 5	
				<i>Less:—Overdraft Account with the Imperial Bank of India, Bombay, (against hypo- thecation of 3½% Government of India Loan, 1947/50, of the Face Value of Rs. 150,000)</i>	76,118 4 11	
				§ Total Closing Balance		11,63,861 13 6
				Total ..		20,26,157 5 0
Total.. ..			20,26,157 5 0	§ Includes Rs. 17,517-8-0 on account of Sinking Fund.		

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

BOMBAY, 23rd June, 1943.

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

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1943.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE-	Rs. a. p.	Rs. a. p.
Opening Balance as on 1st April, 1942	5,24,828 7 3			<i>Balance :-</i>		
<i>Less—</i> Adjustment of Suspense Receipts	5 1 0	5,24,828 6 3		(Government Paper at Market Value).		
Subscribers' contributions ..	31,353 14 0			3% Government of India Defence Bonds 1946 of the Face Value of Rs. 2,72,300 ..	2,80,298 13 0	
<i>Add—</i> Recoveries against advances	11,456 8 0	42,810 6 0		3% Government of India Loan, 1951/54 of the Face Value of Rs. 32,000 ..	32,026 10 8	
		5,67,633 12 3		3½% Government of India Loan, 1947/50 of the Face Value of Rs. 1,20,000 ..	1,24,725 0 0	
<i>Less—</i> Refunds to subscribers who have resigned ..	8,315 9 5			4% Government of India Loan, 1960/70 of the Face Value of Rs. 12,000 ..	13,907 4 0	
Advances to subscribers ..	22,704 8 0	31,020 1 5		2½% Government of India Loan, 1948/52 of the Face Value of Rs. 70,000 ..	69,387 8 0	
		5,36,613 10 10		3% Government of India Loan, 1949/52 of the Face Value of Rs. 35,000 ..	35,153 2 0	
Committee's contribution received from Indian Central Cotton Committee.. ..		31,353 14 0		<i>Savings Bank Account with the Imperial Bank of India, Bombay</i>	15,391 15 0	
		5,67,967 8 10		<i>Current Account with the Imperial Bank of India, Bombay</i>	86,204 9 2	
<i>Less—</i> Payments made to subscribers who have resigned, including transfers to "Lapse and Forfeiture" Account for contributions disallowed		8,151 2 4	5,59,816 6 6			6,07,094 13 10
Interest received on Investments	16,378 6 0					
Interest received on Advances to subscribers	198 9 7					
Refund of Income-tax deducted on interest received during 1941-42	819 9 0	17,396 8 7				
Carried over..		17,396 8 7	5,59,816 6 6	Carried over..		6,07,094 13 10

PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1943—(concl'd).

	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.	Rs. a. p.
Brought forward..				Brought forward ..		6,07,094 13 10
Less—Interest paid during the year to subscribers who have resigned—On their own contributions ..	113 3 0	17,306 8 7	5,59,816 6 6			
On Committee's contributions	114 2 7					
Interest paid in advance at the time of purchase of Government Securities (since received) ..	209 9 0					
Cost of Stationery, etc. ..	29 0 0					
Bank's commission for collection of interest and cost of stamps	21 9 0	487 7 7				
			16,909 1 0			
<i>Investments Fluctuation Account</i> —Not appreciation in Market of Value Securities			30,192 2 8			
<i>Lapse and Forfeiture Account</i>			89 11 8			
<i>Suspense Receipts</i> —Being contributions received from Capt. Kharkar			87 8 0			
Total.. ..			6,07,094 13 10	Total ..		6,07,094 13 10

129

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

BOMBAY, 23rd June, 1943

APPENDIX IV

STOCKS OF INDIAN COTTON ON 31st JANUARY, 1943 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				
	1939.	1940.	1941.	1942.	1943.	1939.	1940.	1941.	1942.	1943.	1939.	1940.	1941.	1942.	1943.
Tinnevellics	32	20	18	27	31	4	2	14	17	15	36	22	32	44	46
Salem.. ..	16	4	9	10	20	8	3	2	6	5	24	7	11	16	25
Cambodias	71	33	34	66	99	17	5	21	38	39	88	38	55	104	138
Northerns & Westerns	19	15	23	25	27	18	2	16	10	32	37	17	39	35	59
Cocanadas	1	1	1	4	3	14	8	9	10	5	15	9	10	23	8
Outside Cottons ..	27	49	56	61	55	..	..	..	4	1	27	49	56	65	56
Total ..	166	122	141	193	235	61	20	62	94	97	227	142	203	287	332

APPENDIX V

INDIAN RAW COTTON CONSUMED IN INDIAN MILLS.

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

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

—	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.	1942-43.
Bombay Island ..	542,086	766,375	664,546	611,606	565,084	491,709	687,237	664,199	636,720	782,815	750,817	634,149	982,084	1,057,745	1,270,786
Ahmedabad ..	318,983	344,021	321,503	322,257	348,009	373,345	326,558	820,982	304,398	846,269	346,375	305,459	341,800	414,870	364,999
Bombay Province ..	1,044,925	1,300,859	1,173,659	1,132,645	1,116,297	1,063,549	1,230,616	1,189,310	1,128,744	1,353,998	1,316,313	1,172,285	1,580,079	1,764,339	1,939,423
Madras Province ..	204,284	211,488	214,759	260,707	292,013	278,060	312,164	365,423	412,268	422,573	480,839	507,391	525,611	594,054	647,407
United Provinces ..	182,462	234,205	235,623	256,820	273,573	277,230	292,424	317,011	299,073	288,320	356,331	349,340	381,025	427,305	437,441
Central Provinces and Berar	121,391	123,146	118,492	115,016	111,208	112,660	125,014	130,298	122,937	146,587	164,616	142,368	153,825	178,791	174,385
Bengal	84,212	99,075	91,993	102,390	103,784	107,633	101,101	98,892	79,944	92,546	90,611	111,383	135,227	125,740	136,098
The Punjab and Delhi.	54,575	64,464	73,736	89,681	80,854	71,939	83,897	89,430	93,886	94,742	133,347	165,274	171,652	179,937	175,955
Rest of British India .	22,189	24,458	27,101	30,342	31,935	35,189	38,575	38,010	35,823	46,840	49,806	44,867	47,316	64,804	59,003
Total—British India ..	1,714,638	2,057,695	1,935,363	1,987,603	2,009,664	1,946,210	2,183,791	2,228,374	2,172,725	2,445,606	2,591,863	2,493,408	2,994,735	3,335,024	3,569,712
Total—Indian States.*	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	711,105
TOTAL—INDIA ..	1,991,578	2,373,094	2,269,359	2,346,396	2,360,924	2,336,326	2,612,132	2,677,688	2,632,785	2,999,609	3,151,065	3,050,106	3,617,147	4,025,395	4,280,817

* 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 and

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	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.	1942-43.
Hyderabad	10,067	20,823	23,074	31,290	33,488	33,231	45,588	51,771	40,981	63,993	68,166	67,995	72,860	83,725	83,680
Mysore	30,019	46,590	43,226	49,293	50,596	47,168	51,196	50,824	53,236	55,244	63,858	67,851	65,062	74,966	77,734
Haroda	48,832	50,043	62,578	58,534	50,587	53,612	57,146	51,963	51,761	70,636	73,278	65,573	91,510	90,442	87,542
Gwalior	36,718	41,463	45,267	45,892	43,306	49,362	56,318	72,163	79,079	89,243	94,000	88,988	95,517	94,300	96,025
Indore	70,070	83,026	88,620	95,296	91,036	111,430	114,229	113,379	106,454	147,766	140,792	120,186	138,795	148,807	1,50,14
Kathlawar States ..			20,283	18,840	18,868	20,506	35,438	37,397	42,717	48,545	44,169	43,703	50,479	60,628	65,007
Other Indian States ..	7,224	64,454	32,558	30,382	40,209	45,197	45,735	51,462	57,767	57,119	58,444	102,702	108,180	137,247	167,134
Pondichery			18,350	20,257	23,170	23,610	22,691	20,355	19,065	22,307					
Total—Indian States.	277,540	315,390	333,996	358,793	351,260	390,116	428,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375	711,105

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

(Based on voluntary returns furnished by mills.)

Cotton Year : 1st September to 31st August.

(In Bales of 400 lbs. nett.)

	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.	1942-42.	1942-43.
Bombay Province ..	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	81,643
Madras Province ..	52,188	46,582	55,717	90,389	96,340	110,875	123,260	147,044	173,102	156,675	182,489	175,540	189,257	230,691	241,751
United Provinces ..	13,878	20,441	18,496	14,367	19,236	17,871	10,990	10,405	10,659	15,719	17,532	20,279	29,127	26,293	5,024
Central Provinces and Bihar	6,924	16,243	15,771	26,743	17,462	18,332	20,544	27,502	26,321	32,860	26,980	29,052	32,589	31,178	19,153
Bengal*									90			3			463
The Punjab & Delhi†	3,760	4,361	4,307	2,317	2,149		5,535	3,110	28,385	23,873	25,960	33,079	24,627	30,986	22,044
Rest of British India*									19,282	17,160	22,916	12,734	15,529	21,280	6,804
Total—British India..	104,074	111,988	148,700	211,795	215,279	221,096	217,784	263,678	325,058	321,037	336,041	357,374	391,314	443,393	376,902
Indian States*									131,149	109,003	122,078	116,962	131,657	118,660	82,083
Total—INDIA*									456,207	430,040	458,119	474,336	523,001	562,053	458,985

* 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.**
