

**INDIAN
CENTRAL COTTON
COMMITTEE**

**TWENTY-FIFTH
ANNUAL
REPORT**

1946

**TWENTY-FIFTH
ANNUAL REPORT**

of the

**INDIAN
CENTRAL COTTON COMMITTEE**

for the year ended
31st AUGUST,
1946.

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Meeting of the Indian Central Cotton Committee held in Bombay. In the photograph can be seen Sir Herbert Stewart (President), addressing the Meeting. On his right are Sir Chunilal B. Mehta, Dewan Bahadur Sir T. Vijayaraghavacharya, Mr. V. Iswaran and Sardar Ujjal Singh. On his left are Mr. Mahta (Secretary) and Sir Purshotamdas Thakurdas.

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INDIAN CENTRAL COTTON COMMITTEE ANNUAL REPORT.

CHAPTER I.

GENERAL.

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, and this is its twenty-fifth Annual Report covering the period 1st September, 1945, to 31st August, 1946. At first, the Committee was purely a technical advisory body to Government on matters connected with cotton. In 1923, however, it was incorporated under the Indian Cotton Cess Act with separate funds for the improvement of the growing, marketing and manufacture of Indian cotton. The idea from the very beginning was that the Indian Central Cotton Committee should form a common meeting ground for all sections of the cotton industry with the Agricultural Departments of all cotton growing provinces in India. It was realised from the outset that the cultivator's interests must be paramount in all matters considered and decided by the Committee and that no permanent developments could take place unless they were in his interests. The Committee was given its own funds almost from the time of its inception. These funds are derived from the levy of a cess of two annas a bale on all Indian cotton consumed in mills in British India or exported from British Indian ports.

The first task of the Committee was to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India, including improvement of the race of the plant by the application of the technique and principles of plant breeding. The Committee was not slow to realise that in no cotton producing area can the crop be improved and that improvement maintained without a widespread recognition of the principles of plant breeding and the practical application of those principles. Grants were made to Departments of Agriculture in the various cotton growing Provinces and States for specific investigations on cotton in which improvement of the variety was naturally given high priority. The policy in the main has been to supplement and not supplant the work of the Agricultural Departments in the cotton

growing Provinces and States and, though, as a matter of convenience, certain lines of demarcation have been laid down regarding the investigations which the Committee considers most appropriate for its grants, assistance, as a general rule, is given in the directions where it is most needed in the carrying out of a co-ordinated policy of cotton improvement in the country. While the Committee's constitution ensures a broad outlook on all matters falling within its purview, its primary concern is the interest and welfare of the cotton grower.

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 members constituting the Committee and the various interests they represent as on 31st August, 1946, is given in Appendix I. The composition of the Sub-Committees as on 31st August, 1946, is given in Appendix II. The functions of the various Sub-Committees have been detailed in earlier reports of the Committee and it is not proposed to repeat them here. It may be mentioned, however, that the day to day administration of the Committee is carried on in consultation with the Standing Finance Sub-Committee which exercises its power under Rule 11 of the Rules under Section 16 of the Indian Cotton Cess Act, and is the principal executive body of the Committee.

There was no change in the administration, Mr. D. N. Mahta continuing as Secretary of the Committee. Dr. Nazir Ahmad, Director of the Committee's Technological Laboratory, relinquished service under the Committee with effect from the 15th November, 1945, on his appointment as a member of the Tariff Board. Mr. D. L. Sen, Senior Research Assistant at the Laboratory, has since been officiating as Director.

The total receipts of the Committee up to the 31st March, 1946, amounted to Rs. 2,09,61,366/- of which Rs. 1,64,48,150/- represent collections from the cotton cess. The receipts during the year amounted to Rs. 13,40,205/- and the total expenditure to Rs. 10,03,692/-. A statement of the receipts and expenditure as well as the Balance Sheet for the year as at 31st March, 1946, are contained in Appendix III.

Sir Herbert Stewart (President), Sir Chunilal B. Mehta (Vice-President), Sir William Jenkins, Rai Bahadur Kalidas Sawhney 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, 1946. During the same period, Mr. Roger Thomas represented the Committee on the Imperial Council of Agricultural Research. Under Article 51, as amended, of the Articles of Association of the East India Cotton Association, the Indian Central Cotton Committee is entitled to nominate from amongst its growers' representatives, three persons, whether members of the Association or not, not having dealings in forward contracts, as Directors of the Association. Rao Bahadur Sir Madhaorao Deshpande, Mr. L. Madhava Reddi and Major Nawab Sir Mohd. Jamshed Ali Khan were elected by the Committee as its representatives for the cotton year 1945-46.

In accordance with the established practice, two meetings of the Indian Central Cotton Committee were held in the year under report. The first meeting was held at Bombay on the 1st and 2nd February, 1946, Sir Herbert Stewart, Vice-Chairman of the Imperial Council of Agricultural Research, presiding. The most important subject affecting the interests of cotton growers in particular, and of the cotton industry as a whole, considered at this meeting was that relating to the acreage that should be sown under cotton in the 1946-47 season. The matter was first examined by the Cotton Planning Sub-Committee which reviewed the plan for cotton production for 1946-47 season tentatively agreed upon at the meeting of the Committee in January, 1945. The view of the Sub-Committee was that with the termination of hostilities, and having regard to the stocks of cotton then held in the country, the probable export and internal demand and the acute shortage of cotton seed in certain Provinces and States, India could not go on growing crops which were dangerously small in relation to her long-term needs, and that, in the interests of farm incomes, she must claim a rightful share of such export markets as were available. The Sub-Committee drew attention to the cotton prospects for 1945-46 and pointed out that the stocks of cotton held by the trade on the 31st August, 1946, were likely to be some 21 lakhs bales of which roughly 50% might be estimated to be of short staple (below 7/8") and that quite an appreciable quantity of the short staple cotton stocks would not be fit for spinning, being more than three to four years old. The Sub-Committee emphasised that the existing level of production of short staple cotton was not adequate for the requirements of the local industry and that the stage had already been reached when the deficit was being met from the large carry-over from previous seasons. Since India had practically a monopoly of certain short staple styles like

Punjab *desi*, Sind *desi*, Comillas, C. P. Oomras, etc., which commanded a good export market during the pre-war years, the Sub-Committee was strongly of the view that this unique position should be exploited to the advantage of the country as a whole. Another factor to which the Sub-Committee drew pointed attention of the Indian Central Cotton Committee in its report was the shortage of cotton seed in the country resulting from reduced acreage under cotton. It was pointed out that the production of cotton seed in 1943-44 which was about 4% less than in the pre-war year, 1938-39, amounted to 2,027,000 tons and that the only areas which had exportable surplus were Sind, Central India and the Hyderabad State; in 1944-45, production of cotton seed had dropped to 1,607,000 tons, *i.e.*, over 420,000 tons or 20% less than in the 1943-44 season. The Sub-Committee estimated that the production of cotton seed during the 1945-46 season was not likely to exceed that in the previous season. Taking into consideration the estimated internal and external demand for Indian cotton of about 51 lakhs bales during the current season, the Sub-Committee felt that the plan should be to aim at a production of 55 lakhs bales which meant reversion to the normal acreage of 21 millions. The Sub-Committee, however, concluded that, although from the standpoint of cotton, it was highly desirable that India should revert to the normal cotton acreage in 1946-47, without authentic information regarding the food position in the country which was reported to be not free from anxiety it could not take the responsibility of recommending any change in the cotton plan for the 1946-47 season agreed to at the meeting of the Indian Central Cotton Committee in January, 1945. It was with this background that the Indian Central Cotton Committee settled down to an extended discussion on this very important subject lasting for several hours. Whilst the debate was going on, official information was received that the food position in the country was in fact very grave. This came as a bomb-shell and the discussion took a different turn. The Committee readily acquiesced that the food position of the country must receive first priority and that all other considerations, however, important they might be in themselves and in their bearing on the economy of the country, must be subordinated to it. After a prolonged debate, the Committee unanimously passed the following resolution:—

“The Indian Central Cotton Committee, after a careful review of the statistical position of Indian cotton and of the plan for cotton production for 1946-47, is of the opinion that from the purely cotton standpoint an extension of the cotton acreage is highly desirable. In view, however, of the gravity of the food position in the coun-

try, the Committee strongly recommends to the Government of India that all Provincial Governments and States be required to take whatever steps are necessary to restrict the cotton acreage for the season 1946-47, so that it may not exceed the acreage sown in 1945-46. In making this recommendation, the Committee is aware that the maximum acreage suggested is below India's minimum domestic requirements of raw cotton and cotton seed for cattle food.

"In order that the sacrifice involved, if effect is given to the above recommendation, may not be in vain, the Committee urges that every avenue should be explored to increase the yield per acre. In this connection, the Committee recommends that, amongst other measures which may be considered necessary to attain the object in view, (1) special arrangements should be made for the import, to the maximum extent possible, of fertilisers which should be made available in large quantities to growers, particularly of food grains, at more favourable concessional rates than at present, (2) every transport facility should be provided for the movement of manures in the present food situation of the country, and (3) the crushing of oil-seeds in the country should be stepped up rapidly with a view eventually to prohibit their export altogether."

The question of the adoption of measures for the improvement of cotton yields in India was another subject which came in for a good deal of discussion at this meeting. The problem of raising the yield per acre of cotton in India has been engaging the attention of the Indian Central Cotton Committee almost from the time of its inception. Some success in this direction has already been achieved as will be evident from the fact 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 per acre during the triennium 1942-45 was 112 lbs., the figure for 1944-45 being probably a record at 122 lbs. per acre. Nevertheless, compared with other cotton growing countries—in Egypt and the U.S.A. the yield per acre of cotton in 1944-45 was 516 and 293 lbs. respectively—the yield per acre in India is still very low. It was agreed that whatever success had been achieved so far was largely due to the extension of the area under irrigated cottons and the improvement of the race of the plant, and that there was little doubt that the yield per acre was capable of considerable improvement by the application of rational methods of agriculture. This was all the more necessary now in view of the impending competition from synthetic fibres; in the battle of fibres, the chief factor in the survival of cotton would be the cost of production. To safeguard the position of cotton growers, therefore, it was highly necessary that the yields should be raised. After extended discussion, the Committee recommended that investigations should be carried out in every region at a suitable farm representing the soil-

climate complex of such region to ascertain what set of treatments produced maximum yields in respect of cotton irrespective of cost. It would then be for the administrations concerned to ascertain which factors contribute to the greatest increase in yield in the regions concerned. It was agreed that investigations were also necessary in regard to the part played by trace elements in cotton yields and it was accordingly recommended that such investigations should be undertaken without further delay. The Committee further recommended that two or more suitable officers possessing basic knowledge of agricultural conditions in India should be sent to the U.S.A. for a period of one or two years to study cotton cultivation and the economics of cotton production.

The second meeting of the year was also held at Bombay on the 2nd and 3rd August, 1946 Sardar Bahadur Sir Datar Singh, Officiating Vice-Chairman, Imperial Council of Agricultural Research, presiding. At this meeting the Committee passed a resolution urging that the East India and Karachi Cotton Associations should be requested to adopt, without delay, the official American cotton staple standards for the purpose of assessing staple lengths of cotton tendered against their Hedge and or Delivery Contracts. In another resolution, moved by Sir Chunilal B. Mehta, the Vice-President, the Committee expressed its concern at the very large variations in survey and appeal awards on cotton tendered against the Indian Cotton Contract, and requested the East India Cotton Association to adopt remedial measures to avoid recurrence of such variations which are detrimental to the interests of the cotton grower. In this connection, it was suggested that the Association should be requested to adopt the system of licenced warehouses as soon as possible. Considerable discussion took place also on the question of the floor and ceiling prices of cotton for the 1946-47 season. The attention of the Committee was drawn to the announcement in the press to the effect that trading in ready and delivery contracts for the 1946-47 season had been permitted by the Government of India, subject to the conditions including ceilings and floors laid down in respect of similar contracts for the 1945-46 crop. While appreciating the permission granted by the Government of India, the Committee expressed its disapproval against the imposition of the floors and ceilings of the 1945-46 crop on the next crop and recommended that in view of the high cost of living and high cost of production of cotton in India coupled with reduced acreage, and having regard to the very high prices of cotton ruling in the U.S.A., the floor and ceiling prices of cotton should be raised by Rs. 100/- per candy. It

was further recommended that wherever there are ceilings fixed for any cotton, there should also be floors.

Another important subject which received the attention of the Committee at this meeting was that relating to the adoption of measures for the improvement of cotton yields in India. Several suggestions were made for the achievement of the objective, such as, publication and dissemination of pamphlets printed in vernaculars, laying out of model plots all over the country and the appointment of a special permanent Sub-Committee to draw up concrete proposals and to report periodically on the progress in the matter. It was pointed out, however, that so long as the present insufficiency of staff available with the Agricultural Departments continued, no headway in this direction was possible. Another view expressed was that cotton, for the present, would perforce have to be neglected since the energies of the Agricultural Departments were, for the time being, almost wholly concentrated on food crops. The Committee felt, however, that the question of the improvement of cotton yields in India was one of the greatest importance and that it could not lightly be set aside even for the time being. It was finally decided that the views of Directors of Agriculture of Provinces and States should be invited in the matter and the whole subject considered again at the next meeting of the Committee.

The Committee also considered the question of the possibilities of the successful introduction of Egyptian cottons in certain areas in India and agreed that Dr. W. L. Balls, F.R.S., who has considerable experience of cotton work in Egypt, should be invited to pay a short visit to India to give advice regarding the lines on which the work for the introduction of Egyptian cottons should be pursued in the Punjab, Sind and Madras.

CHAPTER II.

RESEARCH.

Most of the research schemes of the Committee are concerned with the improvement of the race of the plant. The object is to enable the grower to secure the most profitable yield. To do this there have to be taken into account (a) the quality of the lint on which demand and prices depend, and (b) yield. A number of research schemes among which the most important are those for cotton breeding for the improvement of quality, are in operation in the various cotton growing Provinces and States. The majority of these schemes are financed entirely by the Committee, while the cost of others is borne partly by the Committee and partly by the Provincial Government or State concerned. The Committee also makes grants to Departments of Agriculture in the various cotton growing Provinces and States for specific investigations on cotton, not necessarily confined to breeding new varieties. The aim is to arrange for a well-directed co-ordinated effort for the improvement of every aspect of cotton in India. Since January 1943, the expenditure on new schemes and extensions of old schemes sanctioned by the Committee, which are for the benefit of cotton growers, is being met from the Cotton Fund at the disposal of the Government of India. Research on cotton technology is carried on at the Committee's Technological Laboratory and in addition, trained Technological Assistants are posted at the Cotton Research Stations at Lyallpur, Mirpurkhas, Cawnpore, Surat, Dharwar, Coimbatore and Nanded, to help the botanists in charge in their work of breeding improved varieties of cotton.

COTTON TECHNOLOGY

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

The technological research and testing activities of the Laboratory have been maintained at the previous levels. Valuable assistance was rendered to the cotton breeders by helping them to select types which would bring higher monetary return to the cultivator and prove more acceptable

to the trade and the industry. The interests of the latter were served by carrying out tests for them on trade varieties and by giving them technical information and advice. In some cases, the working details of the mills were critically examined and suggestions offered which would enable the mills to make the best possible uses of their cotton. The total number of samples received for tests was 1,249 in the current year on which 269 reports were issued. Several Indian States, especially Hyderabad, Indore and Baroda took advantage of the facilities offered by the Laboratory.

Among the tests carried out on agricultural samples, mention may be made of an experiment on mixed cultivation of 43F and C520 in different proportions in Baroda State. The mixtures were found to be definitely longer and finer in staple and less wasty than what might be expected by calculating the properties from those obtained for the pure cottons. Tests were also made on samples grown on Chalka and regur soils at Warangal, *Vijay* cotton grown in different centres in middle Gujarat, Gaorani 6 of different generations, long staple hybrids evolved at Mirpurkhas, Jarila grown in different localities with three seed-sources, *desi* cottons grown in wilt-free and wilt-infected lands at Indore, etc.

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

The Testing House of the Laboratory rendered useful service by carrying out tests on 368 samples of lint, yarn and cloth for firms and mills. These included spinning tests on 62 samples, fibre tests on 166 samples, yarn tests on 72 samples and cloth tests on 59 samples.

For the purpose of improving the pre-cleaning and ginning of Indian cottons, experiments were carried out to study the effect of saw speed in the saw gin and overlap settings in roller gins on the ginning percentage, output, quality of ginned lint etc., and leaflets were published on each variety, namely, Wagad, Jarila, Umri Bani, Mollisoni and Sind N. R. Since some difficulty was experienced by ginners with Buri cotton, experiments were made with different sizes of grids and overlaps and the test results published in a leaflet form. It was found that the use of 6/16" grid with 3/16" overlap with crank and roller speeds of about 900 and 168 r.p.m., respectively, would be most suitable for this cotton in single roller gin while a grid size of 6/16" with 13/32"

overlap and beater shaft and roller speeds of 1030 and 100 r.p.m., respectively would give the best results in double roller gin. An investigation on the causes of difference between the spinning performance of saw-ginned and roller-ginned samples of the same cottons was also in progress. Furthermore, with the co-operation of Messrs. Volkart Brothers, ginning tests at their factory at Mirpurkhas and at the Laboratory were made on M4 cotton both in saw gin and double roller gin to study the comparative merits. On the whole, so far as the present study on M4 cotton was concerned, saw-ginned lint was found to be superior to roller-ginned lint. The problem of a gin which would be most suitable for small samples is being investigated with a view to standardize the technique of ginning small samples in different cotton breeding stations. This gin will then be provided to the different cotton breeders so that the results obtained by different workers may be comparable.

Good progress was also made in the technological investigations some of which are of fundamental nature while others are of direct practical value to the trade and the industry. Plain cloths manufactured in a mill from the combed yarns of Cambodia Co. 3 and carded Kampala spun in the Laboratory showed that the quality of the former was even better than that of the latter, showing thereby that Indian cottons after combing to the extent of 16/18" can be used with advantage to replace East African cottons now being used by the Indian mills. A new apparatus for measuring the clinging power of small bunches of fibres was fabricated in the Laboratory. New formulae have been evolved which would give a better prediction of spinning value of Indian cottons from their fibre properties. Causes of abnormal spinning performance of certain Indian cottons having longer lengths are being investigated. Cellulose sheets of varying degrees of transparency and gloss have been prepared at the Laboratory from Indian linters by viscose method. A self-recording dynamometer is being constructed in connection with the problem of modifications in the physical properties of the cotton fibre. A bulletin on the influence of different concentrations of caustic soda on the quality of kier boiled and bleached yarns spun from Indian cottons and another on the use of cotton bags for storing sugar were published.

In addition to the above investigations, work is in progress on the spinning quality of mixings of Indian cottons with special reference to their fibre-properties, influence of different fibre-length groups on yarn-strength, comparison of different methods of measuring halo-length, prediction of strength

of yarn spun with different twist-multipliers, effect of different agronomical factors on the physical properties of the cotton fibre, the effect of storage on Jarila, Verum 434, Vijay, 289F/43 and Cambodia Co.2, etc.

COTTON GENETICS AND PHYSIOLOGY.

Fundamental research on cotton is carried out at the Institute of Plant Industry, Indore, which was established with the object of providing a central research station in the black soil areas of the Malwa Plateau. In April 1940, the working of the Institute was reorganised as a result of which fundamental research on genetics and plant breeding, physiology and field plot technique is carried out under a special scheme—the Cotton Genetics Research Scheme. With the reorganisation of the Institute from the 1st June, 1946, to enable it to function as an Agricultural Research Institute for cotton (including Cotton Genetics) and its rotation crops, such as, jowar, gram, linseed, etc., and also to provide a two years' course of training in cotton growing, general agriculture, horticulture and animal husbandry up to the diploma standard, the work done on the Cotton Genetics Research Scheme was re-transferred to the Institute. A review of the progress made during the year under report under the Cotton Genetics Research scheme is given below :—

1. (a) GENETICS.

In the study of fuzz inheritance in *G. hirsutum*, several of the F_5 progenies grown from highly fuzzy plants showed segregation of tufted individuals. In four progenies fuzzy and tufted plants occurred in the ratio of 3 : 1. This result had confirmed the complete reversal of dominance from tufted to fuzzy observed earlier.

Selection in the Upland progenies based on the curling of leaves as a symptom of Jassid attack, was quite successful and progenies selected for susceptibility were uniformly attacked in the field and resistant progenies remained mostly free. Selection was also continued for susceptibility to heritable red leaf and freedom from it. The heritable red can now be distinguished from Jassid red by definite criteria.

The bulk developed from seed exposed to X-rays in the original experiment continued to show its superiority in halo-length and ginning percentage over untreated seed. Progenies from X-rayed seed in the new experiment did not show this superiority as a whole but certain progenies were found to have a

longer halo-length or higher ginning percentage than progenies from untreated seed.

In *desi* material with five-locked bolls selection was continued for freedom from the abnormality of fasciation and for better productivity. Progenies with normal appearance and with a boll production approaching that of ordinary 3-locked progenies have been secured in different crosses.

The finding in the previous year that narrow leaved plants have longer bolls than broad leaved plants was confirmed this year.

It was also confirmed that the Mollisoni broad leaf is a new member of the leaf shape series and recessive to ordinary broad.

The light khaki mutant gave an anomalous segregation in its crosses with full khaki and white. The heterozygosity of the parent material appeared to have been the cause of such behaviour. It is considered necessary to isolate pure breeding material, before further work is continued for studying the genetics of this mutant.

(b) Further progress was made in breeding for wilt-resistance. Some of the strains evolved from the crosses between the local strain Malvi 9, on one hand, and Jarila and Verum strains on the other, were found superior to Malvi 9 and the new strain Dhar 43, both in yield and fibre properties. These strains should now be included in widespread varietal trials to select a suitable variety for distribution.

(c) Work on the genetics of economic characters was continued. It was shown earlier from a study of genetic variability in halo-length in a series of crosses in the *arboreum* species and from theoretical considerations that initial value of the hybrid was of primary importance in determining the progress resulting from selection. This was actually demonstrated in a selection experiment carried out with F_2 progenies this season. Progenies resulting from selection in crosses which had a longer fibre-length initially also had a longer fibre-length generally than progenies from crosses where the initial fibre-length was shorter.

A small negative correlation between fibre-length and fibre-weight between F_2 plants has been observed in several crosses and appears genetic in nature.

(d) In a comparison of the bulks collected from different localities in Malwa in regard to their capacity to respond to selection, differences have been

found both in ginning percentage and halo-length in the Malvi components of the bulks, and the seed from Indore tops the list in both characters. A further examination of halo-length data indicated, however, that scope for further improvement by selection is limited and it appears unlikely that any type superior to Malvi 9 in fibre-length can be established by simple selection out of these bulks.

2. **Interspecies hybridization** is confined to the crosses between *G. thurberi* and *G. raimondii* on the one hand and cultivated species on the other. Crosses with *G. hirsutum*, *arboreum*, *anomalum* and *barbadense* species have been successfully made and the main objective of the present work is to increase the fertility and productivity of the hybrids by selection.

3. **Physiology.**

(a) Pure Jarila seed delinted and sorted into different size groups was grown in a replicated trial and large seed was found to give 20 per cent. more yield than control without adjustment for stand and 10 per cent. more yield after stand was adjusted. In another trial in which large seed was separated by sieving and the fraction sinking in water was further sorted out, the large and dense seed so obtained gave 8.5 per cent. higher yield than control in Malvi 43 and 9.7 per cent. higher yield in Jarila. It thus appears that a better germination and stand and a higher yield can be secured in cotton by the simple process of sieving and then removing lighter seed by putting the seed in water.

(b) In a trial on the placement of fertilizers, broadcasting the manure was compared with drilling it in furrows 3" and 7" from the furrow. Both ammonium sulphate and groundnut cake were applied at 40 lb. nitrogen per acre. There was a very considerable increase in yield by manuring. Neither stand nor yield were influenced by different methods of application of ammonium sulphate; but for groundnut cake drilling gave a significantly better stand and yield than broadcasting. The increase in yield by drilling the cake was as high as 73.6 per cent over the unmanured control.

(c) The experiment on vernalization of cotton seed by cold treatment was repeated both on the produce of the previous season's treated seed as well as on fresh seed. The increased yield observed last year in plots from treated seed persisted this year also when the seed produced was sown without further treatment; but unlike the previous result the effect of cold treatment was not observed on freshly treated seed this year. It is important to study the influence of high temperature treatment on cotton seed.

(d) The experiment to study the influence of the source of seed and locality of its cultivation on yield and other characters of Jarila was continued for the third season and was conducted at Indore, Akola and Jalgaon. Summarizing the three seasons' results, yield is primarily determined by the environmental conditions of growth and is not consistently influenced by the source of seed. In ginning percentage localities exerted the chief influence and ginning percentage of Jarila grown at Akola was the highest and of that grown at Indore the lowest. Differences in fibre-weight and fibre-length are in a corresponding order and appear to be the factors responsible for the differences in ginning percentage. Among seed sources, Jarila grown from Jalgaon seed had generally a higher ginning percentage than Indore seed. While Indore seed has thus a low ginning percentage it has consistently the longest staple and highest spinning value among the three seed sources.

4. Statistics.

(a) A discriminant formula for selecting superior yielding types in cotton has been developed and shows how the different components of yield should be given proper weightage. The efficiency of the formula in comparison to the ordinary method of selection is being tested.

(b) The different modern methods of conducting field trials were studied in order to find out the most suitable layout for replicated progeny row trials in cotton. Analysis of the various incomplete block designs has shown that for the usual number of progenies, *i.e.*, up to 125, these designs are not efficient in comparison to simple randomized block layouts with compact blocks and cannot be recommended. It is only when over 250 progenies are included in a trial that there is a slight gain in the accuracy of comparisons by the use of incomplete block layouts.

(c) Results of co-ordinated cotton manurial trials at different centres and of the factorial experiments at Mirpurkhas and Sakrand in Sind were analysed.

5. Utilization of promising material.

Selection in Upland material for evolving strains suited to the tract was continued. This included progenies from the X-ray experiments, S.L.D. types and Co.920 X Buri crosses. S.L.D. types though best in halo-length were found to be poor ginners. Progenies from X-ray treated material have been found promising and will be further tried.

The work of the Institute of Plant Industry, *viz.*, varietal tests and seed multiplication, followed the lines of the previous year. A detailed account of this work is published separately in the Annual Report of the Institute.

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, 200 selections representing 106 families, (derived from crosses between 1027 A.L.F. and B.C. 1-2, B.C. 1-6, and B.C. 5-18) with ginning percentage varying from 38 to 42, staple length ranging from 21 to 23 m.m. and freedom from wilt, were studied in the F₃ and F₄ generations. It is stated that the examination of all the selections had not been completed but from those examined, about 200 plants combining all the desirable characters were selected for further study in the coming season. The search for an early maturing type in the hybrid material obtained from the crosses between strains of Maktampore early, B.D.8 early and B.C. 1-2 and B.C. 1-6 resulted in the selection of 76 early maturing plants which also possess the other desirable economic characters. The experiment designed to test whether *Vijaya* of stages A and B grown in the district has undergone any deterioration compared with Farm grown *Vijaya* showed that the District

Vijaya A and B was statistically on a par with the Farm *Vijaya*, B.C. 1-2 and B.C. 1-6 in respect of yield of seed-cotton and lint. The ginning percentages of District *Vijaya* of stage B and B.C. 1-2 were, however, statistically lower than those of Farm *Vijaya* and District *Vijaya* of stage A. As regards staple length, B.C. 1-2 and Farm *Vijaya* were better than District *Vijaya*—stages A and B and B.C. 1-6.

The spinning test results of the last season (1944-45) show that B. C. 1-2 was adjudged suitable for spinning 40s against 35s of B. C. 1-6 and *Vijaya*, and 40s of B. D. 8 and 11s of local.

(b) **Jalgaon Cotton Breeding Scheme.**—This scheme has been in operation since April 1932. Its original object was to obtain, by selection or hybridisation, suitable wilt-resistant types with heavy yielding, high ginning and good spinning qualities to replace the local mixture of N.R. and *Banilla* cottons in Khandesh. Wilt-breeding work was originally included in the Broach and Jalgaon Cotton Breeding Schemes, but, in August 1936, it was decided that the wilt work should be treated as a separate scheme from the 1st April, 1937. In July 1941, the wilt-breeding scheme was extended up to 31st March, 1947.

During the year under report, three promising cultures, 197-3, 403-5 and 670-4 derived from (*Jarila* × N.R. 5) cross were tried with *Jarila* as a check at six places in the district. They were found superior to *Jarila* in respect of yield and ginning percentage as in the past years. In staple length and count value, 197-3 and 670-4 were on a par with the control while 403-5 had given slightly lower value than 670-4. Taking all the economic characters into consideration, it was found that 197-3 was the best; 670-4 and 403-5 were second and third respectively, in order of merit. The cultures were very highly resistant to the wilt disease, the mortality being only 1%. The following complex cross was made with a view to enhance further the yield, ginning percentage, staple quality and wilt-resistance already possessed by 197-3 and 670-4.

Cross [(197-3 × 176-2) × 670-4] × (670-4) × 9-2-8-3).

Under wilt-breeding part of the scheme ten progenies of 3 cultures of the cross (*Jarila* × N.R. 5) F₃ and three selections of *Dokras* cotton were tested in pot culture.

Both (*Jarila* × N.R. 5) cross and *Dokras* cotton were found more highly resistant than in the previous year.

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

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

- (1) (8-1 × K.F.).
- (2) (8-1 × B.C. 1-6) F₇.
- (3) (1027 A.L.F. × B.C. 1-6) F₇.
- (4) (Seg. 22-3-2-8 × B.C. 1-6) F₇.

One culture possessing the agricultural characters similar to Suyog (Seg. 8-1) and a high degree of field resistance from cross No. 1 above, has been selected for further study. Two cultures from cross No. 2 besides being completely free from mortality from wilt under field conditions for the past four seasons have proved as good as Seg. 8-1 in ginning and 1027 A.L.F. in staple. One culture from cross No. 3 and one from cross No. 4 appear to be very promising; they gin 39, 40 to 40.6 per cent, respectively, possess a staple of 25.1. m.m. The former is wilt-resistant under field conditions and selections in the latter for this quality are being made.

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

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

During the year under review, 5 improved close boll types *viz.*, W87, B1, K. 61-8-2, K.72-2, K.80-3, were tested against *Wagotar* and local *Wagad* in randomised blocks at Viramgam, Jagudan and Bavla. It is reported that the results showed that K.72-2 is the most promising strain, being distinctly superior to *Wagotar* in yield of lint per acre and spinning capacity. In regard to ginning percentage, however, it is lower than *Wagotar* by 1.5 to 2%. The spinning capacity of this strain compared with *Wagotar* and local at the three centres at which they were grown is shown in the table below :—

				K.72-2	Wagotar.	
Viramgam	..	..	..	23s	16s	13- $\frac{1}{2}$ s.
Jagudan	..	..	..	33s	26s	16s
Dholka	..	..	..	33s	22s	178
(subsequently transferred to Bavla).						

The lint of K.72-2 obtained a premium ranging from Rs. 40/- to 77/- per candy over *Wagotar* at different localities.

It is suggested that as this type is found to do well in the three centres of the *Wagad* tract, it should be multiplied up with a view to replacing *Wagotar*.

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

During the year under review, none of the *Rozi* selections under trial was found to combine the desirable characters. Three selections, viz., Nos. 28, 125 and 126, which were comparatively better than local *Rozi*, have been retained for further study. It is stated that the material derived from the cross, *Gaorani* × *Rozi*, gave three selections with staple length above 20 m.m. and ginning percentage ranging from 24 to 26.9 against 18.5 m.m. staple and 23.7 ginning percentage of local *Rozi*; these are proposed to be tested in replicated trials in the ensuing season.

The third series of the rotational varietal trial was laid out during the year and it was found that *Vijaya* with *Kodra* gave a better monetary return per acre than *Rozi* with *Kodra*; this confirms the results of the previous two years. It was also evident from the 2nd series started in 1944-45 that *Vijaya* with bajri is more profitable than ratooned *Rozi* with bajri.

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

however, sterile and efforts to induce fertility in them were successful only when they were back crossed to American types. In January 1940, the Committee sanctioned in view of the rapid strides that the scheme had made, an expansion of the scheme so as to include cytological studies during the remaining period of its continuance. In July 1943, the scheme was extended for a further period of five years from the 1st November, 1943.

During the year under report, ten synthetic types derived from the advanced generations of the back crosses of (American \times Asiatic) \times American, were tested in replicated trials against 1027 A.L.F. and Co.2. Seven of these were found equal to 1027 A.L.F. in respect of yield, but superior to it in ginning outturn and staple length. Of the 189 selections included in another trial, it is stated that 12 possessing the desirable combination of economic characters were promising and that these will be further tested in the coming season. Interspecific hybrid material was sent for testing at 12 centres in India and the results are reported to be encouraging, particularly those from strain 68-5-4-1-1 under Gadag rainfed conditions, type 68-79-1-2-1 at Kopergaon under Deccan Canals irrigation and types (125 \times Co.2) 3-3F₂ and (134 \times CW) 3-1-7 at Siruguppa (Bellary district, irrigated). New *inter se* crosses have been made from *hirsutum* varieties acclimatised in black soil rainfed areas and from synthetic types with a view to getting strains combining all the desirable characters.

Cytological work was done on the progenies of pentaploid and hexaploid cottons in order to study the relation of chromosome pairing with fertility.

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

As in previous years, the two strains—9766 and 4411—were tested against Gadag 1 in a large-scale replicated trial ; the results showed that these strains are significantly superior to the control in respect of yield ; they also have better ginning percentage and longer staple than the control. In respect of spinning capacity, they are slightly inferior to Gadag 1, being adjudged suitable for 28s warp counts against 32s of G. 1. This is, however, attributed to the adverse effect of an inclement season.

It is reported that owing to abnormal seasonal conditions sub-normal yields were obtained. As in previous years, the two synthetic strains—9766 and 4411—were tested against Gadag 1 as the control in a large scale replicated field trial. Contrary to the results obtained in previous years, it was observed that Gadag 1 was on a par, in respect of yield, with the two strains in question; these, however, maintained their superiority over the control in regard to ginning outturn and staple length. From the point of spinning capacity, however, they were slightly inferior to G. 1, being adjudged suitable for 30s highest standard warp counts against 34s in the case of G. 1.

Amongst the new families derived from the cross G. 1 × Co.2, family 9-3 alone was found to be consistently better than the control, in respect of yield, ginning percentage, staple length and maturity. It is proposed to repeat the trial with the new families during the next season. In the test with the improved strains of acclimatised American cotton from other provinces, L.S.S. once again proved to be the earliest maturing. It is reported that none of the strains could come up to the yield level of Gadag 1 or 4411, although in earliness, staple length and ginning percentage, individual strains gave better values than the control G. 1. Some of them have, therefore, been included as parents for hybridisation. The interspecific material obtained from Surat is said to be utterly barren of any desirable combination of characters.

(h) Scheme for investigation of 'small leaf' disease of cotton.—This scheme is an off-shoot of the Mungari Cotton Breeding Scheme. It was sanctioned by the Committee in January 1942, for a period of three years and came into operation on the 1st June, 1943. The object of the scheme is to investigate the causes of "small leaf" disease of cotton, and to determine whether or not the disease is of virus origin. The work is being carried out at Poona.

During the year under review, work was concentrated on the transmission of the disease to healthy plants through the different agencies. The results of several experiments conducted showed that the disease is easily transmitted by grafting but inoculation with expressed sap of infected plants or insects found feeding on the malformed leaves or seed from stenosed plants failed to transmit the disease.

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 investigation. Accordingly, a five-year scheme for cotton-breeding investigations for the production of long staple cottons has been launched. The scheme came into operation in April 1940. In July 1944, the Committee sanctioned an extension of the scheme for a period of five-years from the 19th April, 1945. The experimental stations are situated at Mirpurkhas and Oderolal. The most important problem to be tackled is to see whether high quality cottons, preferably of the American types, but possessing a better staple than Sind Sudhar, can be produced. The aim is to evolve a cotton longer than 1-1/16" which would spin about 60 counts and give a high acre cash value of *kapas* relative to the commercial cotton crops now being grown in Sind. This is sought to be achieved by selecting extra long staple Upland types from a wide range of places all over the world, and after testing them under Sind conditions, hybridising the best of them with the hardiest Upland types of cotton, such as Sind Sudhar and M4, now grown on a commercial scale in Sind.

During the year under review a good number of single plants from a large F_2 population of the hybrid material, combining yield, staple and ginning along with the desirable agricultural characters in the field, were selected and their progenies of the F_3 generation tested under replicated trials during the 1943-44 season. Progenies which, in addition to maintaining the same yield and ginning outturn as the Sind-American controls (S.S. and M4), possessed an extra staple length of 1/8 inch and more, were further tested in replicated

F₄ progeny row trials in 1944-45. Of a large number of such F₄ progenies tested, about half a dozen held out promise as the following results will show :—

Serial No.	Parentage.	Strain No.	Yield.		Staple mms.	Ginning percentage.
			Ozs. per plot (actual).	Maunds per acre (calculated.)		
1	(M4 × Wilds) M4 ..	45/2	25	18.4	28	32
2	Wilds × S. S. ..	7b/4	24	17.7	28	33
	M4 CONTROL ..	....	26	19.2	24	33
	S. S. CONTROL ..	....	22	16.2	23	32
3	D. T. Weber × M4 ..	41/4	32	23.6	29	32
4	Wilds × M4 ..	32/4	31	22.9	28	32
5	Wilds × M4 ..	33a/2	30	22.1	28	31
6	Wilds × M4 ..	33b/5	30	22.1	28	32
	M4 CONTROL ..	....	39	28.7	23	31
	S. S. CONTROL ..	....	20	14.8	23	29

These 6 long staple strains were introduced into a replicated Varietal Test at Mirpurkhas. Out of the six strains tested, only two, 41/4 and 45/2, proved healthy and productive in the field and ultimately gave satisfactory yields. While they were both good ginners, only 41/4 possessed good staple and consequently fetched a premium higher than that of the best East African's, while 45/2 was inferior to it though better than the M4 control.

Strain.	Yield in mds. per acre.	Ginning percentage.	GRADER'S REPORT.			
					Staple length.	Premium above contract rate. (Rs. 458/- on 16.4-1946).
						Rs.
41/4	12.48	33.5	Saw-gin	1-1/8"	550	
			Roller-gin	1-3/16"	510	
45/2	10.88	35.3	Saw-gin	31/32"	270	
			Roller gin	1"	240	
M4 CONTROL	11.76	34.4	Saw-gin	7/8"	200	
			Roller-gin	29/32"	170	

The results obtained so far clearly demonstrate the successful achievement of the object set before the scheme at the start. They have, however, to be corroborated by further trials during the coming season. For this purpose these strains have again been introduced into replicated varietal tests during 1946-47 season, under conditions of early and late sowing at five centres, representing the three major cotton growing districts (Tharparkar, Hyderabad and Nawabshah) in the Barrage Zone on the Indus Left Bank in Sind. Simultaneously multiplication of seed of these promising strains is in progress in order to provide nucleus material for further seed distribution.

(b) Scheme for bollworm investigation and clean-up campaign in Sind.—

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

In July 1943, the scheme was extended for a period of three years, with effect from 1st March, 1944. During the extension it is proposed (1) to survey all the cotton growing tracts of Sind to study the status, distribution and the various host plants of the pest, and to determine the time suitable for carrying out control measures, (2) to carry out control measures in a compact area of 1,200 square miles in the rice tract of Tharparkar district and to extend them to the Hyderabad district during 1946-47.

During the year under review the survey of the cotton growing tracts of Sind showed that the attack of spotted bollworm remained low throughout the Province during the month of August. This was explained as having been due to a few heavy showers of rain during the months of July and August which hampered the development of the insect. In September, the attack became pretty serious in Tharparkar and Hyderabad but remained mild in the other districts. During October, however, the attack of the pest showed a distinct rise throughout Sind and was thus responsible for doing appreciable damage to the cotton crop of the Province especially in the southern and central districts.

The pink bollworm which was recorded as a pest for the first time in 1944-45 in some parts of Tharparkar and Hyderabad, was again found to be present

in appreciable numbers practically throughout the cotton belt of Sind. In the two chief cotton growing districts of the Province *i.e.*, Tharkparkar and Hyderabad, however, the pest became very serious and was responsible to a great extent for deteriorating the quality and quantity of the crop in these two districts.

The parasites of spotted bollworm which were present only in insignificant numbers during the year under report, did not play any important part in controlling the pest.

The survey of the host plants showed, once again, that the previous year's uncut cotton sticks and *Abutilon (patiteer)* are the chief host plants responsible for the carry over of the pest from one cotton season to the other.

The clean-up campaign was organised in a compact block of about 800 square miles, distributed in the Tando Bago and Dero Muhbat talukas of Hyderabad district, and a small adjoining part of Digri and the barrage portion of Diple talukas in Tharparkar district, where the bollworm attack was most severe. The removal of cotton stalks commenced in December 1945 and 98% of the area was cleaned up by the end of February. The remaining 2% was finished by the close of March. The total cotton area in the tract attended to was 62,109 acres. Side by side with the removal of cotton stalks, the Patiteer weed (*Abutilon indicum*) was also eradicated in the campaign area.

PUNJAB.

(a) Scheme for improvement of cotton in Jhang district, Punjab.—

This scheme is an offshoot of the Punjab Botanical Scheme and was sanctioned by the Committee in July 1944 under certain conditions for a period of five years. At its meeting in January 1945, however, the Committee reduced the sanctioned period of the scheme from five to two years as it decided to review the position at the end of 18 months in regard to the extent of the elimination of *desi* cotton in the Canal Colonies. The scheme came into operation on the 1st March, 1945. The object of the scheme is to produce long staple American cotton over a compact block of 1,14,000 acres in the district of Jhang, where at present medium staple cotton like 4F is grown.

It is reported that of the strains bred at Jhang, the most promising is 268F and that tests conducted during the last three years at the sub-station and during the past two years in the district have shown that this variety is

superior to 4F not only in respect of technological properties but also as regards yield, ginning percentage and jassid resistance. It is stated further that 26SF offers prospects of converting the Jhang district from a medium staple American cotton area into a long staple cotton area, thus bringing it in line with other neighbouring areas growing fine quality cottons.

(b) Scheme for improvement of cotton of south-eastern districts of the Punjab.—

This scheme is an offshoot of the Punjab Botanical scheme and was sanctioned by the Committee in July 1944, subject to certain conditions, spread over a period of five years. At its meeting in January 1945, the Committee, however, reduced the sanctioned period of the scheme from five to two years, as it decided to review the position at the end of 18 months in regard to the extent of the elimination of *desi* cotton in the canal colonies.

The object of the scheme is to replace the area under *desi* cotton by high quality American cottons in the irrigated portions of the tract without, however, losing sight of the desirability of breeding improved *desi* types which will continue to be grown in certain parts of the districts in question. The scheme came into operation at Hansi on the 1st March, 1945.

As a result of the work already done on *desi* cottons, it is stated that one variety, 231 rosea, has been under large scale tests at the Hansi sub-station during the last four years and that it has given an average mean yield of 18.47 maunds per acre against 15.51 maunds of Mollisoni 60 A2 variety. The ginning percentage of this strain is also appreciably higher than that of 60 A2, being 41.5% against 38.6%.

It is stated that the work on American cottons has resulted in the selection of a strain, 216F, which promises to replace *desi* in the irrigated portions of the districts. During the year under report it gave a yield of 18.22 mds., a ginning percentage of 34 and a spinning value of 34s against 12.89 mds., 38.4% and 6s of the control, M.60 A2.

It is estimated that this strain will cover an area of 2,500 acres during the current season. Further work to evolve a type even better than 216F is under way. Hybrid material obtained from crossing the Cambodia strain from Barberton with several Punjab-American strains is stated to have yielded several promising types with the desired combination of characters. These are proposed to be tested in large-scale trials in the coming season.

(c) **Scheme for improvement of cotton in south-western tract, Punjab.—**

This scheme is an offshoot of the Punjab Botanical Scheme and was sanctioned by the Committee in July 1944, for a period of five years. At its meeting in January 1945, however, the Committee reduced the sanctioned period of the scheme from five to two years as it decided to review the position at the end of 18 months in regard to the extent of the elimination of *desi* cotton in the Canal Colonies. The scheme came into operation at Multan on the 1st March, 1945.

The object of the scheme is to produce long linted types of American cotton, similar to those imported into this country from South Africa and other foreign countries. This is sought to be achieved by selection in the local material as well as by crossing the Punjab-American types with some exotic upland varieties reputed for their good staple. During the year under review some material is stated to have been built up already at the Multan sub-station and a few pure breeding types combining the desirable characters, *viz.*, 1½" to 1¾" staple, 32 to 33% ginning outturn and good yield have been isolated; these are proposed to be tested on a field scale.

(d) **Scheme for improvement of cotton in Lower Bari Doab Canal Colony.—**

This scheme is an offshoot of the Punjab Botanical Scheme and was sanctioned by the Committee in July 1944, spread over a period of five years. At the meeting of the Committee in January 1945, it was decided to reduce the sanctioned period of the scheme from five to two years, it being agreed to review the position at the end of 18 months in regard to the extent of the elimination of *desi* cotton in the Canal Colonies. The scheme was put into operation on the 1st March, 1945.

The object of the scheme is (i) to improve the purity of the 289F/K.25 crop and breed from it jassid resistant strains, and (ii) to evolve high ginning types of 289F/43.

As a result of the re-selection work carried out in 289F/K.25 variety, three new strains, *viz.*, 330F, 331F, and 332F have been evolved and these are reported to be far superior to 289F/K.25 in yield, ginning outturn and technological properties. Two new strains, AC 84 and AC 85, have been evolved from the cross 289F/K.25 × 289/43. Both these are stated to be highly resistant to jassid attack and to surpass 289F/K.25 in yield and ginning outturn. The re-selection in 289F/43 gave six new strains; amongst these, 238F is reported to be the most promising.

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

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

During the year under report *tirak* was found to occur on the same two types of soils, *viz.*, soils deficient in nitrogen and soils with saline subsoils as was the case in the Punjab. Late sowing was again found to remedy *tirak* on both the soil types. The late-sown crops were always found to suffer less from *tirak* than those sown early in all the experiments laid out in different parts of Sind. In view of the above findings it was experimentally determined how far the sowings of each Sind-American variety in each cotton tract could be delayed so as to minimise the intensity and the spread of *tirak* and to get increased yields. In all, 31 experiments were conducted in South, Middle and North Sind during the period 1943-45. As a result of these experiments the optimum sowing time for each tract, the spacing between rows and between plants in a row as the sowing date advanced, have been approximately determined after taking into consideration the various practical difficulties as well as danger from Jassids to late sown crops.

The yellow-red leaf disease generally occurs in Sind on light sandy soils; its more frequent occurrence and its wider spread in South Sind was determined. In addition to the soil factor there is a climatic factor which is responsible for its frequency. The crop in this tract begins to flower and fruit earlier, *i.e.*, in July, on account of an early drop in maximum temperature than it does in Middle Sind or in the Punjab. It also matures so rapidly that by the end of

October the crop is more or less completely harvested. Quick maturation of the crop on account of the fairly high night temperatures from August to October, depletes rapidly the leaves of nitrogen and other nutrients and they, therefore, become senescent, turn yellow and later red. Maturation process is slower in Middle Sind and the Punjab as the latter half of the fruiting period in these tracts coincides with falling night temperatures and consequently the withdrawal of nutrients from the leaves goes on at a slower rate. This has been demonstrated by actual measurement. The leaves, therefore, do not get depleted of nutrients and do not turn yellow and red so rapidly.

The best remedy to ameliorate yellow-red leaf in South Sind is to apply sulphate of ammonia at the rate of two to three maunds per acre in soils containing 60% or more of sand but on heavier types of soils which cannot be remedied by the use of the fertilizer, it is necessary to determine the sand percentage. A rapid method has been devised and can be worked under field conditions to determine such soil types.

The physiological causes of the failure of fine stapled cottons (Egyptian and Sea Island) in the Punjab and Sind were determined. As a result of the work it has been suggested that by proper breeding a stable plant having the leaves of American (*hirsutum*) cotton and lint of Sea Island (*Barbadense*) cotton capable of giving good yields under Punjab and Sind conditions can be produced.

Premature reddening of leaves in pre-rain sown American upland cottons in the rainfed conditions in Central India was found to be associated with soils which have a *kankar* layer within 1 to 3 feet of the soil surface and where water-logging occurred during the rainy season. No such premature reddening has been noticed in fields where *kankar* layer is at greater depths. Chemical analysis of the leaves of red and green plants showed that the concentration of important elements had fallen considerably below normal, indicating a fall in the uptake of nutrients owing to water-logged conditions of the soil. The leaves thus became senescent and turned red. Potash content of the leaves was abnormally low in the green-red leaves of American cotton grown in Central India and this new aspect of the problem is being investigated.

The causes of higher yields of seed cotton obtained in the black cotton soils of Gujerat under wider spacing than under closer spacing were investigated. The chemical analysis of the leaves from all the 108 plots of 1944-45

experiment laid out at Surat indicated that the application of nitrogen increased, in addition to nitrogen, the uptake of other important minerals from the soil, even though they were not added. A regular increase in the uptake of potash in the manured plots as the spacing became wider and wider was also noticeable. There was an indication, not supported at present by any experimental evidence, that the availability of potash increased as the spacing became wider. The experiment laid out in 1945-46 season at Surat confirmed the previous finding, viz., the yield increased though not significantly, as the spacing became wider. The chemical work pertaining to this experiment is in progress. The effect of spacing in the presence and the absence of nitrogen on cotton yields of American cottons in the black cotton soils of Central India was also investigated by laying out an experiment at Indore in 1945-46 season similar to Surat experiment. In this case the results obtained were the reverse of those obtained at Surat, viz., the yields decreased as the spacing became wider. The highest yield was obtained under close spacing. Chemical analyses of the leaves showed that the concentrations of nitrogen and potash in leaves were as high under close spacing as they were under wide spacing. This was not the case at Surat. As the number of plants per acre was higher under close spacing and as nitrogen and potash requirements of the crop were adequately met even when closely spaced, the yield per acre at Indore was higher under close spacing than under wide spacing.

The preliminary investigations conducted simultaneously at Surat and at Indore have, as indicated above, brought in the forefront the problem of potash metabolism of the cotton plant in black cotton soils and will be investigated in all its aspects.

CENTRAL PROVINCES AND BERAR.

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

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

During the year under review, V.434 was cultivated over an area of 3,24,375 acres in the Central Provinces and Berar against 3,99,156 acres in the preceding year. The area under Jarila was 1,516,630 acres, compared with 1,379,847 acres in 1944-45; Buri occupied some 71,357 acres against 91,084 in the preceding year.

It is reported that the performance of H.420 on large scale trial on farmers' fields was very satisfactory and that this strain is very popular in the Nimar district, owing to its high yield, ginning outturn and staple. It is suitable for spinning 32s H.S.W.C. against 30s of Jarila and 26s of V.434, and fetches a premium over Oomras equal to that of Verum and Jarila. It is considered suitable for replacing Jarila in the entire Oomras tract and also a portion of the area under V.434.

From the Buri selections, the new isolation No. 0382 is reported to be remarkable owing to its spinning capacity of 50s and ginning percentage of about 33.

The Cotton Breeding Scheme at Akola is concerned with the production of high yielding superior strains of cotton suitable for the Berars and possessing a staple of at least $\frac{3}{4}$ " with the softness, colour and strength of V.434 and a ginning percentage above 33. Breeding of high ginning new strains of Buri cotton for the Burhanpur tahsil also forms part of this scheme.

The total area under cotton in Berar during the period under review was 2,192,327 acres against 2,119,618 acres in the preceding year. The area covered by the different varieties during 1944-45 and 1945-46 are given below :—

	<i>Area in acres.</i>	
	1944-45.	1945-46.
Verum	306,549	231,396
Jarila	1,226,400	1,432,802
Buri	14,192	8,813
Cambodia	186,555	148,223
Oomras	299,836	331,266

It is reported that five improved strains of *desi* cotton were tested against H.420, Jarila and local Jadi at Akola in a replicated varietal trial and that two strains, viz., 091 and 91 were found to be significantly better than local Jadi but equal to H.420 and Jarila in respect of yield. In another similar trial, four other strains were compared with V.434, Jarila and local Jadi, and two of them, Nos. 0153 and 014 were found to be significantly higher yielders than V.434, but equal to the other two checks, viz., Jarila and local Jadi. All the four promising strains are reported to have recorded higher ginning outturns than their respective controls. It is proposed to test these strains again in the ensuing season.

Field tests of H.420 against V.434, Jarila and local Jadi were carried out at 15 different centres in the districts of Amraoti, Akola, Yeotmal and Buldana in Berar. Owing, however, to unfavourable seasonal conditions, the yields obtained were not altogether satisfactory. H.420 was found superior to V.434 at six centres and to Jarila and local Jadi in four other localities. The average results of all trials taken together indicate that Jarila occupies leading position in respect of yield.

The three improved strains, 0396, 0394 and 0382, are reported to have maintained their superiority in respect of yield and ginning percentage over the controls, Buri 107, 103 and local Buri. Buri 107 was grown at the Akola Farm on an area of 18 acres and gave an average yield of 333 lbs. per acre against 343 in the previous year.

MADRAS.

(a) **Scheme for Improvement of Mungari Cotton in Madras Province.**— This scheme was sanctioned by the Committee in 1937 and has for its object the evolution of strains suitable to the red soils and combining the quality of the Westerns with the yield of Mungari, to replace the inferior Mungari, the existence of which affords opportunities for mixing, with the result that the better cottons of the tract fail to get their proper value. On the black soils of Anantapur, Bellary and Kurnool districts of the Madras Province, cottons commercially known as Westerns and 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, selection 881F is reported to have given consistently promising performance both in the varietal tests on the farm and the village trials on the cultivators' fields, conducted at different centres in Bellary, Anantapur and Kurnool districts. Judged from the mean data for all the years, localities and soils, 881F is regarded to be the best type yet. It gave a higher cash return per acre than the local Mungari.

Of the several crosses made and studied, those involving P.26H, P.710, Jarila, M.274 and M3 possess the maximum selective value. Families 3574, 2070 B3-6, 2093F1-4, 2070F5-2, 2643C3, 3350 and 2093F6-2 have been found to be promising for one economic character or the other, but none of them is earlier maturing than the local. All of them are proposed to be tested next year against 881F and the local, for yield, earliness and other technological characters. Sixty-six fresh crosses were made, involving the best local selections, early maturing and stenosis-resistant types.

Trials made during the year to select a suitable American type for the red soils of Anantapur and Cuddapah districts indicated that it is possible to isolate a *hirsutum* type having the same productive capacity as the unselected Mungari. In respect of fibre characters, however, the selected type, it is reckoned, would easily surpass the bulk Dharwar-American and Mungari cottons now cultivated in the tract. Three selections of Dharwar-American and one hybrid culture from the interspecific crosses from Surat, which gave better yield than the local, notwithstanding delayed sowings and unfavourable weather during flowering time, would be utilised for further selection.

Owing to the low incidence of the small leaf disease during the year, it was not possible to make a proper estimation of the degree of resistance to this disease shown by the different varieties.

(b) Scheme for Improvement of Cocanadas cotton in Madras Province.—

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

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

During the year under review, six of the best coloured selections were compared with x 20 (renamed G.1) and the local for yield in big bulk trials for the third time in the three seasons July, August and September. The families 123, 129 and 130, mentioned as promising last year, maintained their superiority over the control in respect of yield but, as they possess shorter and coarser staple than even the local bulk, they are not considered suitable for general cultivation. G.1, on the other hand, is reported to combine good yield with consistent spinning capacity of 30s H.S.W.C. The mills and the trade, it is stated, prefer G.1 in spite of its light brown lint colour. It is suggested that this strain should be multiplied and distributed in zones where Cocanadas cotton having a similar or lower colour grade is cultivated.

The study of the deep coloured selections in replicated family blocks and progeny rows showed that many of the hybrid cultures breeding true to deep colour are better ginners and possess, at the same time, as good staple as the control, G.1; the staple, however, is coarse. In order to synthesise all the desirable characters, it is considered necessary to resort to intervarietal hybridisation using coloured fine Indian varieties like Manipur khaki or light brown, fine, long Indian *arboreums* as parents. Fresh crosses between early coloured varieties and early white types were made with the object of evolving a coloured bio-type for the Chinnapathi area.

The Cocanadas and Red Northern tracts lying in the Dominions of H.E.H. the Nizam, were surveyed during the year under report. The observations indicated that the variability of the material available and the agricultural practices in vogue were in no way different from those noticed and recorded for the adjoining tract in the Madras Province. The zone is not considered of value for the selection of colour-staple combination.

(e) Scheme for breeding Cambodia cotton in Ceded districts in Madras Province. This scheme was sanctioned by the Committee in July 1944, spread over a period of five years.

The co-existence of a multiplicity of varieties differing in quality, the paucity of variation in the indigenous or hybrid *desi* material resulting in no progress being made in the improvement of the 'Northern' and 'Western' cottons and the prospect of bringing a million acres or more under the Tungabhadra irrigation project are the main reasons for undertaking this scheme. The aim is to investigate the possibilities of replacing *desi* types by American varieties. The objects of the scheme are (1) to evolve a long staple American variety capable of giving good yields when grown as an irrigated *rabi* crop, and (2) to breed an exotic type suitable for cultivation in the unirrigated regions not served by the Tungabhadra project.

The breeding trials were conducted at three centres—Siruguppa, Hagari and Nandyal—representing three distinct regions, *viz.*, (1) irrigated black soil, (2) unirrigated black soil, subject to variable rainfall, and 3 unirrigated black soil, characterised by heavy rainfall and early season.

From the inception of the research station at Siruguppa in 1937, the study of the problems arising out of the irrigation of heavy black soils included cotton varietal trials. A study of the results of these trials indicated (1) that the American varieties, besides being susceptible to red leaf, are late maturing and give low yields when sown in the *kharif* season; (2) that such varieties can be successfully cultivated as a *rabi* crop; (3) that the best planting time is the period ranging from the middle of August to the middle of September; and (4) that Hyderabad-American—HA.11—is the most consistent in yield and quality combining also such other desirable characters, as adaptability to variations in sowing dates, low bad *kapas* content and spinning capacity up to 40s H.S.W.C. in spite of its medium staple.

During the year 1944-45, 156 *hirsutum* varieties (collected from different countries of the world) under irrigation and 141 under rainfed conditions were sown at the respective centres of work, at the normal sowing time, in suitably replicated yield trials. Mysore-American II, Parbhani-American and six selections of Dharwar-American were found to be more productive than HA.11 but they were lower in quality. Amongst the 40 other equal yielders, 24 varieties from Coimbatore, 5 from Mysore, 3 from Dharwar and one from Iraq possessed longer staple than the control. There was a general appreciation of ginning percentage in all varieties as compared to the parental values recorded in their home of cultivation. In addition to the above varieties, the performance of three synthetic tetraploids, *viz.*, BC22-7-1-3, BC63-5-4-1-1 and

(BC125 x Co.2) 3-3 from Surat, tested against HA.11 under irrigation, is stated to be very encouraging from the points of staple and ginning, although their productivity was on a par with the control.

During the past year, 1945-46, the rainfall in the *rabi* season was scanty and ill-distributed, leading to drought in the later stages of growth of the cotton crop. The severe incidence of jassids and thrips in the irrigated cottons, which followed the low humidity conditions, enabled easy elimination of the susceptible varieties. In the yield trials which included 14 promising types of 1944-45 and 9 fresh tetraploids from Surat, M.A.II, Parbhani-American and 4 sibs of interspecific hybrids proved to be the most desirable and all but one of the tetraploids gave yields equal to the control. M.A.II had an exceptionally early habit, judged from the node number, flowering or harvest phases. It was also found to be highly resistant to jassids and thrips. Two interspecific hybrids possessed very high resistance to jassid attack in addition to their superior lint characters. It was concluded from the results that improvements in staple, ginning and quality of Dharwar, Hyderabad and Mysore-American varieties are best achieved by hybridising them with long staple Coimbatore strains and that the Surat material is likely to respond to re-selection for greater adaptability against insects and adverse environments.

During 1945-46, HA-11 was again found to be the most desirable type in respect of yield, fibre properties, adaptability and low percentage of bad *kapas* in an agronomic trial with 4 planting dates and eight varieties. In view, however, of some degree of variability in vigour, yield and ginning outturn noticed in the bulk crop of this type, 200 single plants have been selected for further study.

At Hagari and Nandyal the yields of only four common varieties, *viz.*, HA-11, (GI x Co.2) 5, D.A.2-6-5/3 and M.A.II, were on a par with those of the local *desi* controls. It is reported that a study of the rainfed American types has indicated that there are greater possibilities of evolving a suitable type from Dharwar, Surat, Mysore and Hyderabad by means of re-selection and hybridisation.

UNITED PROVINCES.

Scheme for hybridisation in arboreum cottons.—This scheme was sanctioned in July 1943 and it came into operation on the 1st April, 1944.

The object of the scheme is to evolve strains of *desi* cotton, primarily for the rainfed areas of the Province, which, while possessing the earliness, hardiness, yield and ginning qualities of C.520 would be capable of spinning higher counts than the latter. This is proposed to be achieved by crossing some of the promising strains obtained under the United Provinces Botanical Scheme with superior quality cottons, such as Jarila, Verums, Indicum (Bani and Gaorani), Shans and Million Dollars.

During the year under review, work on *desi* cottons was carried out at the Bulandshahr and Raya experiment stations and the material available from the different stages of F1, F2 and F4 to F7 of various *desi* crosses was studied. Successful fresh hybrids were obtained and these will be tested during the ensuing season. Several individual plants superior to the parents in one or more economic characters have been obtained from different crosses at the two centres.

The work on American cottons has for its object the evolution, by hybridisation or selection, of strains superior to Perso-American in yield and quality. Several successful crosses have been made, using Perso-American, Punjab-American, Parbhani-American, Cambodia, Irans and M.4 as parents and, from these, selections superior to the parents in one or more economic characters have been obtained.

HYDERABAD STATE.

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

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

During the year under review, G.6 covered some 3,51,300 acres in Nanded district. Two other improved strains—G.12F-2 and G.6E-3—covered 524 and 892 acres in Latur taluq and Wadi Buzrug village in Nanded taluq, respec-

tively. As in previous years, four Gaorani improved strains—G.6E-3, G.12F-2, G.145, and G.160—were tested against Gaorani 6 in randomised replicated varietal trials at Nanded and Madhol. The results did not show any significant differences in respect of yield between the strains tested and the control. It is, however, stated that G.12F-2 appeared to be as good as Gaorani 6 or G.6E-3 for the Central Gaorani protected area. In the varietal trial conducted at Latur, G.4M-11, G.12F-2, Jarila and L-II-41-990A were tested against Latur Gaorani but none of them was found to come up to the level of the control in yield.

It is reported that the year's results indicate that, with the material available, it would be possible in the near future to get a strain superior to Gaorani 6 in spinning, ginning and resistance to wilt. Gaorani 12F-2 has been found to solve the immediate needs of the Latur zone and further work is concentrated on the isolation of a high ginning strain of 12F-2 and an early maturing selection from G.4M-11.

With the object of evolving a suitable Upland strain for the highland area of Adilabad, thirty American strains were tested against Adilabad-American and Parbhani-American I in a replicated trial on a cultivator's field at Adilabad. Of these, five strains proved promising and these have been retained for further testing in the ensuing year.

The fresh material tested at each of the three centres consisted in all of about 646 single plant selections. The examination of some of these is said to be still in progress and from the rest of the material which has been examined completely, about 130 selections, which appeared promising, are proposed to be studied in the coming season.

During the year, district trials were conducted with three or four improved varieties of cotton at 9 centres in the Gaorani protected area and two places on the Adilabad plateau. The trials at three places in the Gaorani tract failed entirely; at two centres, G.12F-2 gave significantly better yield than the control. The trials at the remaining centres gave no conclusive results.

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

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

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

During the year under review, some 800 progenies were tested in the wilt infected soil against the local as control ; of these 36 progenies recorded nil mortality against 25% in the case of the control. The mortality of 19 other selections ranged from 2 to 3%. In the wilt free soil, 78 wilt-resistant strains were compared with Parbhani local, Gaorani 12F-2 and Jarila in respect of their yield and other economic characters ; 23 of these, which proved promising, have been retained for further study.

The main varietal trial consisted in testing three improved varieties of Hyderabad Gaorani, *viz.*, Gaorani 12F-2, Indicum 17 and II-41-6919, against the imported variety, Jarila, and the local variety of Parbhani district. The results showed that strain II-41-6919 significantly outyielded all the other varieties which were, however, on a par with Jarila in this respect. In respect of ginning percentage, 6919 was equal to Jarila, but Indicum 17 was superior to both. As regards spinning capacity, 12F-2 was adjusted suitable for 38s highest standard warp counts against 16s of the local, 27s of II-41-6919, and Indicum 17, and 26s of Jarila.

The experiments on the Ghat area of Aurangabad district, undertaken for the production of an early maturing and high ginning strain of Parbhani-American resulted in the selection of 20 types which, besides combining the two characters mentioned, gave better yield than Parbhani-American I.

It is reported that out of the eight centres at which District trials were laid out ; those at three centres were complete failures. At the other centres, the yields obtained were below normal. From the meagre data available, it would appear that strain II-41-6919 is better than all the varieties tested in respect of yield, but inferior to G.12F2 as regards spinning quality.

Of the five strains tested for wilt-resistance at Poona, strain II-41-6632, was found to be very highly resistant.

(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, seven promising strains were tested against R.K. 19, local and Hagari 1, and three of them—R-II-43-2472, R-II-42-2011 and R-II-42-2074—possessing superior lint qualities and capacity to resist wilt, have been retained for further trial. Another batch of 30 strains including five wilt-resistant types obtained from Poona were tested in two other replicated trials both on wilt-free and wilt-sick plots. The Poona types, though highly resistant to wilt, were late maturing. One of them, 47A, is said to be promising notwithstanding this defect. In all, nine types combining the desirable combination of character are proposed to be further studied in the ensuing season.

The district trials were laid at seven centres in Raichur and Gulbarga districts. At three centres, the trials completely failed owing to bad seasonal conditions. The results from the remaining four centres showed that R.K. 19 does well in the eastern part of Raichur and Gulbarga districts while Jayawant is more suitable to areas adjacent to the Dharwar tract.

The material tested in pot culture at Poona for wilt-resistance consisted of cultures derived from the back-cross (R.K.19 × N.S.12) × R.K. 19. These tests are still in an early stage.

BARODA STATE.

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.

As in previous years, large scale comparative trials were carried out with two promising strains—S. 24-2 and S. 31—at four centres in Kathiawar, *viz.*, Amreli, Ingorala, Damnagar and Palitana and Junagadh, using local Mathio as the control. (In accordance with the approved programme, the fifth centre should have been located in Jamnagar; it is stated, however, that the authorities of the State did not agree to conduct the trials there and arrangements were accordingly made for the work to be done at Junagadh). The results showed that in respect of yield of *kapas*, the two strains were on a par with the local Mathio at all the five localities, but, being high ginners, their lint yield was more than that of the local. The technological tests on the fibre properties revealed once again the superiority of S. 31 to S. 24-2 and local both in staple length and spinning performance. S. 31 is adjudged suitable for spinning 29s highest standard warp counts against 21s and 13-1/2s warp counts, respectively, in the case of S. 24-2 and the local. Mill tests carried out at the Century Spinning and Manufacturing Co., Ltd., Bombay, are stated to have confirmed the results obtained at the Technological Laboratory.

It is stated that owing to its high spinning value S. 31 is much in demand and is a keen competitor, particularly in regard to quality, with Jarila, which, under Amreli conditions, has never fared well. It has been suggested that this strain, which has been evolved mainly to withstand seasonal vicissitudes, may be found to adapt itself better than Jarila in the Khandesh tract and that it might be well worth undertaking trials with it in that tract.

MYSORE STATE.

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

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

It is reported that the climatological conditions during the year under review were not favourable for profitable cultivation of cotton under irrigated or rainfed conditions. Two new Mysore-American strains—MA.X and MA.XI—were tested for the second time on the Irwin Canal Farm along with Co.4 and other Mysore-American Strains, MA.V, VI and VII; the results confirmed that, as in previous years MA.V is the best, recording significantly higher yield than all other Mysore-American strains. MA.X and XI did not come up to the level of either Co.4 or MA.V. In the seasonal varietal trials conducted at the Babbur Farm with MA.X, MA.V, MA.VI, Co.4 and MA.IX and sowings done in May, June and July, the July plantings gave the best yield; amongst the types under trial, MA.VI gave better yield and matured much earlier than the others. MA.X proved to be invariably a poor yielder.

Field trials were conducted with MA.V over an area of 600 acres under rainfed conditions; notwithstanding severe drought in the northern part of the State, MA.V gave 350 lbs. per acre against 200 lbs. of the local. In the Banavar area lying in the Central tract, the yield obtained varied from 500 to 600 lbs. per acre against 300 lbs. of the local and Co.4. Owing to its remarkable success under such adverse climatic conditions, MA.V is gaining popularity among the cultivators with consequent increase in the demand for its seed. During the year, a premium of Rs. 1/4 per maund of *kapas* was obtained for this cotton over the local.

In the trials with Egyptian varieties on the Irwin Canal Farm, Giza 12 gave the highest yield in all the four plantings done in October, November, December and January; Giza 7 and Maarad were the next best, while Sakel and Ashmouni recorded low yield. As regards the different monthly plantings, those done in October were not only vigorous and healthy but also gave the optimum yields. Seasonal sowings done in the months of May, June and July on the Babbur Farm resulted in poor germination due to heavy rains, which affected the yields considerably. Giza 7 is, however, reported to have given the highest yield followed by Giza 12, Maarad and Sakel. The spinning value of these Giza strains ranges from 60s to 80s H.S.W.C.

S.I.V. 135 was tested for the third year along with other Egyptians; the test confirmed that the best results are obtained from plants sown in October.

It is stated that a large number of high yielding Egyptian and Sea Island selections possessing long staple and high ginning percentage has been retained for further study in the coming season.

The results of the manurial trials on Giza 12 with six different levels of N—0, 50, 75, 100, 125 and 150 lbs. per acre, with a basic dose of 25 lbs. of phosphoric acid and 25 lbs. of potash per acre indicated that with increasing dosage of N there was a corresponding increase in the yield of seed cotton; the economic dose, however, appeared to be 150 lbs. N per acre for the Mysore soils which are normally deficient in N.

CHAPTER III.

PROGRESS IN THE INTRODUCTION OF IMPROVED VARIETIES OF COTTON.

As mentioned elsewhere most of the schemes of the Committee are concerned with the improvement of the quality of cotton and it is perhaps in this direction that the biggest success has been achieved. For example, out of a total area of 2,017,000 acres under cotton in the Bombay Province, there are now some 1,138,000 acres grown under improved cottons, Suyog, Jarila, Vijaya, Jayawant, Gadag No. 1, etc. Similarly, out of a total area of some 867,000 acres under cotton in Sind, there are nearly 784,000 acres under improved varieties of cotton; amongst these may be mentioned Sind-Sudhar, 289F including M4, Sind-American 4F and 27 W.N. In the Punjab, out of a total cotton area of 2,955,000 acres, there are some 2,352,000 acres under improved cottons, such as, 4F, LSS, 289F/43, 289F/K.25, Victory and Mollisoni. Again, in the Central Provinces and Berar, where the total cotton area is roughly 2,865,000 acres nearly 2,161,000 acres are under improved cottons, about 1,617,000 acres under Jarila, 317,000 acres under Verum strains, 218,000 acres under improved Buri (*G. hirsutum*), Cambodia, etc. In the Madras Province, where the total area under cotton is 1,584,000 acres, some 951,000 acres are occupied by improved cottons, such as, Cambodia, Karunganni 1, N. 14 and H. 1. and Cocanadas x 20. The total area under cotton in the United Provinces, where the bulk of the crop comprises U. P. Bengals, is only about 200,000 acres, but out of this 34,000 acres are under improved cottons, C.520 and Perso-American. Coming now to the Indian States, there are in Hyderabad State nearly 2,155,000 acres under cotton, out of which nearly 464,000 are grown under improved cottons, Gaorani 6, Parbhani-American, Jarila, Jayawant, etc., developed under the auspices of the Indian Central Cotton Committee. In Baroda State, almost the entire cotton area (435,000 acres) is under improved cottons such as, 1027 A.L.F., B.D.8, B.9, Wagad 8, Vijaya and Suyog. The improvement in the character and staple of the Indian cotton crop brought about by the extension of the area under the superior types of cotton mentioned above may be regarded as one of the most outstanding achievements in the history of cotton in India.

BOMBAY.

The total estimated area under cotton in the Bombay Province during the year 1945-46 as reported in the final forecast for 1945-46 season was 20,17,371 acres including 9,03,893 acres in Indian States.

Broach Tract :—

“Vijay” is the improved variety of cotton that has been introduced in the Broach Tract which lies between the two rivers—Nerbudda in the south and Sabarmati in the north. The produce of Vijay cotton was in brisk demand and easily disposed of with adequate prices during the year under report as the trade has, by now, been fully convinced about the intrinsic value of “Vijaya” cotton resulting from its wider use by the mills.

The total estimated area under “Vijay” cotton in the Broach Tract during the year 1945-46 was 1,19,927 acres against 89,450 acres of the previous year. The Agricultural Department controlled 15,569 acres of “Vijay” cotton including 1,536 acres grown with Pedigree Seed from Broach Farm and the Registered Seedgrowers for seed multiplication purposes.

The Agricultural Department purchased 6,22,181 lbs. of “Vijay” cotton seed from the produce of the controlled area including 981 lbs. of Pedigree Seed of the Borach Farm and distributed through 10 seed depots 5,28,221 lbs. of seed to the cultivators of the tract. Besides, 1,83,920 lbs. of seed were directly supplied under the Departmental guidance to the growers in parts of Broach and Kaira districts by the Co-operative Cotton Sale and Seed Supply Societies. The total quantity of “Vijay” cotton seed, thus handled during the year 1945-46 was 7,12,141 lbs. as against 7,34,530 lbs. in the previous year.

Wagad Tract :—

An improved variety “Wagotar” cotton which has been introduced in “Wagad” tract of Ahmedabad district is superior to local “Wagad” in fineness of staple, ginning outturn, spinning capacity and yield per acre. A scheme financed by the Committee for multiplication and distribution of “Wagotar” cotton has been in operation since the 1st December, 1943. The area under cotton in “Wagad” tract (comprising Virangam, Sanand, part of Daseri, Dholka and Dhandhuka talukas of Ahmedabad district) was 3,30,000 acres when the scheme was put up but due to the application of ‘Bombay Growth of Food Crops Act’ and the unfavourable nature of season, the area sown under cotton was limited to 1,08,300 acres only in 1945-46.

A quantity of 1,00,535 lbs. of seed of 'Wagotar' cotton was available for distribution, during the year under report, of which the department purchased 25,730 lbs. and 44,085 lbs. were distributed by approved agents. The remaining quantity of about 30,000 lbs. of seed was directly sold to the merchants by the farmers.

According to programme 6,030 acres were to be covered during the previous year but due to water-logging only 560 acres could be finally sown ; this has resulted in a big set-back to the rapid multiplication of the seed just at the beginning of the operation of the scheme. During the year under report the total quantity of seed distributed was sufficient to cover 3,800 acres. However the actual total area sown was 2,813 acres (controlled area) only, due to peculiarity of the season and ill-distributed rainfall.

The area in Viramgam, Sanand, Dholka and Dhandhuka talukas covered 1251.1/2, 260, 810 and 491-15 acres, respectively.

Khandesh—Jarila :—Jarila is now the established and recognised variety of Khandesh tract. It is admirably suited for the tract and liked both by cultivators and trade. A seed multiplication scheme subsidised by Indian Central Cotton Committee, was continued during its 9th year. During the year 1945-46, 80,080 lbs. and 59,57,900 lbs. of Jarila cotton seed were stocked respectively by the Department and by 40 co-operative organisations. From these, 4,864,600 lbs. of seed were distributed and the area covered was 213,122 acres. Out of this an area of 66,843 acres under stages III, IV, V and VI was organised for multiplication. In addition, an area of 121 acres and 10 gunthas was grown under this variety on Jalgaon and Mamurabad seed farms (near Jalgaon Farm) under stages I and II.

The total area under Jarila including natural spread is estimated at about 2,34,581 acres. Only 23 acres were put under *desi* cotton in the Nandurbar and Taloda talukas where the Cotton Act has not been applied. The area under cotton has further decreased this year on account of late rains and better prices and demand for groundnuts. This is the lowest acreage during the last 10 years.

Out of the pure seed produced on Government farms and on controlled areas 78,00,488 lbs. of Jarila cotton seed have been stocked by Department and cooperative organisations for distribution during 1946-47.

The production of Jarila including natural spread is estimated at 52,000 bales or approximately 87 lbs. of lint per acre.

The cotton sowings during the season of 1945-46 were delayed by 3 to 4 weeks and after sowings were over, rains continued for longer period than usual, as a result of which timely interculturing could not be done and consequently the growth of cotton crop was stunted. Then there was a dry period with bright sun-shine which improved the condition of the crop. In September the heavy rains accompanied with stormy winds caused shedding of bolls. All these conditions affected the yield of Jarila. On an average prices realised by Jarila growers during 1945-46 varied from 10 to 51 'ons' over the ruling quotations of Jarila cotton in Bombay. The marketing of Jarila was satisfactory.

The Cotton Control Act was applied to the area in the previous year. One case of *desi* cotton growing was detected at Akulkheda in East Khandesh; this, however, was compounded as it was the first offence; further it was not deliberate. The produce was ginned under Departmental supervision; the seed was fed to cattle and the lint was used for home purposes. The Cotton Transport Act has also been applied this year to this tract only by rail in the first instance.

There are 24 cotton sale societies now working in Khandesh for marketing and agmarking pure Jarila cotton in the division. The work of agmarking could not be taken up as societies had sold cotton of their members without pressing owing to limited production.

Except Jarila now there is no other cotton in Khandesh Division.

Deccan-Barsi-Nagar Tract.—In this tract there is no organised seed multiplication and distribution scheme of Jarila cotton which is found to be suitable to this locality also.

The total area under cotton in this area is 8,591 acres of which 6,460 acres are under Jarila. Jarila is spreading on its own merits.

Surti Tract :—The Committee sanctioned the Scheme for Multiplication and Distribution of Suyog cotton seed in the area lying south of river Nerbudda and it came into operation on 1st April, 1945. The Department controlled 30,440 acres of pure Suyog; of this the certified area was 28,952 acres which included 348 acres grown with Farm Pedigree Suyog. The Agricultural Department purchased 8,76,392 lbs. of Suyog seed of which 5,202 lbs. were the

produce of Government Farm, Surat. A further quantity of 20,808 lbs. were supplied to their members by the Hansot Co-operative Sale Society. The total quantity of Suyog cotton seed handled by the Department was 8,97,200 lbs.

The resulting produce of the controlled area was agmarked under the Grading and Marking Scheme, and out of 8,225 bales of Suyog, 8,040 Agmark Bales was disposed of at a premium of Rs. 8-14-0 per candy over local, leaving a balance of 185. Due to its higher ginning % than 1027 A.L.F. the variety had been appreciated by the cultivators.

Under the Scheme for cultivation of 1027 A.L.F. cotton in Nawapur Taluka of West Khandesh District the whole Nawapur Taluka is now covered with 1027 A.L.F. cotton seed. The resulting produce of the controlled area was pooled and agmarked. Out of 694 Agmark 1027 A.L.F. bales, 272 bales were sold at a premium of Rs. 9/- per candy leaving a balance of 422 bales still to be disposed of.

Kumpta-Dharwar Tract :—(1) The total area under cotton (estimated) in the Southern Division including the Deccan States 8,35,000 acres. (2) Area under improved varieties.

Variety.	Area in acres.
(a) Jayawant	6,39,700
(b) Gadag No. 1	1,25,920
	7,65,620
Total	

- (A) Jayawant is a pure type derived from a cross between two pure line selections of Kumpta, viz., Dharwar 1 and Dharwar 2. It possesses all the economic characters of Dharwar 1 with the wilt-resistance of Dharwar 2. It has a staple length of 0.92" and a ginning percentage of 28 and is capable of spinning up to 40s H.S.W.C.
- (B) Gadag No. 1 is a pure line selection from the hairy-leaved typed of Dharwar-American (Dharwar-Upland). The staple length of G.1 is 7/8" and its ginning percentage 33; it has been adjudged suitable for spinning 30s H.S.W.C. Jayawant cotton is concentrated in the Dharwar, Belgaum and Bijapur districts of the Southern Division including the Deccan States, except in the Gadag and Ron centres of the Dharwar district, where Gadag No. 1 cotton is mainly grown.

(3) Quantity of improved seed controlled and distributed.

Variety.	Seed controlled in lbs.	Seed distributed in lbs.
(a) Jayawant	92,06,960	57,96,980
(b) Gadag No. 1 ..	11,81,400	10,59,200

(4) The Bombay Cotton Control Act, 1942 has been applied to the Bijapur district as desired by the Bombay Government and the Indian Central Cotton Committee, Bombay.

SIND.

The total area under cotton in Sind (including Khairpur State) during the year 1945-46 was 8,67,433 acres against 9,01,615 acres in the previous year. The acreage under American and *desi* was as follows :—

	American Acres.	Desi Acres.	Total Acres.
British Districts	7,13,593	1,06,891	8,20,484
Khairpur State	36,756	10,193	46,949
Total	7,50,349	1,17,084	8,67,433

Sind-Sudhar (289F-1).—A selection for high yield and longer staple from Punjab 289F cottons. It was first introduced in 1932-33 and is commonly grown in middle and east Sind, *i.e.*, in the districts of Tharparkar and Hyderabad only. It occupied an area of 4,00,000 acres during 1942-43. The M.4 variety introduced in 1941-42, to a great extent, replaced this variety so that during 1945-46 it occupied 60,000 acres only. Sind-Sudhar variety is sown during April and May and is picked in October and November. The average yield is 7 to 8 mds. of *kapas* per acre. The cotton is creamish white in colour and silky in feel. It possesses a staple of 1" and gins only 30%. It is capable of spinning up to 45's standard warp counts.

M. 4.—This is a new strain evolved by selection from N.T. 21 bulk. It was issued for general cultivation, to a limited extent, from kharif of 1942. It has given very satisfactory performance under varied conditions and is popularly grown all over the province, including Nawabshah district, where all other American cottons had failed. During 1945-46 it occupied an area

of 4,43,000 acres. It is sown in April and May, picked in September and October. Average yield is 8 mds. of *kapas* per acre. This cotton is bright white in colour with a roughish feel. It has 7/8" staple and ginning outturn only 34%. It can spin up to 38's standard warp counts. The points in favour of this variety are (a) early maturity by about 30 days, by virtue of which the crop escapes attack from bollworm, red leaf blight and frosts, allows times for preparatory tillage for rabi crops and requires one less irrigation, (b) very good opening of bolls, hence it is easier to pick and (c) bulk of the produce *i.e.*, about 65% is realised in the first picking. Its drawbacks are (a) early flowering liable to heavy shedding in years having late showers of rain in the second fortnight of August or early September, (b) inferior quality compared to Sind-Sudhar.

Sind-American 98 (4F-98).—This is a selection from 4F. It was introduced in 1932-33, has a staple length of 7/8" and spins about 34's and its ginning outturn is 33%. This variety which was mainly confined to Indus Right Bank tract has entirely been replaced by M.4.

Sind N.R. (27 W.N.).—This is an improved short staple strain evolved from *desi* cottons. Its staple length is little more than 1/2". It spins about 65's and its ginning outturn is about 38%. This variety is mainly confined to the Nawabshah district. The Department had stopped distribution of this seed since 1943-44. After the war, there has been steady increase under the area under *desi* cottons in Sind. Consequently, distribution of seed has again been taken up by the Department. Area under this variety during 1945-46 was 25,000 acres only.

Quantities of seeds of improved varieties controlled and distributed during 1945-46.

Variety.	By the Agricultural Department		By the factories directly.	Total.
	..	Mds.	Mds.	Mds.
Sind Sudhar	..	9,500	2,000	11,500
M.4	58,500	80,000	138,500
Sind N.R.	2,000	1,000	3,000
Total	..	70,000	83,000	153,000

Area under improved varieties during 1945-46.

Variety.	Area in acres.
Sind Sudhar	60,000
M.4	443,000
Sind N.R.	25,000

PUNJAB.

The total area under cotton in the British districts of the Punjab was estimated at 2,955,000 acres, which is 3 per cent less than the actual area of last year. Of the total area, 927,000 acres were grown under *desi* varieties and 2,028,000 acres under the medium and long stapled American varieties. The American varieties thus constituted about 69% of the total Punjab cotton crop. The total outturn was estimated at 1,210,000 bales (*desi* 340,000 bales and American 870,000 bales), which is about 5 per cent more than the crop of last year.

Punjab Desi Cotton.—The campaign instituted by the Government for increasing the area under food crops in preference to short stapled *desi* cottons brought down the area under these cottons by 7% as compared to last year. Amongst the improved varieties of *desi* cottons grown in the Province, 39 Mollisoni was popular in the Central Canal Colonies, Mollisoni 60 A 42 in the South-Eastern districts and 119 Sanguineum in the South-Western parts of the Punjab.

Punjab-American Cotton.—The medium stapled 4F, which was hitherto the most extensively cultivated variety, was exceeded by some of the long-stapled varieties recently introduced by the Punjab Department of Agriculture in the various ecological zones of the Province. L.S.S. is now most popular in the districts of Lyallpur, Sheikhpura and Sargodha, while 289F/43 and 289F/K.25 are the two principal varieties of the South-Western tract, including the districts of Multan, Montgomery, Dera Ghazi Khan and Muzaffargarh. Another noteworthy feature is that a new long stapled variety 124F named "Victory" (staple length 0.97" and ginning percentage 33.5) has now been approved by the Department for distribution in the tract extending South-West of Mian Channu.

CENTRAL PROVINCES AND BERAR.

The total area under cotton in the Central Provinces and Berar during

the year 1945-46 was 2,864,844 acres against 2,801,091 acres in the previous year. The slight increase in the area, was attributed to favourable prices received by the cultivators in the previous year. The area under Verum 434 was 298,982 acres against 3,77,934 acres in the previous year. This strain possesses fine, strong staple, about 7/8" in length, capable of spinning up to 30's highest standard warp counts. 12,985 maunds of seed are distributed for sowing purposes through departmental, co-operative and other agencies. The total area under Buri 107 (*G. hirsutum*) was 73,853 acres, out of which 61,126 acres were grown in the Nimar district from the seed distributed by the Department. This strain possesses fine staple, about 1" in length, capable of spinning up to 40's highest standard warp counts. The total quantity of seed distributed in the Burhanpur tahsil through Government Seed Depots, seed farmers and dealers amounted to 2,588 maunds.

MADRAS

The total area under cotton in the Madras Province during 1945-46 according to the forecast report published in July 1946 was estimated at 1,584,000 acres as against the finally recorded area of 1,671,000 acres in 1944-45. The present estimate for the province represents a decrease of 6.1% compared to the previous year. The decrease in area in the current year occurred in all the districts of the province except Guntur, Salem, Madura and Ramnad where there was an increase. The decrease in area was due to (1) the preference given to the cultivation of food crops, (2) restriction imposed on the cultivation of cotton as a pure crop and (3) want of rains at the time of sowing.

A. Cambodia Cotton.—The area under Cambodia during the year was 345,900 acres as against 343,800 acres recorded in 1944-45. The improved strains Co.2, Co.3, Co.4, 4463 and 920 continued to be popular and covered an extent of 258,187 acres which works out to 75% of the total area under Cambodia against 80% in the previous year. Strain Co.2, being very cosmopolitan, occupied the largest individual area and figured in all districts growing Cambodia. Spread of strain Co.3 in Salem and Trichinopoly districts increased by 50%. The area under Co.4 was reduced by 50% due to the ban on the cultivation of cotton in summer with the help of irrigation. The extent of spread of the different varieties is indicated in Table I.

TABLE I.

Cambodia cotton.

Area as per Forecast 345,900 acres.

Districts.	Name of strain.	Quantity of seeds distributed by		Total area under the strain inclusive of natural spread. Acres.
		Madras Agricultural Dept. lbs.	Co-operative Societies. lbs.	
1	2	3	4	5
Madura	Co.2	21,161	....	30,468
Ramnad		2,940	....	1,495
Tinnevelly		980	....	2,300
South Arcot		250	500	2,108
Salem .. ..		....	....	12,000
Coimbatore		447,311	30,548	132,600
Trichinopoly		5,123	....	9,159
Malabar		4,606	....	1,900
Kurnool .. ..		....	....	400
Anantapur		91	....	12
Cuddapah	58	....	100	
Total		482,520	31,048	192,842
South Arcot	Co.3	755	....	50
Salem		8,000	371,500	20,000
Trichinopoly		18,325	....	1,743
Total		27,080	371,500	22,993
Madura	Co.4	1,333	....	334
Ramnad		64,672	....	13,521
Tinnevelly		8,038	....	7,408
South Arcot		1,644	....	123
Anantapur		234	....	27
Total		75,721	....	21,413
Coimbatore	920	58,030	....	13,800
Trichinopoly		2,058	....	641
Anantapur		50	....	3
Total		60,138	....	14,444
Coimbatore	4463	12,348	....	6,000
Trichinopoly		6,860	....	495
Total		19,208	....	6,495
GRAND TOTAL		664,667	402,548	258,187

The agencies which multiplied and organised the sale of pure seeds were (1) The Madras Agricultural Department, for Co.2, 4463, 920 and Co.4, (2) The Co-operative Sale Society, Tiruppur, for Co.2 and (3) the subsidised Indian Central Cotton Committee's schemes in Salem district for Co.3.

B. Tinnevellies.—The total area under Tinnies recorded during 1945-46 was 549,800 acres against 520,900 acres in the previous year. Madura, Tinnevelly and Coimbatore showed increased area, while Ramnad showed decrease in area. The estimated acreage of 250,499 acres under improved Karunganni strains (vide Table II) expressed as percentage of total Tinnevellies works out to 46 per cent as against 51 per cent of last year. The reduction of area under improved strains is estimated at 27% decrease in Ramnad district, 45% in Madura and 14% in Coimbatore in spite of the improved strain C-11-2 which is becoming more popular in the Coimbatore district having been grown over an area of 23,200 acres in the present year against 1,152 acres in the previous year. The seed multiplication and distribution of the strains were done on a limited scale by the Madras Agricultural Department.

TABLE II.

Tinnevellies.

Area as per forecast 549,800.

1	2	3	4	5
Madura	K. 1	5,972	....	6,532
Ramnad		110,221	....	81,251
Tinnevelly		134,710	....	89,074
Coimbatore		70,764	....	50,000
Trichinopoly .. ..		....	....	442
Total		321,667	....	227,299
Coimbatore	C-11-2	37,919	....	23,200
GRAND TOTAL		359,586	.. ..	250,499

C. Salems.—The area under "Salems" decreased to 20,400 acres in the present season from 23,300 acres in the previous year mainly as a result of propaganda for "Grow More Food." As there was no special strain evolved and recommended for this area there was no special organization for the spread of improved varieties. In Trichinopoly district, however, K.1 is reported to have spread over 442 acres. In future, C.11-2 which has fared well in this district will be distributed.

D. White and Red Northern.—There was a further shrinkage of area during 1945-46 to 84,000 acres from 114,000 acres for the previous year. N.14 was the only strain under distribution but its area remained low 15,585 acres due to the absence of any organisation for the production and distribution of pure seeds.

E. Westerns.—The estimated total area was further reduced to 498,600 acres during the present year from 573,000 acres in the previous year. The restrictions imposed on the cultivation of Mungari cotton and subsidies given to food crops were mainly responsible for the reduction which was concentrated mainly in the district of Bellary and Anantapur. The area under improved strain H.1 was estimated at 422,048 acres working out to 85% of the total area under Westerns in the present year as against 38% in the previous year. The year under report records a phenomenal increase by 164% of the area in Bellary under H.1.

TABLE III.

Westerns.

Area as per forecast 498,600 acres.

1	2	3	4	5
Kurnool	H. 1	279	9,000	29,000
Bellary		73,080	203,040	316,635
Anantapur		26,504	217,300	52,113
Cuddapah		138,576	....	24,300
Total		238,439	429,340	422,048

F. Warangal and Cocanadas.—The area under this cotton during the year was 82,000 acres as against 91,700 acres in the previous year. There was reduction in area in Godavari, Nellore and Kistna districts while there was an increase in Guntur district. Strain X 20 renamed as G.1 (Guntur 1) a strain derived from a cross between two Cocanadas cottons was found to be suitable for the tract. A seed distribution scheme by the provincial government has been sanctioned and the strain has spread over an area of 6,830 acres during the current year.

UNITED PROVINCES.

Due to the late commencement of the monsoon in the province, sowings in the unirrigated tracts commenced only about the first week of July. The sowings in irrigated tracts, however, were done at the normal time. Germination on the whole was satisfactory. The heavy rains received in the month of September caused shedding of flowers and also hampered weeding operations.

The revised final area under cotton in the Province during the year 1945-46 was 195,329 acres against 202,237 acres (revised) last year, showing a decrease of 6,908 acres, or 3.4 per cent, which is attributable to the prevailing high prices of food-grains and the "Grow More Food" campaign.

The revised final outturn of the crop (lint) was estimated at 57,900 bales (rounded) of 400 lbs. each, against 61,700 bales (rounded and revised) last year, showing a decrease of 3,800 bales, or 6.2 per cent.

Improved varieties.—The area sown under Perso-American and C.520 during 1945-46 in the whole province and the amount of seed distributed by the Department of Agriculture are given in the following table :—

Variety.	Total area under the variety (including natural spread.)	Quantities of seed distributed by the Department.	Areas where the variety is chiefly concentrated.
C. 520 ..	.. 10,651	1 maund 21 seers	Etawah, Etah, Mainpuri, Muttra and Bulandshahr.
Perso-American	.. 22,890	6,778 Maunds 5 seers	Meerut, Hapur, Ghaziabad, Bulandshahr, Aligarh, Muttra & Etah (Kasgunj.)

Chief characteristics of the improved varieties.—C.520 cotton is a pure line selection from the "Roseum" type of U.P. Bengals, originally isolated from the material collected in Saharanpur and Bijnor Districts as early as 1920-21. It gives a high yield both under irrigated and unirrigated conditions. When grown on a commercial scale at the Government Cotton Research Farm Raya (Muttra) its yield is about 9 to 10 mds. of *kapas* per acre. The strain possesses an average staple length of 0.72", a ginning outturn of about 35 to 37 per cent. and is capable of spinning 10 to 12-1/2s highest standard warp counts. The variety had spread fairly in general cultivation in the cotton areas, but owing to general decline in cotton cultivation due to the high prices of food-grains, its area has considerably declined. It has also gained popularity in some of the Central Indian States, Baroda, Rajputana and even in some areas in the eastern districts of the Punjab. The *kapas* of this variety fetches about -/8/- per maund more than that of the ordinary *desi* under normal trade conditions.

The Perso-American cotton is a selection from American types of cotton imported from Persia (Iran) and acclimatised in the U.P. When grown on a commercial scale at Raya and other suitable areas, *e.g.*, Budaun, it has yielded up to 13 to 14 maunds per acre. The strain has an average staple length of 0.85", gins 30 to 32 per cent and is capable of spinning from 28 to 34s highest standard warp counts. The *kapas* of this variety ordinarily fetches a premium of Rs. 1/8/- to Rs. 2/- per maund over *desi* in normal times. During the last two to three seasons, it has been sold at a price which is about 35 to 50 per cent higher than that of the local *desi* cotton.

HYDERABAD STATE.

The total area under cotton in 1945-46 in H.E.H. the Nizam's Dominions based on the fourth or prefinal forecast of the Statistical Department of H.E.H. the Nizam's Government was 2,112,262 acres.

Area under improved varieties of cotton :—

Name of Variety.	Description.	1945-46		Remarks.
		Quantity of seed distributed Lbs.	Area. Acres.	
1	2	3	4	5
1. Gaorani 6	A selection made in 1929 from Hyderabad Gaorani in Bhainsa in Nanded district. A fair yielding early maturing type with a staple length of 0.85 inch and ginning outturn of 32 per cent, capable of spinning 36's highest standard warp counts. It is under large scale cultivation and is especially suited to the north and north eastern parts of the Gaorani Protected Area.	56,20,800	3,51,300	Mostly confined to Nanded district.
2. Gaorani 6E-3	A sub-strain of Gaorani 6, with a mean staple length of 0.86 inch, ginning percentage of 32 and capable of spinning 35-40's highest standard warp counts.	14,272	892	Nanded taluq (Wadibuzurg) village.
3. Gaorani 12	An earlier maturing re-selection from Gaorani 12F and as resistant to wilt in field as the parent. It has a staple length of 0.85", ginning percentage of 32 and can spin to 30's to 35's. The area which this variety is expected to cover is 8 to 10 lakhs of acres.	8,384	524	Latur taluq of Osmanabad District in the South-West Gaorani Protected area.
4. Raichur Kumpta-19	A selection from the local Kumpta crop of Raichur district. It is good yielding, drought and wilt resistant variety with a staple length 0.81" capable of spinning to 24's. The ginning percentage is 28-29 per cent. This variety was released in 1944-45 for distribution.	12,966	804	Raichur taluq of Raichur District.
5. Jayawant	Is a derivative from a cross between Dharwar I and Dharwar II. It has a staple of 0.89", ginning outturn of 28% and spins 32's to 34's highest standard warp counts. It appears to be well suited to the western half of Raichur district.	61,432	5,600	Raichur Protected Area (Kopbal and Gangawati.)

BARODA.

(1) Total area under cotton in Baroda State was 451,347 acres as against 472,433 acres of 1944-45. The decrease is due to the "Grow More Food" Campaign.

(2 and 3).

Variety.	Area under improved variety.	Where concentrated.	Seed distributed.
	Acres.		Lbs.
Vijaya	200,000	All Baroda district except Savli area	29,04,407
B. 9	19,096	Savli taluka of Baroda	1,21,860
Suyog	22,134	Navsari district	1,54,582
Wagad 8 ..	41,247	Mehsana district	2,49,000
Wagotar ..	3,364	" "	93,580
Pratap	35	Amreli district	1,120

The Baroda State Cotton Control Act is now applied to Mehsana so that Wagotar is now the standard type for that district.

In the State of Baroda, there are four well-defined cotton tracts, each requiring a different type of cotton to suit the varying conditions of soil and climate met with. Commencing from the south, there is first of all the Surti tract lying to the south of the Nerbudda in which Navsari district is situated; then the Broach tract between the Nerbudda and the Sabarmati including the whole of Baroda district and a portion of Mehsana district; after that the Wagad or closed-boll tract north of the Sabarmati and including the remainder of the Mehsana district; and finally the Mathio tract in Kathiawar. Each of these tracts requires its own special type of cotton and the efforts of the department are directed to isolate suitable strains for each one and then to multiply them throughout the tract as rapidly as possible.

Navsari District.—In January 1945, the Indian Central Cotton Committee sanctioned a scheme for the introduction of Suyog cotton over the whole of the cotton tract in Navsari district, which in normal years extends to some 210,000 acres, but which in the year under report amounted to only 22,134 acres. Before then, the strain 1027 A.L.F. evolved by the Bombay Department of Agriculture had been introduced, but continuous selection work at

Surat had resulted in the isolation of a new strain Seg. 8-1, now known as *Suyog* which is better in many respects than its predecessor. As a result of tests spread over two seasons, it was found that the yield of *kapas* in the case of *Suyog* was 425 lbs. per acre while in the case of 1027 A.L.F., it was only 374 lbs., so that there is a gain in favour of the former of roughly 50 lbs. per acre; further the ginning percentage of *Suyog* during the past season was also exceptionally high, being 36.5 as compared with 33 per cent in 1027 A.L.F. The fibre length, however, is 27/32" in the case of *Suyog* compared with 28/32" in the case of the other.

When the scheme was launched in the sowing season of 1945, the department already had at its disposal the following quantities of seed :—

Selfed seed	..	..	..	865	lbs.
Nucleus	..	..	..	30,800	„
Grade A	..	..	..	56,500	„
Grade B	..	..	..	66,417	„

Further supplies of seed were also obtained from the contiguous parts of the Surti tract in Bombay territory, where the same strain is being developed, with the result that the department was able to distribute altogether 353,430 lbs. of seed of the new variety. Of the total area sown during the year, 22,134 acres were controlled by the department and rogued to a high standard of purity so as to supply the seed for next year's requirements. From this area, 34,83,000 lbs. of seed were secured and stored in 21 depots throughout the district and of this quantity 20,34,000 lbs. were sold for 1946 sowings.

The entire *kapas* pooled and ginned under departmental arrangements amounted to 54,69,660 lbs. or 5,918 *bhars* of 924 lbs. each, which produced 18,332 fully pressed bales; prices ranged from Rs. 600 to Rs. 610 per candy. Of this, 4,985 bales were certified by the department and sold under arrangements made by it; these earned a premium of Rs. 10 to Rs. 15 per bale over the general crop.

Baroda District.—When *Vijaya* cotton was first introduced into Baroda district, it was felt that its cultivation should not be attempted on an intensive scale in the Savli and Waghodia talukas, until extensive trials had been conducted to establish its suitability for the loamy soil found there. Such trials were carried out during the two years, 1943-44 and 1944-45, and the results showed that *Vijaya* cotton was eminently suited to these two talukas; the Indian Central Cotton Committee, after considering the report for 1944-45, directed that work on the introduction of B.9 should be discontinued and

that the single type Vijaya should be cultivated in the whole of the Broach tract in Baroda territory. In conformity with this decision, 6,80,540 lbs. of Vijaya seed were sold during the year in the new area under departmental arrangements, and it is estimated that some 43,000 acres were sown with the new variety in these two talukas.

The total area under cotton in the district during the year was approximately 2,12,250 acres spread over nine talukas; of this area some 57,600 acres were controlled by the department of which 380 acres were rogued to nucleus or 100 per cent purity standard; 11,400 acres to grade A standard, and the balance to B grade. The average yield obtained was 382 lbs. *kapas* per acre.

A total of 18,189 *bhars* of 924 lbs. each of *kapas* was pooled under departmental arrangements which yielded 18,387 fully pressed bales of lint all of which were certified by the department. The average selling price of Vijaya ranged from Rs. 475/- to Rs. 500/- per candy as compared with an average price of Rs. 445/- for Jarila. In addition to this advantage, however, lint certified by the department earned a further premium of Rs. 10/- per bale.

Of the 48 gins working in the district, 21 were certified by the department and the ginning of grade seed in those gins was supervised by the departmental staff. The total amount of seed obtained and stored amounted to approximately 53,00,000 lbs. of which 89,000 lbs. and 18,51,000 lbs., respectively, were of A and B grade standards, the balance being composed of C grade seed. Of the total quantity ginned 43,82,000 lbs. were sold for seed for 1946 sowings.

Mehsana district.—In January 1943, the Indian Central Cotton Committee sanctioned a scheme for the introduction of Wagad 8 into the Wagad or closed-boll tract in Mehsana district, lying north of the Sabarmati. Simultaneously, with the introduction of this strain, however, further selection work at Viramgam on the local Wagad crop continued, which led to the isolation of a strain Wagad 4-1, now known as Wagotar. This strain yields not only as well as Wagad but gins 3 per cent higher and spins 6 counts more, with the result that it brings to the grower an increased return of Rs. 10/- to Rs. 12/- per acre. Accordingly, in July 1945 the Committee approved of the introduction of Wagotar in place of Wagad 8 in the Wagad tract. The new scheme was put into operation in January 1946, but actually Wagotar was being multiplied and carefully rogued for two years previously so that at the end of the year under report, the departmentally controlled area was 3,364 acres, practically all of which had been rogued to a high standard of purity to supply seed for further operations in the ensuing year.

It is estimated that at the end of the year, the following areas in the closed-boll tract were under improved strains :—

Area under Wagad 8	43,247	acres.
Area under Wagotar	3,364	„

The new selection met with the approval of the trade, members of which are prepared to pay As. -/12/- to Re. 1/- extra per standard maund of *kapas* of these new introductions, which have been grown under the control of and certified by the staff of the agricultural department.

Amreli district.—Mathio cotton is grown over an extensive area of the whole of the Kathiawar peninsula, but in its present undeveloped state, it is a poor cotton with a staple of only 1/2" and spins only 10's. Accordingly, work was begun some years ago with a view to obtaining a strain that would show a general all-round improvement on the local mixture generally grown. In the early stages of the work, a variety, C.520, introduced from the United Provinces, revealed distinct advances over Mathio, but selection work within the crop itself resulted in the isolation of promising strains which surpassed C.520 in yield, fibre length and fibre weight. One of these, S.31, now known as 'Pratap' shows a very marked advance over the usual Mathio crop, both in respect of ginning and spinning qualities, so much so that certified lint was purchased by a Bombay firm at Rs. 70/- "on" over Jarila, showing that from the point of view of quality, 'Pratap' is a keen competitor with the latter, which, however, has never done well in Kathiawar.

On account of its superior quality, a beginning is being made by introducing this strain into Amreli district, but as its yield of *kapas* is no better than that of ordinary Mathio, work is being continued with a view to combining in one strain the superior ginning and spinning qualities of 'Pratap' and higher yield of per *kapas* acre than is at present the case. This is being done partly by selection work within the Mathio crop itself, partly by hybridisation of 'Pratap' and C.520 and partly by a study of crosses obtained from 'Pratap' and ten long stapled *arboreums* and C. 520 and partly received from Coimbatore.

RAJPIPLA STATE.

The Rajpipla Cotton Improvement Act of 1921 prohibits the import and sowing of *Goghari* or any other short staple cotton. The export likewise, of cotton by rail or by boat is entirely prohibited except in the form of full-pressed bales, an exception being made only in favour of *bonafide kheduts* who are allowed to take their cotton in carts for sale outside the State. Best cotton seed of the 1027 A.L.F. variety is supplied by the State to the *kheduts*.

and only the long staple cotton of this strain is grown throughout the State. The cotton grown in the State has attained a high standard of reputation on account of its purity and finds ready customers in the market. During the year under report the best seed was obtained through the good offices of the Commissioner of Agriculture, Baroda State and supplied as usual by the State to the cultivators. The total area under cotton cultivation throughout the State was about 1,02,626 acres, the total outturn being 22,852 bales pressed within the State and about 1,542 bales pressed outside the State limits from the cotton transported in cartloads by some cultivators of the outlying limits for sale outside the State. The reduction in the outturn of the cotton crop was mainly due to the "Grow More Food Campaign" rigorously followed in the State.

MYSORE.

Total area under cotton in the state was 46,724 acres. The area was almost 50 per cent less than in the previous years. Sorghum and Bajra (*Setaria italica*) crops were raised in most of the black-cotton soil. Hence the variation.

Area under improved varieties was 10,620 acres. Of those, Co.4 from Madras, with a lint length of 7/8 to 1 inch, 35% ginning and an average of 850—11,00 lbs. yield to an acre and M.A.II with 7/8" lint and 33% ginning and 1,200 lbs. yield per acre were grown on 10,500 acres.

M.A.V., a new selection from Mysore-American, with a lint length of 1 1/8", ginning percentage 35, and an average yield of 900 to 1,200 lbs. is replacing Co.4 and M.A.II. Amongst the Asiatic cottons large areas were grown with Jayawant. American cottons were concentrated in Arasikere, Belur, Kadur and Hassan talukas and Jayawant in Shimoga and Chitaldrug districts. Karunganni to a small extent in ChamaraJanagara area.

The quantity of seed from the American cottons were mainly distributed by the Cotton Marketing Society at Arasikere.

GWALIOR.

The total area under cotton during the year 1945-46 was 3,73,316 acres including *jagirs*.

The improved varieties recommended are :—

- | | |
|--------------------------------|-------------------|
| (i) Cambodia, | (iii) Jarila, and |
| (ii) G.16 (a strain of Malvi), | (iv) Upland. |

In Gwalior State, the greater part of the cotton area is restricted to the Malwa *prant*, whereas Gwalior *prant* grows only about 2,064 acres out of the total area mentioned above.

The main districts growing cotton in Malwa *prant* are Ujjain, Shahapur, Mandsaur, and Sardarpur. Cambodia variety is usually grown on rich well manured "*Adan*" lands in Ujjain and Sardarpur and Mandsaur districts while Malvi variety is chiefly grown in Shahapur and Mandsaur districts. Ujjain district comparatively grows less of Malvi type. Jarila cotton is mainly restricted to Sardarpur district because of proximity of Nimar tract and lighter soils. Jarila is also grown in Shajapur district. Upland is only restricted to Shajapur district in whole of Malwa *prant*.

The quantity of seed of each improved variety controlled and distributed by the department is as given below :—

Cambodia.		Malvi.		Upland.		Jarila.	
Mds.	srs.	Mds.	srs.	Mds.	srs.	Mds.	srs.
591	22	2470	6	228	11	24	10

The quantity of seed distributed in the year by the department fell short of the total area under improved seeds. The remaining area was sown with improved seed purchased by the cultivators from the seed stockists of the department and also from seed stocked by individual villagers as a result of natural spread.

BAHAWALPUR.

1. The total area under cotton in the State during the year 1945 was 3,90,300 acres (American 2,90,000 acres and *desi* 99,400 acres).

2. The area under improved varieties of cotton were ;—

(a) Punjab-American 4F	.. ..	1,99,000 acres.
(b) 289F/K.25, 289F/43, 124F and 199F.		92,000 ,,

Separate figures relating to different varieties under (b) are not available with the Agriculture Department.

(c) Mollisoni	70,000 acres.
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Different varieties of American and *desi* cotton were imported from time to time from the Punjab. Breeding work has not yet been taken up. Type 199F is being grown in a small area at present while 124F is fast replacing 289F/K.25 and 289F/43.

CHAPTER IV.

EXTENSION WORK IN THE PROVINCES AND STATES.

The Seed Distribution and Extension Schemes of the Committee form the real link between the experimental station and the cultivator and in recent years increasing attention has been paid to the development of the extension work with the object of getting the grower to adopt the various improved practices and improved seed evolved as a result of the research schemes of the Committee. The total amount so far spent by the Committee on such schemes amounts to some Rs. 20½ lakhs. During the period under review, there were 19 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) **Jarila Seed Distribution and Extension Scheme.**—This scheme was sanctioned in March 1937, for a period of ten months in the first instance. It was extended in January 1938, for a period of one year, in November 1938, for three years and again in July 1941, for a further period of five years. Its original object was to replace Banilla in the Khandesh tract with Jarila, which is wilt-resistant, over an area of some 1,55,000 acres. In view, however, of the general suitability of Jarila for the Khandesh area, the expansion now aimed at is 8,00,000 acres, out of a total cotton area of 11,00,000. The scheme is operated in five stages of which the first two are the Government Farms at Jalgaon and Bhadgaon. The seed produced at the Jalgaon Farm is used for further multiplication in the wilt affected regions, and that at Bhadgaon Farm for the wilt free zone of Khandesh. In January 1943, the Committee approved of the proposal to close down the seed farm at Bhadgaon and to transfer the seed multiplication work being done there to the Jalgaon Farm and the Mamurabad village adjoining it.

Stages I and II.—The selfed seed from the previous year was sown on an area of 24.10 acres on the farm and gave 6,040 lbs. of seed for multiplication in stage II. The seed of stage II produced from 97 acres was 20,376 lbs. The produce of both stages was ginned in the Farm gin and the lint sold by

auktion at Jalgaon. It fetched Rs. 225/- per *boja* i.e. Rs. 510/- per candy, f.o.r. Bombay, against Bombay Jarila quotation of Rs. 439/- per candy on that day.

Stages III and IV.—Of the 60,37,980 lbs. of Jarila seed distributed by the Department and approved stockists, only 48,64,600 lbs. of seed were utilized for sowing due to unfavourable conditions; the balance, viz., 11,73,380 lbs. was handed over to the Revenue Department for feeding purposes. The controlled area during the year was 2,13,112 (including a reserved area of 66,843 acres) being 90% of the area under Jarila cotton. This, however, falls short of the stipulated area of 3,20,000 acres by 1,06,888 acres; the reduction is attributed to the curtailment of acreage under cotton and adverse seasonal factors. The total area under Jarila (including natural spread) is estimated at 2,34,538 acres against 3,44,267 acres last year.

It is estimated that the growers realised on an average Rs. 18/- per maund of *kapas*. The marketing of Jarila cotton during the year was regarded as satisfactory from the point of view of the premium realised. A total quantity of 2,429 *bojas* of purified Jarila lint was sold at premiums varying from Rs. 10/- to Rs. 51/- over the prevailing Bombay Jarila quotations. The gross extra income realised by the cultivators of Jarila is estimated at Rs. 31,07,626/- i.e. Rs. 13/4/- per acre.

For sowing in 1946-47, the Agricultural Department and approved stockists have stocked 78,00,488 lbs. of seed. In addition, 20,27,350 lbs. of seed have been reserved for emergent use to cover completely the cotton area in Khandesh.

The Cotton Control Act has been applied to the whole of Khandesh tract, making Jarila, the prescribed variety for this tract. Proposals to apply the Cotton Transport Act, in so far as it relates to rail transport only, to this tract are under the consideration of the Government of Bombay.

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

The original object of the scheme was to distribute seed of Banilla to enhance general cotton yields and to improve the quality of the cotton in the

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

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

(c) 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. In August 1946, it was further extended up to the 31st May 1948.

The original object of the scheme was to eliminate local mixtures and to extend pure *Jayawant* and Gadag No. 1 in the Southern Division of the Bombay Province, over an area of 9½ lakhs acres, within a period of five years. During the extension period of the scheme, it is proposed—

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

The scheme is operated from eleven centres for *Jayawant*, viz., Dharwar, Hubli, Nargund, Haveri, Bailhongal, Gokak, Athani, Bagalkot, Hungund, Bijapur and Muddebihal, and from two centres for Gadag No. 1, viz., Gadag

and Ron. Decentralisation is the key-note of the scheme, the idea being that no single agency should have too big an area to cover or too great a responsibility to shoulder.

It is stated that during the year under report, the Department organised 1,18,000 acres of *Jayawant* and 24,400 acres of Gadag No. 1, of which, 1,01,062 acres and 18,698 acres, respectively, were rogued. In all, 41,407 bags of *Jayawant* seed and 10,592 bags of Gadag No. 1 seed were distributed to cover an area of 5,79,700 acres and 1,05,920 acres, respectively. The area under natural spread is estimated at 60,000 acres in the case of *Jayawant* and 20,000 acres in the case of Gadag No. 1 thus bringing the total area under *Jayawant* to 6,39,700 acres and that under Gadag No. 1 to 1,25,920 acres, the corresponding figures for the previous year being 6,17,830 and 1,18,000 acres respectively. It is stated that the areas under these varieties during the year under report would have been much greater but for the application of the Bombay Growth of Food Crops Act and the absence of timely rains for sowing.

The produce of the controlled area amounting to 29,532 docras of *Jayawant* and 11,113 docras of Gadag No. 1 was sold by auction at a premium of Rs. 15/- for *Jayawant* and Rs. 20/- for Gadag No. 1 per *nag* of 1,344 lbs. over the bazar rates. The total gross extra income to the growers of the two improved varieties is estimated at Rs. 47,91,732/-.

The original programme was to stock 1,01,50,000 lbs. of *Jayawant* seed and 20,00,000 lbs. of Gadag No. 1 seed for sowing in the next season but owing to the Bombay Growth of Food Crops Act, the area under these varieties will be appreciably curtailed. Purchases up to the 30th April, 1946, amounted to 56,00,000 lbs. of *Jayawant* and 12,60,000 lbs. of Gadag.

It is reported that Agmarking was continued on an optional basis and that up to the end of April, 1946, the number of bales agmarked were 8,852 of *Jayawant* and 558 of Gadag No. 1. It is feared, however, that unless the millowners appreciate the value of Agmarking by paying adequate prices for Agmarked bales, the Agmarking of cotton would not become popular.

(d) **Scheme for cultivation of 1027 A.L.F. Cotton in Nawapur Taluka.**— This scheme was sanctioned by the Committee in January 1942, for a period of three years and it came into operation on the 4th May, 1942. In January 1945, it was extended for a period of one year. The Committee was informed at that meeting that the total area under cotton in the taluka had decreased

from 25,000 acres in 1942-43 to 18,300 acres in 1943-44 and to 16,000 acres in 1944-45 and that, of this, the area covered with pure seed of 1027 A.L.F. distributed by the Department was 10,000 acres. In February, 1946 the scheme was further extended from 4th July 1946 to 31st March 1946).

The original object of the scheme was to cover an area of 25,000 acres in Nawapur taluka with 1027 A.L.F. cotton. During the 1st extension period, it was proposed to multiply 1027 A.L.F. cotton in the controlled area so as eventually to cover the whole area with it. During the present extension it is proposed to study the results of the comparative trials with Suyog and 1027 A.L.F. with a view to evaluating the suitability of the strains for cultivation in Nawapur taluka.

A total quantity of 168,020 lbs. of seed was distributed during the year by the Taluka Development Association at Nawapur to cover an area of 4,259 acres (against 3,320 acres programmed for) including a certified area of 3,962 acres. The seed obtained from this area is stated to be more than sufficient to cover the whole area of Nawapur taluka.

The results of the four comparative trials undertaken with the object of evaluating the suitability of the two strains, 1027 A.L.F. and Suyog, for cultivation in Nawapur taluka showed that Suyog is superior to 1027 A.L.F. in respect of yield of seed cotton, lint and ginning outturn; in staple length, however, it is shorter than 1027 A.L.F. by 0.4 m.m. Samples of the two varieties have been sent for spinning tests with a view to deciding as to whether 1027 A.L.F. should be replaced by Suyog in Nawapur taluka.

The produce of the current year was pooled and marketed by public auction at a premium of Rs. 5/- per bhar (924 lbs.) over local.

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

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

During the year under review, the Agricultural Department controlled a seed multiplication area of 15,569 acres (including 1,536 acres grown with farm pedigree seed) against an area of 11,051 acres (including 259 acres grown

with farm pedigree seed) in the previous year. The total estimated area under Vijaya during the year was 1,19,927 acres against 89,450 acres in 1944-45. The increase in area is attributed to the modification of the Bombay Growth of Food Crops Act which permitted a slightly larger area to be grown with cotton. Out of a total quantity of 6,22,181 lbs. of Vijaya seed, handled this year (against 7,34,530 lbs. in the previous year), 5,28,221 lbs. were distributed by the Agricultural Department. An additional quantity of 1,83,920 lbs. was distributed directly by the Co-operative Cotton Sale and Seed Supply Societies to cotton growers in parts of Broach and Kaira districts. It is stated that 93,960 lbs. of seed left over with the Department due to the enforcement of the rationing in cotton seed under Bombay Growth of Food Crops Act, were disposed of under revenue permit. The usual rate of multiplication of the area under Vijaya in the tract is said to be 15 times. In all, 3,477 full pressed bales of pure Vijaya were obtained from the controlled area ; of these 3,288 were sold at a premium varying from Rs. 88/- to Rs. 120/- per candy f.o.r. Bombay over March and May Indian Cotton Contract quotations. There are still 189 full pressed bales remaining to be disposed of.

It is stated that the premium obtained by 1027 A.L.F. cotton was not sufficient to compensate for the loss in ginning outturn and that consequently Vijaya seed cotton from the general area was readily purchased by the gin-owners at a premium of Rs. 15/- to Rs. 20/- per bhar of 1,020 lbs. of seed cotton over that of 1027 A.L.F. cotton grown in the tract.

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

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

It is stated that originally the Wagad cotton tract of Ahmedabad district extended over an area of 3,30,000 acres but owing to the application of the Bombay Growth of Food Crops Act and unfavourable season the area under cotton decreased to 1,08,300 acres in the year under report.

During the year, the total quantity of Wagotar seed available for distribution was 1,00,535 lbs. against 1,04,000 lbs. in the previous year. Of this 25,750 lbs. of seed were purchased by the Department, 44,805 lbs. were distributed directly by the approved agents and the remainder was sold by merchants to the farmers. The seed handled by the Department was sufficient to cover an area of 3,800 acres. Owing, however, to unfavourable seasonal conditions the area sown with the improved strain was only 2,813 acres. The estimated quantity of seed expected from this area is 3,25,120 lbs. which will be sufficient to cover an approximate area of 16,750 acres in the ensuing season.

Stages II and III were organized at Jakhavada and Haripura villages in Virangam taluka over an area of 14 and 110 acres respectively. The produce of these two stages has been purchased and ginned under Departmental supervision.

The kalas (dry bolls with seed cotton) of stages IV to VII were purchased by the approved agents at eight centres at a premium of two to four annas per maund of 40 lbs. over the prevailing market rates. The growers of Wagotar cotton are stated to have realised a profit of Rs. 4-12-0 per acre and the estimated gross extra income to the growers over an area of 2,813 acres comes to Rs. 13,361-12-0.

(g) **Scheme for multiplication and distribution of Suyog cotton in Surat tract (South of river Nerbudda).**—This scheme was sanctioned by the Committee in July, 1944, for a period of five years and it came into operation on the 1st April, 1945.

The object of the scheme is to replace 1027 A.L.F. and 1A cottons by Suyog within the next five years, over an area of 2 lakhs acres in British territory in the Surat tract lying South of the river Nerbudda, excluding Nawapur taluka of West Khandesh district.

During the year under report, the Agricultural Department controlled an area of 30,440 acres ; of this an area of 28,959 acres including 348 acres grown with farm pedigreed seed was certified. Out of the total quantity of 8,97,200 lbs. of Suyog seed handled by the Agricultural Department, 8,76,392 lbs. of seed, including 5,202 lbs. from the Government farm at Surat, were distributed by the Agricultural Department and the balance, *viz.*, 20,808 lbs., by the Hansot Co-operative Societies to their members. The number of pressed bales of certified Suyog cotton was 8,225, of which 149 were agmarked with

red labels and 8,076 with black labels. 70% of the certified bales have been disposed of at a premium ranging from Rs. 5/- to Rs. 15/- per candy over 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. In January 1946, it was further extended for a period of five years from the 1st April, 1946, and at the same time was merged with the scheme for financing seed distribution in Sind.

The main objects of the scheme are :—

- (a) Varietal tests of improved strains—Sind American cottons.
- (b) Trials of high quality cottons—Egyptians and imported American cottons.
- (c) Demonstration of cotton cultivation on non-cotton growing areas of new barrage lands.
- (d) Seed multiplication, distribution and extension work.
- (e) Propaganda, demonstration and advisory work in connection with the extension of improved varieties of cotton and better methods of cultivation.
- (f) Assistance to cotton growers in marketing cotton.

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

During the year under review, 9,500 maunds of Sind-Sudhar, 58,500 maunds of M.4 and 2,000 maunds of N.R. seed were distributed by the Department on the Left Bank against 12,150 maunds of Sind-Sudhar and 33,300 maunds of M.4 distributed in the previous year. The total area under cotton on the Left Bank is estimated at 8,50,000 acres against 8,80,500 acres in the previous year the area under improved varieties being 5,47,000 acres (67,000 acres under Sind-

Sudhar and 4,80,000 acres under M.4); on the Right Bank and North Sind the estimated area is 32,671 acres, the improved varieties covering 14,000 acres (13,000 acres under M.4 and 1,000 acres under 4F/98). The percentage of the area under improved strains on the Left Bank is 64.3 % of the total cotton area, against 62.3 in 1944-45.

Certified *kapas* on the Left Bank fetched a premium of Re. -/6/- to -/8/- per maund, the gross extra income to the growers being estimated at Rs. 1,12,500/-.

(b) **Financing of Seed Distribution.**—This scheme was sanctioned by the Committee in January 1938, for a period of three years, subject to the condition that it would not be put into operation until the Rules under the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, have been brought into force. This condition was fulfilled on 18th April, 1941, and the scheme came into operation in January, 1942. In July 1944 it was extended for a period of one year and three months, up to the 31st March, 1946. In January 1946, the Committee approved of the amalgamation of this scheme with the Sind seed distribution and extension scheme and extended the combined scheme for a period of five years from the 1st April, 1946.

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

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

		<i>Sind-Sudhar</i>	<i>M-4.</i>	<i>Total.</i>
		Acres.	Acres.	Acres.
'A' class growers .. ..	.. ..	—	1,272	1,272
'B' class growers .. ..	.. ..	7,227	21,058	28,285
General growers .. ..	.. ..	9,158	18,767	27,925
		16,385	41,097	57,482

It is stated that M-4, on account of its satisfactory performance under varied conditions in all parts of the Province, including Nawabshah district where other American types have failed, its earlier maturation than Sind-

Sudhar by 30 days as a result of which it escapes boll-worm attack and damage by early frosts, its decidedly higher yield and good staple length and ginning outturn, has become more popular than Sind-Sudhar.

The quantity of pure seed purchased by the Department for distribution is shown below :—

	Left Bank.	Right Bank.	North Sind.
	mds.	mds.	mds.
M-4	58,500	1,300	250
Sind-Sudhar	9,500	—	—
Sind-N.R.	2,000	—	—

It is reported that owing to the collection of only 60% of the estimated yield of *kapas*, there was dearth of cotton seed in the Province.

On the Right bank, out of a total quantity of 4,524 maunds available for distribution, only 1,250 maunds of seed could be utilised due to the late receipt of inundation water ; the balance of the seed was sold for feeding purposes.

CENTRAL PROVINCES AND BERAR.

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

During the year under report a total area of 15,58,606 acres was grown with Jarila cotton of which 47,600 acres (against 40,000 acres originally programmed) were covered with 7,958 maunds of pure seed of stages III, IV and V distributed by the Department. A total quantity of 27,670 maunds of seed was stocked for sowing about 1.66 lacs acres in the 1946-47 season.

In all 3,937 bales were produced from the controlled area. The average price obtained per *khandi* of lint f.o.r. Bombay basis was Rs. 494/- against the premium of Rs. 47-12-0 realised over the average Indian Cotton Contract price. The gross extra income realised by the growers of Jarila is estimated at Rs. 22,90,663/-.

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. This scheme came into operation on the 20th July, 1942, and terminated on the 30th September 1946. Its object was to improve the standard of Cambodia cotton in Salem district by replacing the existing Co.1 and Co.2 cotton strains with Co.3.

The total area cover by the improved strain in the past year was 31,000 acres of which the area maintained under seed farm conditions by the three Co-operative Marketing Societies at Trichengode, Salem and Rasipuram was 7,064 acres. In all, 270 candies and 292 lbs. of lint were obtained from the produce of the seed farm and sold at rates varying from Rs. 570/- to Rs. 650/- per candy. The premium obtained for a *pothi* (305 lbs.) of seed cotton ranged from Rs. 3/- to Rs. 15/- over local Cambodia. The estimated gross extra income realised by the growers of Co.3 is stated to be Rs. 8,37,000/-

(b) **Scheme for multiplication and distribution of Karunganni cotton in Ramnad and Tinnevely districts.**—This scheme was sanctioned by the Committee in July 1944, for a period of 3 years and 4 months. The scheme came into operation on the 15th October, 1945. The object of the scheme is to distribute K.1 seed over an area of about 3.5 lakhs of acres or roughly 70% of the total area under cotton in the districts of Madura, Ramnad and Tinnevely, south of the river Vaigai.

During the year under review, the entire quantity of 79,680 lbs. of pure seed obtained from the inner seed farm area of 700 acres was purchased by the Department for distribution to the outer seed farm area; of this, the seed distribution in Koilpatti and Aruppukotai taluks was 44,146 lbs. to cover 3,900 acres and 8,736 lbs. to cover 400 acres, respectively. It is stated that the entire target area of 6,250 acres could not be covered for two reasons, *viz.*, (i) difficulties experienced in the transport of seeds by rail, and (ii) the late appointment of the staff. The unsold stock is reported to have been disposed of as cattle food.

The seed farm cultivators of the outer area were unwilling to pool their produce as there was great variation in quality due to damage by rains and as the Co-operative Societies were unable to provide godown facilities or

advance loans on the pledged produce. The produce of the inner seed farm amounting to 1,37,208 lbs. of seed cotton was ginned under departmental supervision and the lint sold at prices varying from Rs. 500/- to Rs. 540/- per candy of 784 lbs. against Rs. 490/- to Rs. 525/- for local Karunganni. The growers of pure K.1 are stated to have realised a profit of Rs. 5/- per acre.

Owing to low acreage under cotton and subnormal yields, the total quantity of seed obtained for sowing next year, was only 2,367 bags (2,65,136 lbs.) or 53% of the anticipated production of 4,463 bags.

(c) **Scheme for maintenance of nucleus of pure seed of improved varieties of cotton in Madras Province.**—The scheme was sanctioned by the Committee in January, 1938, for a period of five years and came into operation on the 12th September, 1938. In July, 1943 it was extended for a further period of five years for the maintenance of nucleus of the four strains, Co.2, Co.4, K.1 and N.14.

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

Name of variety.	Area sowed.	Quantity of sowed seed produced.	How disposed of.
Co.2	.. Acres. 1	lbs. 424	For Central Farm sowings in 1946-47 and for inner seed farm at Tiruppur.
Co.4	.. 0.70	158	For sowing the bulk areas on the Farm during 1946 summer.
K.1	.. 2	682	For sowing Farm bulk area in 1946-47.
N.14	.. 2	170	For sowing on the Farm and for raising pure seed blocks under non-official management.

UNITED PROVINCES.

Scheme for Distribution, Extension and Marketing of Perso-American Cotton in Western United Provinces.—This scheme was sanctioned in January, 1942 for a period of four years. The agricultural and marketing part of the scheme came into operation on the 6th May, 1942. In January, 1946, it was further extended up to the 31st August, 1946.

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

It is reported that owing to unfavourable seasonal conditions the average yield of Perso-American is estimated at about Re. 0-8-0 in the rupee ; this works out to about 3 mds. of *kapas* per acre against 4 maunds in the previous season, The produce obtained from stages III and IV, amounting to 6,820 maunds was purchased by the Agricultural Department at a premium of Rs. 4/- to Rs. 10/- per maund of *kapas* over *desi* cotton. The pure seed thus secured will suffice to cover an area of about 35,000 acres next season.

During the year under report, 522 bales were obtained from the produce of stage V, and 170 bales from that of stages I to IV. Premia ranging from Rs. 50/- to Rs. 125/- per candy 'on' Jarila were offered for these bales by the mills at Hathras, Ahmedabad and Bombay. However, in view of the discussion at the last meeting of the Committee, it was decided to ask Major Pocock to secure offers from the mills at Cawnpore.

The gross extra income to the cultivators by growing Perso-American cotton over an area of 21,710 acres is estimated at Rs. 3,09,392/-.

BARODA STATE.

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

It is stated that, during the year under report, efforts were mainly directed in extending the area under Vijaya cotton in Waghodia and Savli talukas in which the total area under cotton had fallen in 1944-45 to 67,159 acres ; 93% of this area, i.e., 62,370 acres, had been covered with Vijaya and B.9, the acreage under Vijaya alone being 43,274 acres which is 65% of the total area.

The Department issued 1,21,860 lbs. of B. 9 seed to cover an area of 19,096 acres (412 acres of A grade and 2,156 acres of B grade being Departmentally

controlled) and 6,80,541 lbs. of Vijaya seed for sowing over an estimated area of 43,274 acres of which 10,922 acres, (consisting of 2,122 acres of A grade and 8,800 acres of B grade) were controlled by the Department.

In all, 49,260 maunds of certified *kapas* (40,596 maunds of Vijaya and 8,664 maunds of B.9) and 3,000 F.P. bales (2,300 of Vijaya and 700 of B.9, were marketed at different centres. Certified Vijaya cotton fetched a premium of Rs. 4/- per bhar over ordinary cotton whilst the agmarked lint of Vijaya obtained a premium of Rs. 10/- per candy. The gross extra income to the growers of Vijaya cotton on an area of 43,274 acres is estimated at Rs. 4,05,693/-

(b) **Scheme for creation of a pure Wagad Zone in Mehsana district in Baroda State.**—This scheme was sanctioned by the Committee in January 1943 for a period of two years and it came into operation on the 14th December, 1943, and terminated on the 31st December 1945.

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

During the year under report, 2,49,000 lbs. of seed of Wagad 8 and 93,580 lbs. of Wagotar seed were distributed by the Department for sowing 14,647 and 3,364 acres respectively. An additional area of 28,600 acres was covered by Wagad under natural spread. Out of an area of 3,364 acres covered with pure seed of Wagotar, 3,360 acres, (including 699 acres of A grade and 2,520 acres of B grade) were controlled by the Department. The certified produce from the controlled area was offered a premium of 12 as. to Re. 1/- per standard maund of *kapas* over the local. the total gross extra income to the growers of Wagotar cotton is estimated at Rs. 40,368/- or Rs. 12/- per acre.

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

During the year under report, the Department issued 29,04,407 lbs. of Vijaya seed, including 16,01,775 lbs. of commercial seed of B grade of 1944-45,

to cover some 200,000 acres, representing the whole area under cotton in the black soil tract in Baroda district ; of this, 60,340 acres (4 acres of S.F. seed, 415 acres of nucleus seed, 9,087 acres of A grade and 50,834 acres of B grade) were under departmental control. In all 20,742 F.P. bales (14,499 bales by the Department and 6,243 bales by Co-operative Sale Societies) were ginned, agmarked and marketed. The premium obtained for certified *kapas* was Rs. 4/- per bhar and that for certified lint Rs. 10/- per candy over non-certified Vijaya. The total gross extra income to the growers of Vijaya cotton on an area of 2,00,000 acres is estimated at Rs. 34,00,000/-, *i.e.*, Rs. 17/- per acre.

(d) **Scheme for distribution of Suyog cotton seed in Navsari district of Baroda State.**—This scheme was sanctioned by the Committee in January, 1945, for a period of five years. It came into operation on the 1st April, 1945. The scheme aims at the replacement of 1027 A.L.F. cotton over an area of 210,000 acres in Navsari district by the improved new strain 'Suyog.'

During the year under report, the Department distributed a total quantity of 3,53,430 lbs. of Suyog seed ; of the total area sown, 22,134 acres (4 acres of S.F. seed, 130 acres of nucleus seed, 2,597 acres of A grade and 19,403 acres of B grade) were under departmental control. It is stated that the marketing of the 1945-46 area had not been commenced during the period covered by the report. As regards the 1944-45 crop, 3,820 bales of certified cotton were agmarked with the Suyog black label and sold under departmental control at a premium of Rs. 5/- per bale.

MYSORE STATE.

Scheme for multiplication and distribution of Sel. 69 and M.A.V in Mysore.—This scheme was sanctioned by the Committee in January 1945, for a period of 5 years. The scheme came into operation on the 1st June, 1946. The object of the scheme is to extend the cultivation of (i) Sel. 69, an improved Asiatic cotton, in the black soil tract of the State covering an area of about 64,000 acres, and (ii) Mysore-American, M.A.V in the red soil tract extending from 16,000 to 20,000 acres, under rainfed and irrigated conditions.

Sel. 69 :—Ten lbs. of selfed seed, obtained from an area of 1 acre, was utilised to raise a pure crop at the Babbur Farm, the subvention farm at Madadihalli and two other demonstration plots.

M.A.V :—Bulk seeds were distributed to cover an area of about 1,200 acres, at the Irwin Canal Farm, five subvention farms and 8 demonstration plots. It is reported that under irrigated conditions this variety gave an yield of 35 maunds. (probably Madras maund of 25 lbs.) per acre.

CHAPTER V.

COTTON STATISTICS.

The total area under cotton in India during the year under review was 14,478,000 acres, showing a decrease of 365,000 acres or 2.5 per cent as compared with the previous year. The reduced acreage was due mainly to the "Grow More Food" campaign and the recommendations made by the Committee for curtailment of the area under short staple and low grade medium staple cottons. The reduction was chiefly in the provinces of Bombay, Punjab, Madras and Sind and in Rajputana and Gwalior States. The Central Provinces and Berar, Bengal, Hyderabad and Central India recorded increased acreage. The total estimated outturn for 1945-46 was 3,438,000 bales, against 3,580,000 bales in 1944-45 and was the smallest on record since 1911-12 when the production was 3,288,000 bales.

INDIAN COTTON SITUATION 1945-46.

During the opening month of the season under review, the September contract remained grounded at the floor owing to the unwillingness of buyers in that contract to take delivery and Government was forced to put into operation their buying plan which lasted till the September delivery matured on the 25th of the month. The attractive prices induced moderate buying by local spinners while there were also good export enquiries from Liverpool, France and Spain. The market ruled steady during the first half of October but thereafter a sagging tendency prevailed owing to reported attempts of the American Government to re-establish export trade with liberated countries by the extension of financial credits. The Indian Cotton Contract January delivery which opened at Rs. 409/- on the 1st of October declined to Rs. 386/- on the 1st November. Owing to demand in the spot market, hardening of prices in up-country centres and the increasing premium offered for staple varieties, the market remained steady and the Indian Cotton Contract January delivery rose to Rs. 414/- by the end of November. The market continued to be steady during December when local spinners were active buyers. From the opening quotation of Rs. 415/- for the Indian Cotton Contract January delivery, the market advanced until the quotation was Rs. 429/- towards the end of the month. Prices firmed up during the first week of January and after

a setback, the market was again steady. Owing to the issue of the Domone-tisation Ordinance, there was again a setback in prices. The improvement in the ready market had, however, a favourable effect and January Delivery matured at Rs. 434/-. On the 26th January, March Delivery was quoted at Rs 435/-. Due to the continued strength of the spot market, prices firmed up during February and after minor setbacks the market closed steady on the last day of the month at Rs. 464/-. Meanwhile some of the staple cottons like 289F, L.S.S. etc. were being quoted at or near the ceilings. In early March, the market looked up again on all-round support with the result that Jarila September 1946 Delivery was quoted at Rs. 492/-, the highest price for the season. At this level, however, support slackened off. By a notification the Government of India empowered the Textile Commissioner to requisition cotton to be sold at such prices as the Commissioner would specify. This notification coupled with the report that Government intended to fix individual ceilings for lengths above the basic staples unnerved the market and brought about a sharp decline in prices. On April 12, the Government of India announced the fixation of ceilings for lengths above the basic staple. Government also announced their decision to authorise imports under licence of foreign cottons stapling 7/8" and longer provided that such cotton was sold to a mill and would be paid for in sterling. Further, the export of Indian cotton stapling 13/16" and over was banned, unless such cotton was sold prior to April 13, 1946. The lower price level attracted widespread speculative support with the result that despite bearish factors, prices rallied from Rs. 459/- on the 12th April to Rs. 479/- on the 2nd May for May Delivery. Subsequently, owing to disintegration of bull support, prices staged a sharp decline and May Delivery matured at Rs. 443/- on the 25th May. This was followed by a recovery in June and July, when prices of long staple cottons reached their ceilings. The bullish fervour was kept up by a veritable boom in the American cotton markets. On August 2, the Government of India announced that trading in ready and delivery contracts for the 1946-47 season's cotton crop had been permitted by them subject to the conditions including ceilings and floors laid down in respect of similar contracts for the 1945-46 crop. On the 14th August, the Government of India issued a press note to the effect (i) that the ceiling prices announced on January 19, 1946, and subsequently extended in a notification issued on April 12, 1946, were to be continued into the 1946-47 season and made applicable to both the 1945-46 and 1946-47 crops, (ii) that cotton exports through trade channels were to be allowed only to the extent of 200,000 bales for the four months ending December 1946 and were to be

confined only to cotton stapling 11/16" and lower and (iii) that quotas would be confined to established shippers and for fixed destinations. The announcement had a bearish effect on the market which was further aggravated by anticipated reduction in consumption following the adoption of the 48 hour week by the Indian mill industry and the uncertainty regarding the grant of early permission for trading in new crops. The result was that Jarila September 1946 delivery touched its lowest level of Rs. 401/- on the 28th August, 1946.

As regards the statistical position of Indian cotton, the season started with an estimated carryover of 30.8 lakhs bales (400 lbs. net each) with the trade (excluding spinning mills). On the basis of the figures of cotton pressed and unpressed cotton consumed in mills, the actual crop in 1945-46 is estimated at about 37.5 lakhs bales (excluding extra-factory consumption of 4.5 lakhs bales), of which 29.5 lakhs bales are estimated to have been of staple length 7/8" and above. The receipts at mills of Indian cotton during the season amounted to 40.1 lakhs bales (400 lbs. net each), of which about 30.1 lakhs bales were of staple length 7/8" and above. The total exports amounted to 10.4 lakhs bales, of which 3.9 lakhs bales were of staple length 7/8" and above.

On the basis of the figures of actual production (based on cotton pressed plus unpressed cotton consumed in mills), mill receipts and exports, the carry-over of Indian cotton with the trade, excluding spinning mills, at the end of the season, is estimated at 17.8 lakhs bales as shown below :—

	In lakhs of bales of 400 lbs. net (excludes extra-factory consumption.)		
	Below 7/8"	7/8" and above.	Total.
Estimated stocks held by the trade (excluding spinning mills) on 31st August, 1945.. ..	17.5	13.3	30.8
Probable production in 1945-46	8.0	29.5	37.5
Total supply	25.5	42.8	68.3
Receipts at mills in 1945-46	10.0	30.1	40.1
Exports during 1945-46	6.5	3.9	10.4
Total distribution	16.5	34.0	50.5
Estimated stocks held by the trade on 31st August, 1946	9.0	8.8	17.8

STAPLE LENGTH OF INDIAN COTTON CROP.

Owing to delay in the receipt of information from certain Provinces and States, the usual report on the estimated production of cotton according to staple length for the 1945-46 season could not be issued during the season under review.

DEMAND FOR VARIOUS TYPES OF INDIAN COTTON.

Statistics relating to internal and export demand for various types of Indian cotton are compiled from the information collected on a voluntary basis and are published in Statistical Leaflets Nos. 3 and 4. The importance of such statistics to the trade and industry and to those entrusted with the responsibility of shaping and directing the cotton policy of the country has been stressed in previous reports. The statistics relating to mill receipts and exports of cotton classified by varieties for the 1945-46 season are not yet complete and the publication of the relevant leaflets has been held up owing to delay in the receipt of the returns from some mills and exporters.

The Committee, at its meeting in January 1945, endorsed the recommendation of the Cotton Movements Committee that the compilation from compulsory returns of monthly figures covering Indian mill consumption, stocks and receipts of the various descriptions of Indian and foreign cotton, which was being undertaken by that Committee, should be continued after the war as a permanent feature of cotton statistics, the idea being that the statistics in question should be collected by the Indian Central Cotton Committee. In this connection, the Government of India enquired whether any changes in the form in which the statistics were being collected were necessary, particularly as the classification used in that form is not the same as used in the Committee's Statistical Leaflets Nos. 2 and 3. The view was expressed that it would be desirable to adopt a classification which, while convenient from the point of view of trade practice, should also be amenable to re-classification under the heads long staple, medium staple and short staple cotton. After extended discussion, the Committee felt that it would throw too much burden on the mills, if they were to be asked to supply information monthly in respect of Indian cotton under 46 classifications in the Committee's form used in collecting the statistics annually on a voluntary basis. The consensus of opinion was that it would be enough if such detailed information were called for only once a year and that for the purposes of monthly returns the form in which information was at present being obtained by the Cotton Movements Com-

mittee should suffice. It was also suggested that the weight of bale should be clarified in the Cotton Movements Committee's form as gross weight 400 lbs. or net weight 392 lbs. It was further decided that Government should be requested to empower the Indian Central Cotton Committee by suitable legislation to collect and publish the statistics in question. The views of the Committee have been communicated to the Government of India.

STOCKS OF COTTON HELD IN THE COUNTRY.

The position regarding the collection of statistics of stocks of cotton held by the trade in the country was reviewed by the Committee at its meeting in February 1946. It was noted with satisfaction that attempts to collect the information for the 31st August, 1945, through local official sources, on a voluntary basis, had yielded satisfactory results. The data indicated that the difference between the figures of the all-India trade stocks as collected by the Committee and as estimated by the trade was about 2.3 lakhs bales only as compared to about 12.0 lakhs bales in 1944. In view of the importance of having complete information regarding the end-season stocks of different varieties of cotton held by the trade in the country, the Committee recommended that the major cotton growing Provinces and States should be pressed to take early steps to introduce the necessary legislation for the purpose. Action was taken accordingly.

Concerted attempts were continued to be made to collect the fullest information in respect of stocks of cotton held in the country on the last day of the cotton season. The results of the census for the 31st August, 1946, are, however, not yet complete; the preliminary figures so far available indicate that the stocks on the 31st August, 1946, were probably around 20 to 22 lakhs bales. The lower figure of calculated carryover on the same date arrived at elsewhere appears to be vitiated to some extent by unknown factors. Trade associations, market committees and other authorities gave valuable assistance in the collection of the information and to them the thanks of the Committee are due.

As the season adopted for the cotton crop of the Madras Province is the year ending 31st January, figures of stocks of cotton held in the province on this date are collected annually in addition to the figures relating to the 31st August. The relevant figures for the 31st January, 1946, 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 1931-32 to 1945-46 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.*, 3,871,022 bales, showed a decrease of 287,642 bales as compared with the previous season. Out of this decrease, mills in British India and Indian States accounted for 88 per cent and 12 per cent, respectively. Mills in Bombay Island, Ajmer-Merwara and Mysore State showed slight increases in consumption while other areas recorded decreases.

EXPORTS.

The exports of Indian cotton from British India during the season totalled 1,035,000 bales against 406,000 bales in 1944-45. On the average of the three financial years ending 1945-46 the value of cotton (including waste) exported from British India formed 2.5 per cent of the total value of exports of "Raw materials and produce and articles mainly unmanufactured" and 0.6 per cent of the total value of all merchandise exported.

STATISTICS OF COTTON PRESSED.

During the season under review 2,558,735 bales of cotton were pressed in British India and 1,022,579 bales in Indian States, making a total of 3,581,314 bales for all-India; the corresponding figures for 1944-45 were 2,697,160, 1,120,600 and 3,817,760 bales, respectively. For India as a whole, the average net weight per bale of cotton pressed during the season under report amounted to 388 lbs. against 390 lbs. in the previous season.

UNPRESSED (LOOSE) COTTON STATISTICS.

The statistics of cotton pressed do not account for the whole of the Indian cotton crop as, apart from the quantity utilised for extra-factory consumption, chiefly in the form of *kapas*, mills situated near cotton growing areas often use considerable quantities of ginned, unpressed cotton. During the year, 282,589 bales of unpressed cotton were consumed in mills in India against 336,233 bales during the preceding year. The relevant figures for the years 1931-32 to 1945-46 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 avail-

able, both ginned unpressed cotton and *kapas* are also utilised for domestic purposes, such as hand-spinning, making of quilts, mattresses, etc., for which there are no reliable data. If ginning returns were instituted, all that would be required for arriving at the actual crop is a reliable estimate of the quantity of *kapas* used for domestic purposes. The ginning and pressing returns would, at the same time, serve as a check on each other. The submission of ginning returns is now in force in the Central Provinces and Berar, Bombay Province, Bengal, Sind, the United Provinces, Madras Province and Ajmer-Merwara and certain Indian States. The Punjab Government have also issued the necessary notification making it obligatory on all ginning factories in that province to submit weekly returns of cotton ginned in the prescribed form.

APPLICATION OF INDUSTRIAL STATISTICS ACT, 1942, AND RULES THEREUNDER TO COTTON GINNING AND PRESSING INDUSTRY

The Committee considered a letter from the Director of Industrial Statistics, Government of India, Department of Industries and Supplies, forwarding drafts of Parts (E) and (F) of the form of return relating to cotton ginning and pressing industry, proposed to be instituted under the Census of Manufacturing Industries Rules, 1945. The Rules provide for the collection of industrial statistics for the year ending 31st December in respect of all notified industries except the sugar industry for which the period prescribed is the year ending 30th June. In making detailed suggestions on the various items included in the draft form, the Committee expressed the opinion that it would be most difficult to give correctly the "ex-factory net selling value" in the case of cotton bales ginned and pressed by a factory and recommended that the column providing for this information in Part (F) of the form should be deleted. The question of the period to which the return prescribed for the cotton ginning and pressing industry should relate was discussed and it was recommended that the period should be the cotton year ending 31st August, which, apart from being more appropriate, would obviate the inconvenience that would be caused if factories were required to submit the return in the middle of the season.

IMPROVEMENT OF COTTON FORECASTS.

The all-India cotton forecasts of the 1944-45 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 1944-45 was estimated at 45.3 lakhs bales against 35.4 lakhs bales forecasted in the Final Cotton Forecast for 1944-45, the latter being short of the actual by 22%. The discrepancy lay mainly in the forecast estimates of the United Provinces, the Punjab, Bombay Province, Madras Province, Hyderabad State, Rajputana and Mysore States. The attention of the forecasting authorities in the Provinces and States was drawn, where necessary, to the discrepancies between the forecasts and the estimated actual crop.

In connection with the estimate of extra-factory consumption which is taken at 450,000 bales per annum, it was suggested that, as this estimate is based on the results of enquiries conducted by the Committee in 1933-36, fresh enquiries should now be undertaken particularly in the Punjab and the United Provinces, to find out whether any modification is required in the estimate under present conditions and owing to changes in population. The desirability of conducting such enquiries periodically, say, once every five years, was considered. After extended discussion, the Committee recommended that Dr. Panse should be asked to go into the matter and prepare a sample survey scheme, on an all-India basis, for the consideration of the Committee at its next meeting. It was agreed that meanwhile enquiries should be made of the forecasting authorities in the major cotton growing Provinces and States as to the appropriate local agency (as for instance, the Board of Economic Enquiry in the Punjab) through whom the required information should be collected and the extent to which such agencies would be prepared to help in the matter.

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.

PUBLICATION OF MANUAL ON PREPARATION OF ALL-INDIA COTTON FORECASTS IN INDIAN LANGUAGES.

Realising the need for an up-to-date publication explaining the procedure followed in the preparation of official cotton forecasts in India, the Committee, in January 1943, decided that a note on the subject should be compiled and published for general information. As an outcome of that decision, the publication entitled "A Manual on the preparation of All-India Cotton Crop Forecasts" was issued by the Committee in 1944. In this connection, the question of publishing the Manual in the principal Indian languages was considered

and the Committee agreed that the Manual should be translated into Marathi and five other main Indian languages, *viz.*, Gujerati, Hindi, Urdu, Tamil and Telugu, current in the major cotton growing Provinces. It was further decided that 500 leaflets in each of the languages mentioned should be printed at the cost of the Committee and passed on to Directors of Agriculture concerned for dissemination.

QUESTION OF ADVANCEMENT OF DATES OF PUBLICATION OF THIRD AND FOURTH COTTON FORECASTS.

The Committee considered a suggestion from the Registrar of Co-operative Societies, Bombay Province, for the advancement of the dates of publication of the Third and Fourth Cotton Forecasts to the 1st December and 1st January from the 15th December and 15th February respectively, as at present. It was represented that such advancement would particularly be in the interests of the growers of Jarila cotton in West Khandesh. As there was not much difference between the December estimates of the Jarila crop and the harvest results reported in the February forecasts and as the existing dates of publication of cotton forecasts were arrived at in consultation with the various local authorities after full consideration of the varying seasons of cultivation in the different parts of India and with due regard to the requirements of the cotton trade, the Committee was not in favour of any change being made in the existing dates except on very strong grounds, affecting broad interests of an all-India character. It was, however, thought that the object in view could probably be secured by amplifying the existing Second and Third Intermediate Reports on the cotton crop of Bombay, by the inclusion therein of the desired information. This aspect of the question is being investigated in consultation with the Director of Agriculture, Bombay Province.

PUBLICATION OF WEEKLY WEATHER AND CROP REPORTS IN RESPECT OF COTTON GROWING INDIAN STATES.

A suggestion was received that official reports should be issued weekly on the progress of the cotton crop in the various Provinces and States on the lines of the weekly weather reports published in the U.S.A. Most of the cotton growing provinces already publish weekly reports on the progress of crops, including cotton, in their provincial Gazettes and these are reproduced in the Indian Trade Journal under the heading "Weather and Crop Reports." No arrangements exist at present for the publication of such weekly reports in respect of cotton growing Indian States. The proposal that the Committee

should make direct arrangements with Indian States for the supply of weekly weather and crop reports, with special reference to cotton, on the lines of the reports published at present by the Provinces was accepted. In accordance with the decision of the Committee, the States of Baroda, Hyderabad, Mysore, Gwalior, Indore, Kolhapur, Bikaner and Mewar and the Punjab States have been addressed in this connection for the supply of the required information.

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

The revised classification as approved by the Committee has been referred to the Provinces and Indian States concerned for their concurrence and for defining, where more than one variety is grown, the exact delimitation of the areas under each variety. Most of the replies from the Provinces and States have been received and it is hoped to give effect to the classification as early as possible.

ACCURACY OF THE ALL-INDIA COTTON FORECASTS.

The publication of Statistical Leaflet No. 5 relating to the above was suspended during the war, commencing with the issue for the 1941-42 season. It has now been decided to resume publication of this Leaflet.

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

The object of this scheme is to provide a suitable technique for conducting crop-cutting experiments on cotton which form the most reliable direct basis for estimation of yield. The scheme was originally sanctioned by the Committee in July 1942 for a period of one year. It came into operation on the 15th October, 1942, the venue of experiments being the Akola district. At its meeting in July 1943, the Committee agreed to extend the scheme to the Buldana district for a period of one year. Crop-cutting experiments were accordingly carried out during 1943-44 in the Akola and Buldana districts for estimating the yield of cotton in the two districts. Side by side, arrangements were made to ascertain, by executive enquiries, the movement of loose cotton in and out of these two districts so that this information together with the statistics of cotton pressed already available could be used as an independent check on the results of the crop-cutting experiments. The reliability of yield estimates obtained from the crop-cutting scheme was borne out by a comparison with the results obtained from the executive enquiries. In July 1944, the Com-

mittee approved of the proposals received from the Director of Land Records, Central Provinces and Berar, for extending the scheme to the whole cotton tract of the Province for a period of one year in the first instance, the object being to determine accurately the average yield of *kapas* per acre and the total production for the whole of the cotton area in the Province, by the method of harvesting random plots. At the same time it was intended to train the staff of the Land Records and Revenue Departments in the practical working of the method so that the work could ultimately be taken over by these Departments as a routine procedure for carrying out crop-cutting experiments.

In July 1945, the Committee approved of a further extension of the scheme for a period of one year. The practicability of the random sampling technique and the trustworthiness of the results obtained having been fully demonstrated by the first three years' work, it was considered necessary to take the experiment to the final stage in which the field work would be organised in such a manner that it could be entrusted completely to the staff of the Revenue and Land Records Departments primarily responsible for the crop-cutting work in the Province.

This was the second Provincial survey for estimation of average yield per acre and total production of cotton. As in the previous year, the survey was carried out in all four districts of Berar, *viz.*, Buldana, Akola, Amraoti, and Yeotmal, three districts in the Central Provinces, *viz.*, Nimar, Wardha and Nagpur and the Harda tahsil of Hoshangabad district, Warora tahsil of Chanda district and Sausar tahsil of Chindwara district. In all, 35 tahsils, having a cotton area of 2.83 million acres or 98.9 per cent. of the total cotton acreage in the Province were included in the scheme. The entire field work and supervision were entrusted to the Land Records staff. Consequently, Revenue Inspectors' Circles were taken as the sub-divisions for selection of villages in place of tahsils in the previous surveys. Two or three random villages were selected in each Circle depending on the cotton area in the Circle and three cotton growing fields were randomly selected in each village. In each field a plot 1/10 acre size (132' long and 33' broad) was located in a random position for harvest. In all, there were 355 villages and 1,005 crop-cutting plots, against 204 villages and 816 plots in the last survey.

The average yield of *kapas* per acre for the whole province was estimated at 195.6 lbs. as against 174.1 lbs. last year. For Berar, the estimate for 1945-46 was 199.3 lbs. and for Central Provinces 181.6 lbs. Individual

districts in Berar gave about 200 lbs. per acre but there was considerable variation in the Central Provinces; the yield for Nimar was 227.4 lbs. per acre, the highest district estimate for the season, while for Wardha it was 158.1 lbs. There was close agreement between revenue estimates and survey estimates during 1945-46, as the Land Records staff concerned with forecasting yield was intimately connected with the survey scheme.

Employing actual ginning outturns, based on reports from ginning factories, covering roughly over one-fifth of the total production in the province, and the cotton acreage figures according to the final forecast, the total provincial production is estimated at 481,504 bales with a standard error of 13,091 bales. The revenue estimate when recalculated with the correct ginning outturn comes to 501,116 bales.

The statistical analysis of the plot yields indicates that by adopting the present plan, provincial estimates can be obtained with a high degree of accuracy and district estimates with reasonable accuracy.

The usefulness of the survey in providing reliable forecasts of yield in addition to estimates of actual yield was put to a practical test during 1945-46 and estimates based on the crop-cutting plots were furnished to Provincial authorities in time before issuing the third and fourth cotton forecasts. The former was based on anna valuation of plots while the latter was based on actual yields as the bulk of the picking was over when the estimate was required.

The desirability of co-ordination of the surveys on crops other than cotton carried out by the Imperial Council of Agricultural Research and those on cotton conducted by the Committee was stressed with a view to ensuring uniformity in regard to the detailed instructions to be followed in the surveys undertaken. The Committee was informed, however, that such co-ordination already existed and that the detailed instructions only varied, where necessary, to suit the needs of a particular crop.

Proposals for the extension of the scheme for a further period of two years, *viz.*, 1946-47 and 1947-48 were approved by the Committee at its meeting held in August 1946. The purely experimental stage of the work having been completed, it was proposed that the Land Records Department should undertake to continue the survey during the extension period in co-operation with the Indian Central Cotton Committee. During this transitional period of two years, the training of the field staff was proposed to be intensified to bring

the superior staff of the Revenue and Land Records Departments into closer touch with the scheme. The opportunity would also be utilised by the Provincial Government to study the working of the survey carefully, with a view to taking over the work permanently at the end of this period.

REPORT ON INVESTIGATION INTO PLOT SIZE IN RELATION TO CROP CUTTING SURVEYS ON COTTON.

The above investigation was an offshoot of the crop-estimating survey scheme in the Central Provinces and Berar. The Committee considered the Report and approved of the suggestion contained therein that in future crop-cutting surveys on cotton, plots of 1/10 acre should be adopted as the standard in rain-fed tracts and plots of 1/20 acre in irrigated tracts. In accordance with the recommendation of the Committee, a copy of the report was sent to the forecasting authorities in the major cotton growing Provinces and States for information and guidance.

SCHEME FOR CROP ESTIMATING SURVEY ON COTTON IN THE PUNJAB.

Proposals for a scheme for crop estimating survey on cotton in the Punjab, for one year, received from the Director of Agriculture, Punjab, were approved by the Committee at its meeting in August 1946. The objects of the scheme are (1) to estimate the average yield of cotton per acre for each district as well as for the whole Province, (2) to find out the total production of cotton in the Punjab, (3) to obtain normal or standard yields for each district and (4) to provide technical information on the planning of future surveys. The scheme is not expected to be put into operation till the *kharif* 1947-48 crop owing to insufficiency of staff.

PUBLICATIONS

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

- (1) Statistical Leaflet No. 1—Twelfth Issue (1944-45), "Report on the staple length of the Indian cotton crop of 1944-45 season."
- (2) Statistical Leaflet No. 2—Twelfth Issue (1944-45), "Stocks of Indian raw cotton held in India by the mills and the trade on 31st August, 1945."
- (3) Statistical Leaflet No. 3—Twelfth Issue (1944-45), "Receipts at mills in India of raw cotton classified by varieties—1944-45 season."
- (4) Statistical Leaflet No. 4—Twelfth Issue (1944-45), "Exports by sea of Indian raw cotton classified by varieties—1944-45 season."
- (5) Statistical Bulletin No. 14—"Supply and distribution of the various types of Indian cotton during the season of 1943-44."

CHAPTER VI.

COTTON MARKETING, LEGISLATION AND OTHER PROTECTIVE MEASURES.

(i) Increased use of Indian cotton in mills in India.—

In connection with the possibility of increasing the use of Indian cotton in mills in India, the Committee decided that information regarding the number of combers used for combing Indian cotton on the one hand and foreign cotton on the other would be of great value and should be collected. Some 46 mills where combers are already installed were accordingly addressed in the matter. The information collected showed that with the exception of one mill in South India having a set of 5 old model Nasmith Combers, no other mill is combing Indian cotton. The classes of cottons generally combed in the South Indian mill referred to, for preparing special hosiery yarn, are Cambodia, Mandya Co.4, saw-ginned 289F and Gaorani 6. The question of encouraging the use of combers for combing Indian cotton is being followed up.

(ii) Restrictions on exports of Indian cotton.—

The Committee considered representations from certain cotton firms for the removal of the restrictions imposed on exports of short staple cotton. The consensus of opinion was that the restrictions placed on exports of Indian cotton below 13/16" in staple were against the interests of Indian cotton and it was decided that the Government of India should be informed that, in the opinion of the Committee, no restrictions should be imposed on exports of Indian cotton below 13/16" in staple. Action was taken accordingly.

(iii) Sale price of Sudan cotton in India.—

The attention of the Committee was drawn to the fact that Sudan cotton was being sold in India at almost double its purchase price and the view was expressed that although the British Government accepted the risk when they purchased this cotton before and during the war, a hundred per cent. increase in price was not justified. It was pointed out, however, that the British Government had to pay increased charges on account of insurance, etc., and that they became the under-writers of their own purchases. The view was expressed that there could be cause for grievance only if Indian mills were treated differently from Lancashire mills in regard to these purchases. The

Committee was informed that while the actual price at which the cotton was sold to Lancashire was not known, nor whether any subsidy was given for it as in the case of American cotton, it was an open secret that the British Government had sold it at about 4d. a lb. cheaper to Lancashire than to Indian mills. The approximate F.O.B. port of shipment price of Sudan G.4S current in January 1946 was 10.00d. per lb., compared with the offered U.K. spot price of 15.50d. per lb. The purchase price in Sudan and the selling price in the United Kingdom, per candy of 784 lbs., thus worked out to Rs. 435/9 and Rs. 675/2, respectively, (exchange Re. 1=18d.) against Rs. 915/- which was the price at which the variety in question was sold in India in 1945. The Committee was not aware what the future policy of Government in this connection was going to be, but after extended discussion, it expressed the view that now that the war was over, if the Cotton Control was going to be continued, Indian cotton mills should not be asked to pay for Sudan cotton more than the mills in the United Kingdom. The Government of India were accordingly addressed in the matter.

(iv) Bombay Sales Tax Act, 1946.—

The Committee recommended to the Government of Bombay that *kapas*, cotton lint, cotton seed and cotton yarn should be exempted from the operation of the Bombay Sales Tax Act, 1946. It was further decided that the Government of Madras should be requested to exempt cotton seed also from the operation of Madras Sales Tax Act (cotton and cotton yarn having been already exempted).

(v) Cotton baling hoops.—

The arrangements for the distribution of cotton baling hoops were continued along the lines of past year. During the year under report, some 10,963 tons of Lease-Lend hoops and hoops of indigenous manufacture, were distributed to pressing factories in the country through the agency of this office working in conjunction with the Iron and Steel Controller. On the recommendation of the Baling Hoops Advisory Committee, the maximum rate for pressing cotton during the 1945-46 season was fixed by the Government of India at Rs. 10/- per bale, the same as in the last season. Except in the case of one factory at Bezwada, Madras Province, no application for permission to charge a higher pressing rate was granted.

(vi) Reversion to pre-war lashings of cotton bales.—

With the cessation of hostilities and the consequent improvement in the supply position of cotton baling hoops, the Committee decided that the cotton

presses should now revert to pre-war lashings of cotton bales. In this connection, the Committee agreed to support the proposal of the Karachi Cotton Association that the Bye-laws of the Association should be amended so as to impose heavy allowances on improperly pressed bales and to make such bales untenderable against the Association's forward contracts. The East India Cotton Association were also requested to take similar action.

(vii) Fuel requirements of ginning and pressing factories.—

The arrangements for the supply of coal, under priority, to cotton ginning and pressing factories on the recommendation of this office working in conjunction with the Textile Commissioner, Bombay, were continued during the season under report. The total quantity of coal recommended by this office for supply to ginning and pressing factories during the year amounted to about 132,000 tons. Recommendations were also made for the supply of diesel oil to cotton ginning and pressing factories. In addition, assistance was given to the factories in the matter of obtaining iron and steel required for maintenance and repairs.

(viii) Dismantling of cotton ginning and pressing factories.—

Applications under the Factories (Control of Dismantling) Ordinance, 1943, for the grant of permission for the dismantling of cotton ginning and pressing factories are referred to this office for opinion by the Textile Commissioner, Bombay. Several such applications were dealt with during the year under review.

(ix) Regulated Cotton Markets.—

Investigation into the financing and marketing of cultivators' cotton having established beyond doubt that cultivators obtain better prices for their cotton in tracts where regulated markets exist, Provincial Governments were requested by the Committee to establish such markets in all the more important cotton growing areas. Accordingly, legislation for the establishment of regulated markets has been enacted in the Provinces of Bombay, Madras, the Punjab and the Central Provinces, and the Hyderabad, Baroda, Indore, Chota Udepur and Sangli States. In the Province of Bombay, 15 markets were functioning at the beginning of the year under report under the Agricultural Produce Markets Act. It is proposed to apply the Act to Barsi, Gokak and Kapadvanj cotton markets in due course. In the Punjab, under the Agricultural Produce Markets Act, 1939, there were 137 market committees working in 1945-46 against 133 in the previous year. These Committees have func-

tioned satisfactorily and it is reported that they are becoming more conscious of the possibilities of control open to them. In Madras three regulated markets continued to function at Tirupur, Adoni and Nandyal. In the Hyderabad State, the Hyderabad Agricultural Produce Markets Act has been made applicable to 28 markets and in the light of the experience gained the question of amending the legislation and framing new rules is under the consideration of the State Government.

(x) **Agmarking.**—

During the year, Agmarking of cotton bales continued at Hubli, Gadag, Bailhongal and Savanur as a guarantee of purity of cotton by affixing Agmark labels to bales after supervision of ginning and pressing by the special staff. Agmarking has been made applicable to V.434, Sind-Sudhar and Perso-American cottons.

In January 1945, the Committee considered a proposal from the Deputy Agricultural Marketing Adviser to the Government of India for the grading and marking under "AGMARK" of Perso-American cotton ginned and pressed in the United Provinces and while approving of the proposed grade specifications, *viz.*, 95% and 98% purity, expressed the view that for the Agmark to be really useful, its application should be confined only to one grade of purity. For this purpose, a purity of 98% was suggested. The Government of the United Provinces, who were addressed accordingly, concurred in the views expressed by their Provincial Director of Agriculture which were in accord with those of the Committee. In view, however, of the opinion of the Director of Agriculture that it was difficult to get a product of 98% purity in appreciable quantities, in the absence of legislation to prevent mixtures of cotton, the Committee agreed that, in the meanwhile, the recommendation of the Deputy Agricultural Marketing Adviser to the Government of India that two grades of purity, *viz.*, 98% and 95% should be prescribed for Perso-American cotton under the Cotton Grading and Marking Rules, should be accepted.

(xi) **Universal Standards.**—

As mentioned in the previous reports, since 1934, with the co-operation of the East India Cotton Association, and the Karachi Cotton Association, Universal Standards common to both the markets have been prepared by a Special Sub-Committee of the Indian Central Cotton Committee. As already reported, on the suggestion of the two Associations, the preparation of Universal Standards was dropped for the period of the war and has not yet been resumed.

(xii) Legislation to maintain the purity of cotton and other protective measures.

Several legislative measures have been passed by the Central and Provincial Governments on the recommendation of the Indian Central Cotton Committee with a view to checking the spread of undesirable or inferior types of cotton and insect pests and diseases and other malpractices. A brief account of the working of these measures during the year under review is given below. For more details, previous reports should be referred to.

(a) Cotton Transport Act. —

During the year under report, the Cotton Transport Act has been applied to the East Khandesh district, West Khandesh district excluding Nandurbar, Taloda and Nawapur talukas and to the talukas of Boglan, Malegaon and Nandgaon of Nasik district with effect from the 14th March, 1946. This covers transport by rail only and the question of extending the restriction to transport by road as well is under the consideration of the Bombay Government. The issue of licences to import cotton into the Kumpta-Dharwar protected area from the notified tracts of Hyderabad State was resumed during the year by the Director of Agriculture, Bombay, for six months from the 1st September, 1945, subject to the condition that the cotton imported under licence should be pressed separately under the supervision of the cotton staff. But when the conditions imposed for the issue of licences were not complied with by the traders, the concession granted for the issue of licences was withdrawn. Licences were issued as usual for the import of cotton from the notified talukas of Kustigi and Lingasugur of Hyderabad State into the Bagalkot Protected Area.

(b) Cotton Ginning and Pressing Factories Act. —

During the year under report, the Government of Madras forwarded for the opinion of the Committee a draft Bill to amend the Cotton Ginning and Pressing Factories Act, 1925 in its application to that Province with a view to penalising watering of cotton, mixing of different varieties of cotton and the presence of foreign matter. The draft bill was approved with certain amendments to bring it in line with similar legislation already in force in the Province of Bombay.

It will be recalled that, at a previous meeting, the Indian Central Cotton Committee, convinced that the malpractice of mixing of different varieties of cotton was seriously hampering the work of cotton improvement in the

country, had strongly represented to the Government of India that until this malpractice was made a penal offence, it would be impossible to provide seed of improved varieties of cotton in quantities adequate to meet requirements. As a first step, the Committee had recommended that the mixing of short staple with medium and long staple cotton and of medium with long staple cotton at the factories should be forthwith prohibited by the Government of India by legislation. In making this recommendation the Committee had no doubt that the adoption of the measures suggested by it would have a beneficial effect on the food position of the country for, if the utilisation of short staple cotton for mixing purposes could be stopped, the production of such cotton would be automatically reduced to the minimum commensurate with requirements. The position was reviewed by the Committee and, in view of the difficulties pointed out by the Government of India in the matter of enacting central legislation for the purpose, it was decided to urge the major cotton growing provinces and States to themselves enact the necessary legislation against mixing of cotton and to take early steps for its introduction and enforcement. It was further decided to request the Government of India to take steps to enact the required legislation in so far as the Chief Commissioner's Provinces are concerned and thereby give the lead in the matter to the provinces and States concerned. The Committee attached considerable importance to uniformity in such legislation in the provinces and States.

The Hyderabad Government invited the opinion of the Committee in connection with a case of incorrect marking of certain bales pressed in a pressing factory at Partur. In view of the explanation of the factory that the breach of the rules had been committed through oversight and its assurance that such mistakes would not recur, the Committee recommended that the offence should be condoned with a warning that the factory should exercise due care and vigilance in future.

Out of 70 Indian States which have enforced in their territories the main provisions of the Cotton Ginning and Pressing Factories Act as applied to British India, by legislation or executive orders, weekly returns of cotton pressed were received from 52 States ; in the remaining States, pressing factories did not work during the year.

(c) Prevention of Introduction of Foreign Cotton Pests.—

In order to prevent the introduction into India of the Mexican Bollweevil (*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. During the year under review 23,542 bales of American cotton were imported and fumigated.

(d) **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.

(e) **Cotton Control Act.—**

Cotton Control Acts are in operation in the Provinces of Madras, Bombay, and the Central Provinces and in the Baroda and Bhopal States. The aims and objects of the Acts in the areas where they are in force are stated in previous reports.

The Bombay Millowners' Association forwarded for opinion a copy of a letter from the Gendalal Mills, Ltd., Jalgaon (East Khandesh) enquiring whether the prohibition and restriction imposed under Bombay Government, Revenue Department, Notification No. 3939/33-J, dated the 1st November, 1944 on the possession or use of, or trade in varieties of cotton other than Jarila, whether or not mixed with it, in the East Khandesh District is applicable also to mills as contended by the Police Department. The matter was referred to the Bombay Government for clarification. They intimated that a proposal was under consideration to allow the mills to mix cottons for their own use on condition that they do not offer such mixed cotton for trade. The draft amendment to the Bombay Cotton Control Act suggested by the Provincial Government to give effect to the proposal, was examined by the Committee and, after careful consideration, it suggested that the following amendment should be inserted before Section 4 and numbered as Section 3A. :—

- 3A (1) Notwithstanding the provisions of the foregoing Section or of any notification published thereunder, any prohibited variety of cotton may be mixed with standard cotton in any factory, situate in a controlled area, in which cotton is manufactured into yarn and/or cloth, provided that the cotton so mixed is
- (a) not made into fully-pressed bales ; and
 - (b) is used solely in such factory for the manufacture of yarn and/or cloth.

- (2) (a) The person in charge of a factory, situate in a controlled area, in which cotton is manufactured into yarn and/or cloth shall cause a register to be maintained at such factory in which shall be entered all stocks of cotton, not being standard cotton, taken into and all stocks of such cotton used in such factory.
- (b) Such register shall be open to inspection at all reasonable times by the Director of Agriculture or any person nominated by him in this behalf.

The Government of Bombay were also informed that the penalties provided by section 4 will cover contraventions of the above proposed section but if it is thought that the penalty is too heavy for failure to maintain or permit inspection of a register, suitable provision will have to be made by inserting another section in the Act relating to penalty for the contraventions of section 3A(2).

In the Central Provinces, vigorous propaganda against the cultivation and trade in Garrowhill cotton was continued.

D. N. MAHTA,
Secretary.

APPENDIX I.

MEMBERS OF THE INDIAN CENTRAL COTTON COMMITTEE.

(1) PRESIDENT—

Sirdar Bahadur Sir Datar Singh, Vice-Chairman, Imperial Council of Agricultural Research, *ex-officio*.

The Agricultural Commissioner with Government of India, *ex-officio*.

(2) REPRESENTATIVES OF AGRICULTURAL DEPARTMENTS—

<i>Madras</i>	.. .. .	Rao Bahadur Dr. B. Viswanath, C.I.E., F.I.C., Director of Agriculture.
<i>Bombay</i>	.. .. .	Dr. Ganda Singh Cheema, I.A.S., Director of Agriculture.
<i>United Provinces</i>	.. .. .	Mr. C. Maya Das, I.A.S., Director of Agriculture.
<i>Punjab</i>	.. .. .	Malik Sultan Ali Noon, I.A.S., Director of Agriculture.
<i>Central Provinces and Berar</i>	.. .. .	Rao Saheb P. D. Nair, Director of Agri- culture.
<i>Sind</i>	.. .. .	Rai Bahadur R. L. Sethi, Director of Agriculture.

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

(4) REPRESENTATIVES OF CHAMBERS OF COMMERCE AND ASSOCIATIONS—

The East India Cotton Association	Sir Purshotamdas Thakurdas,	K.B.E., C.I.E.,
The Bombay Millowners' Association	Sir Sorab Saklatvala,	M.L.A.
The Bombay Chamber of Commerce	Mr. L. F. H. Goodwin.	
The Indian Merchants' Chamber	Mr. Chimanlal B. Parikh.	
The Karachi Chamber of Commerce	Mr. A. P. Darlow.	
The Ahmedabad Millowners' Association.	Mr. Nanddas Haridas.	
The Tuticorin Chamber of Commerce	Mr. J. L. Hurschler.	
The Upper India Chamber of Commerce	Major S. R. Pocock, M.C., M.B.E., M.L.A.	
The Empire Cotton Growing Corporation	Sir William Roberts, C.I.E.	

(5) COMMERCIAL REPRESENTATIVES NOMINATED BY CENTRAL GOVERNMENT—

<i>Central Provinces and Berar</i>	.. .. .	{ Dewan Bahadur Seth Gopaldas Mohta, Mr. Pukharaj Kochar.
<i>Madras</i>	.. .. .	Mr. G. V. Doraiswamy Naidu.
<i>Punjab</i>	.. .. .	Sardar Ujjal Singh, M.L.A.

(6) BENGAL REPRESENTATIVE Mr. Surya Kumar Basu.

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

(8) REPRESENTATIVES OF COTTON GROWING INDUSTRY—

<i>Madras</i>	.. .. .	{ Mr. D. Ghanasiromani, Mr. L. Madhava Reddi.
<i>Bombay</i>	.. .. .	{ Rao Bahadur F. B. Loxmeshwar. Mr. B. K. Patel.
<i>United Provinces</i>	.. .. .	{ Major Nawab Sir Mohd. Jamshed Ali Khan, M.B.E., M.L.A. Rai Bahadur Kunwar Laxmi Raj Singh, M.L.C.

<i>Punjab</i>	....	..	..	..	{ Chaudhri Ram Sarup, M.L.A. Mian Mohammad Nurulla, M.L.A.
<i>Central Provinces and Berar</i>				..	{ Rao Bahadur Sir Madhaorao G. Deshpande, K.B.E., Mir Riyat Ali.
<i>Sind</i>		..	..	..	(Vacant).

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

<i>Hyderabad State</i>	..	..	..	..	Rai Bahadur Kalidas Sawhney, Director of Agriculture.
<i>Baroda State</i>	..	..	..	..	C. A. MacLean, C.B.E., M.C. Commissioner of Agriculture.
<i>Gwalior State</i>	..	..	..	..	Mr. N. M. Deshmukh, Director of Agriculture.
<i>Rajputana and Central India States</i>					Rao Bahadur Dr. D. V. Bal.

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

1. Sir Chunilal B. Mehta.
2. Dewan Bahadur Sir T. Vijayaraghavacharya, K.B.E.,
3. Sir Shri Ram, Representative of the Cotton millowners of Delhi.
4. Mr. Roger Thomas, C.I.E., J.P.
5. Mr. R. G. Saraiya, O.B.E., Messrs. Narandas Rajaram & Co., Bombay.
6. Sir Padampat Singhania, Senior Proprietor, Messrs. Juggilal Kamlatpat, Cawnpore.
7. Dr. V. K. R. V. Rao.
8. Musahib-i-Khas Bahadur Capt. H. C. Dhanda, Commerce Minister, Holkar State.
9. Mr. M. J. Narasimhan, Director of Agriculture in Mysore, Bangalore.
10. Sardar Bahadur Sardar Beant Singh.
11. Mr. Camar Tyabjee, O. B. E., Managing Agent, Osman Shahi and Azam-Jahi Mills, Hyderabad (Deccan).
12. Hon'ble Nawab Khurshid Ali Khan, C.I.E., M.B.E.,
13. Khan Saheb Agha Yusuf Ali, Director of Agriculture, Bahawalpur State.
14. Dr. M. M. Junaid, Director of Statistics, Government of India, Deptt. of Food.
15. Dr. B. L. Sethi, Economic Botanist (Oil Seeds) to Government, U.P.
16. Dr. Chellaram Shewaram, Representative of the Karachi Indian Merchants' Association.
17. Mr. Jivandas Ladha, Representative of the Karachi Cotton Association, Ltd.
18. Mr. G. V. Deshmukh, M. L. A.,
19. Mr. R. Balasubramania Ayyar, Cotton Specialist, Coimbatore.
20. Dr. P. J. Gregory, Second Economic Botanist, Bengal.
21. Rao Saheb V. C. Pavate, Deputy Director of Agriculture, S. D. Dharwar.

APPENDIX II.

SUB-COMMITTEES.

Standing Finance Sub-Committee.—Sir Chunilal B. Mehta (Vice-President) Chairman, Sardar Bahadur Sir Datar Singh (President) (*ex-officio*); Sir Purshotamdas Thakurdas; Sir Sorab Saklatvala; Sir Chunilal V Mehta; Mr. J. L. Hurschler Dr. Ganda Singh Cheema; Rao Bahadur Sir Madhaorao Deshpande and Mr. R. G. Saraiya.

Local Sub-Committee.—President (Sardar Bahadur Sir Datar Singh); 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; Dr. Ganda Singh Cheema; Mr. A. P. Darlow; Rao Bahadur Sir Madhaorao Deshpande and Rao Bahadur F. B. Loxmeshwar.

Agricultural Research Sub-Committee.

- I. *The President.*—Sardar Bahadur Sir Datar Singh (*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, Rao Bahadur Sir Madhaorao Deshpande and Mir Riyat Ali.
- V. *Cotton Trade Representatives*—Sir Purshotamdas Thakurdas, Mr. R. G. Saraiya, Mr. J. L. Hurschler, Mr. L. F. H. Goodwin and Dewan Bahadur Seth Gopaldas Mohta.
- VI. *Agricultural Officers.*—The Agricultural Commissioner with the Government of India (*ex-officio*); Dr. Ganda Singh Cheema, Malik Sultan Ali Noon, Mr. C. Maya Das, Rao Bahadur Dr. B. Viswanath, Mr. C. A. MacLean, Rai Bahadur Kalidas Sawhney, Mr. N. M. Deshmukh, Rao Saheb P. D. Nair, Rai Bahadur R. L. Sethi, Mr. M. J. Narasimhan, Rao Saheb V. C. Pavate, Rao Bahadur Dr. D. V. Bal, Khan Saheb Agha Yusuf Ali, Mr. R. Balasubramania Ayyar.
- VII. *Additional Members.*—Dewan Bahadur Sir T. Vijayaraghavacharya, Mr. Roger Thomas, Mr. Mohammad Afzal, Prof. R. H. Dastur, Dr. B. L. Sethi, Dr. R. Sankaran, Mr. S. S. Pande, Dr. V. G. Panse, Dr. B. N. Uppal, Dr. P. J. Gregory, Dr. S. D. Choudhary, Mr. D. L. Sen, Mr. P. D. Gadkari, Mr. L. Madhava Reddi, Mr. V. M. Chavan, Dr. Khan A. Rahman, Rao Bahadur F. B. Loxmeshwar and Mr. G. V. Deshmukh.
- VIII. The Secretary, Indian Central Cotton Committee (*ex-officio*).

Technological Research Sub-Committee.—The President-Sardar Bahadur Sir Datar Singh (*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 Singhanian, Dr. Ganda Singh Cheema, Rao Saheb P. D. Nair, Mr. L. F. H. Goodwin, Major S. R. Poocek, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Rao Bahadur Dr. B. Viswanath, Malik Sultan Ali Noon, Mr. D. L. Sen, Mr. R. Balasubramania Ayyar, Rai Bahadur Kalidas Sawhney, Dewan Bahadur Seth Gopaldas Mohta, Mr. Roger Thomas, Dr. R. Sankaran, Dr. B. L. Sethi, Mr. Mohammad Afzal, Dr. K. Venkataraman, Mr. P. D. Gadkari, Mir Riyat Ali, the Director of Industries, Bombay, the Principal, Victoria Jubilee Technical Institute, Bombay, Mr. Bhagwandas C. Mehta and Mr. A. D. Walwyn, (Representing the Bombay Millowners' Association), Mr. Ambalal Himatlal and Mr. Pranlal Bhikabhai (Representing the Ahmedabad Millowners' Association), Mr. Gatulal Rangildas and Mr. Jamnadas Randas (Representing the East India Cotton Association, Ltd.) and Mr. Kisharam Lekhray and Mr. A. B. Kotak (Representing the Karachi Cotton Association, Ltd.)

Cotton Forecast Sub-Committee.—The President (*ex-officio*), The Vice-President, the Agricultural Commissioner with the Government of India (*ex-officio*), The Director of Commercial Intelligence, the Director of Agriculture, Bombay Province, the Director of Agriculture, Punjab, the Director of Agriculture, Madras, The Director of Agriculture, United Provinces, the Director of Agriculture, Central Provinces and Berar, the Director of Agriculture, Sind, the Director of Agriculture, H. E. H. the Nizam's Government, the Commissioner of Agriculture, Baroda, the Director of Statistics, H. E. H. the Nizam's Government, the Director of Land Records, Central Provinces and Berar, the Director of Statistics, Calcutta, the Statistical Officer, Department of Industries and Commerce, Madras, Dr. V. K. R. V. Rao, Mr. J. L. 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—Sardar Bahadur Sir Datar Singh, The Vice-President, Sir Chunilal B. Mehta (*ex-officio*), the Co-operative Banking Representative Sir Chunilal V. Metha (*ex-officio*), Sir Purshotamdas Thakurdas, Sir Sorab Saklatvala, Mr. J. L. Hurschler, Mr. R. G. Saraiya, Sir William Roberts, Dr. Ganda Singh Cheema, Major S. R. Pocock, Mr. L. F. H. Goodwin, Mr. G. V. Doraiswami Naidu, Rao Saheb P. D. Nair and Mr. D. L. Sen.

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.

INDIAN CENTRAL COTTON COMMITTEE.

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH. 1946.

RECEIPTS.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Opening Balance as on 1st April 1945	12,84,378	12	10							<i>Administration of the Committee.—</i>						
Sinking Fund	20,844	9	0							(Including Improvement of Cotton Marketing, Printing, Publicity and Distribution and Travelling Allowance of Non-Official Members)				1,01,892	0	2
Less.—Adjustment of Suspense Receipts during 1944-45 ..				13,05,223	5	10				<i>Agricultural Research Grants-in-Aid.—</i>						
				1,089	4	9				(Including Research Seed, Marketing and Miscellaneous schemes)				5,76,957	10	8
Receipts under Section 12 of the Indian Cotton Cess Act 1923.							13,04,134	1	1	<i>Technological Research</i>				2,34,842	2	2
Other Receipts.—							5,22,132	0	0	<i>Closing Balance.—</i>						
Sale of Publications, Sale of cotton, Miscellaneous receipts, Test fees, etc. ..	21,645	14	8							(Government Paper at Cost).						
Suspense Receipts	1,221	11	0							23% Government of India Loan 1948-52 of the Face Value of Rs. 4,95,000	4,94,414	1	0			
Sinking Fund Provision 1945-46	1,814	11	0	24,682	4	8				34% Government Promissory Notes of the Face Value of Rs. 2,00,000	2,02,046	14	0			
Interest on Investments				49,571	13	2				*34% Government of India Loan 1947-50 of the Face Value of Rs. 4,75,000	4,18,923	7	0			
Amount received from the Cotton Fund at the disposal of the Government of India ..							74,254	1	10	41% Government of India Loan 1955-60 of the Face Value of Rs. 26,600	25,004	0	0			
										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. 3,33,500	4,15,328	2	0			
										(Market Value as on 31st March 1946, Rs. 16,54,618-6-0, inclusive of Rangoon Municipal Debentures at cost).	15,59,666	8	0			
										* (34% Government of India Loan 1947-50 of the Face Value of Rs. 1,50,000 have been deposited with the Imperial Bank of India, Bombay, as Security against any Overdraft that may be required by the Committee).						
Carried over ..							26,44,339	2	11	Carried over ..	15,59,666	9	0	10,03,692	6	0

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31st MARCH. 1946.—(concl'd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..			20,44,339 2 11	Brought forward ..	15,59,606 8 0	10,03,092 6 0
				Current Account with the Imperial Bank of India, Bombay	38,220 14 9	
					15,97,887 6 9	
				<i>Imprests.—</i>		
					Rs. a. p.	
				(1) Secretary's Office	1,500 0 0	
				(2) Director, Technological Laboratory, Matunga	500 0 0	
				(3) Director of Agriculture, Bombay.	1,820 0 0	
				(4) Director of Agriculture, Sind.	670 0 0	
				(5) Cotton Research Botanist, Lyallpur	150 0 0	
				(6) Plant Physiologist, Indore	400 0 0	
				(7) Geneticist and Botanist, Indore	500 0 0	
					5,540 0 0	
				<i>Suspense.—(Recoverable).</i>		
				(1) Committee's Account	2,717 8 2	
				(2) Hoops and Fuel Account.—		
				Expenditure Incurred. 40,059 0 0		
				<i>Less.—</i>		
				Receipts	11,557 2 0	
					34,501 14 0	
					37,219 6 2	
				**Total Closing Balance		16,40,846 12 11
Total ..			20,44,339 2 11	Total ..		26,44,339 2 11

** Includes Rs. 22,659-4-0 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, 5th July, 1946.

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

INDIAN CENTRAL COTTON COMMITTEE
PROVIDENT FUND ACCOUNT AS AT 31st MARCH, 1946.

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Opening Balance as on 1st April, 1945		7,04,366 2 11		<i>Balance.—</i>			
Subscribers' contributions ..	29,852 12 0			(Government Securities at Market Value).			
Add.—Recoveries against Advances	12,103 15 0	41,956 11 0		3% Government of India Defence Bonds 1946, of the Face Value of Rs. 28,000		28,437 8 0	
		7,46,322 13 11		3% Government of India Loan, 1951-54, of the face value of Rs. 32,000		32,640 0 0	
Less.—Refunds to subscribers who have resigned	10,132 11 0			3½% Government Promissory Notes of the face value of Rs. 3,68,500		3,78,633 12 0	
Advances to Subscribers ..	9,124 8 0	10,257 3 0		3½% Government of India Loan, 1947-50, of the face value of Rs. 1,20,000		1,24,050 0 0	
		7,27,065 10 11		4% Government of India Loan, 1960-70, of the face value of Rs. 12,600		14,411 4 0	
Committee's contributions received from Indian Central Cotton Committee		29,851 3 0		2½% Government of India Loan 1948-52 of the face value of Rs. 1,00,000		1,00,750 0 0	
		7,56,916 13 11		3% Government of India Loan, 1949-52 of the face value of Rs. 35,000		35,743 12 0	
Less.—Payments made to Subscribers who have resigned, including transfers to "Lapses and Forfeiture Account" for contributions disallowed ..		9,842 10 8				7,14,666 4 0	
		7,47,074 3 3		Savings Bank Account with the Imperial Bank of India, Bombay		526 15 0	
Less.—Payment of balance standing to the credit of late Mr. Shrinivas		500 0 0	7,46,574 3 3	Current Account with the Imperial Bank of India, Bombay		68,434 13 4	7,83,628 0 4
Interest received on investments	22,794 3 0						
Interest received on advances to subscribers	1,392 11 3	24,186 14 3					
Carried over ..				Carried over ..			7,83,628 0 4

PROVIDENT FUND ACCOUNT AS AT 31st MARCH. 1946.—(concl'd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Brought forward ..		24,186 14 3	7,46,574 3 3	Brought forward ..			7,83,628 0 4
<i>Less.</i> —Interest paid during the year to Subscribers who have resigned :—							
On their contributions ..	87 9 8						
On Committee's contributions	81 9 5						
Interest paid in advance at the time of purchase of Government Securities (Since received)	68 12 0						
Bank's commission for Collection of interest and stamp charges	20 4 6	267 3 7	23,919 10 8				
Investments Fluctuation Account :—							
Appreciation in market value of Securities			12,918 18 0				
Lapses and Forfeiture Account			215 5 5				
Total ..			7,83,628 0 4	Total ..			7,83,628 0 4

Examined and found correct.

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

BOMBAY, 5th July, 1946.

INDIAN CENTRAL COTTON COMMITTEE
BALANCE SHEET AS ON 31st MARCH, 1946.

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Cotton Cess receipts	1,64,00,519 7 8		I. A. Administration		27,49,124 14 2
Less.—Refunds of cess to Burma	42,369 10 9	1,64,48,149 12 11	B. <i>Improvement of Cotton Marketing.</i> —		
<i>Interest account.</i> —			(1) Cost of exhibits, travelling allowance of representatives on the Board of the East India Cotton Association and members of Standards Sub-Committee and cost of standards	2,14,547 7 0	
Amount received on Investments	23,79,843 3 4		(2) Enquiry into cost of cotton production in India	2,71,963 8 9	4,86,510 15 9
Add.—Refund of income tax from interest	29,920 5 6		C. Travelling allowance of non-official members		3,06,409 14 9
	24,09,768 8 10		D. <i>Printing and Propaganda.</i> —		
<i>Less.</i> —			(1) Publicity and propaganda	1,56,555 15 0	
(1) Interest paid in advance at the time of purchasing Government Paper (since recovered) interest on temporary overdraft and Bank's commission for collection of interest	76,097 1 4		(2) Printing and distribution	1,45,337 1 3	3,01,893 0 3
(2) Interest credited to Provident Fund	4,886 6 2		E. <i>Statistical Research.</i> —		
(3) Bank's withdrawal charges	5,936 1 0		(1) Studies of village consumption of Indian cotton	23,913 5 8	
(4) Income tax on interest on Government Paper	31,200 7 1		(2) Improvement of cotton forecast	36,772 0 0	
(5) Brokerage for securities sold	828 10 0		(3) Crop Estimating Survey on cotton in the Central Provinces	63,395 14 3	1,18,081 12 11
(6) Provision for Sinking Fund	22,659 4 0		II. <i>Agricultural Research Grants.</i> —		
	1,41,607 13 7	22,63,160 11 3	A. <i>RESEARCH SCHEMES.</i>		
Profit on conversion and sale of securities		3,60,046 8 2	(i) <i>Bombay.</i> —		
Sinking Fund account		22,659 4 0	(1) A. Surat Physiological	2,45,139 11 3	
Miscellaneous receipts		1,86,527 11 4	B. Surat Physiological Writing-up	5,814 7 8	
Refund from Provident Fund for contributions disallowed		3,391 1 11	(2) A. Surat Bollworm	1,14,509 9 7	
			B. " " Propaganda	91,468 9 2	
Carried over		1,92,88,935 1 7	Carried over	4,56,932 5 3	39,62,020 9 10

BALANCE SHEET AS ON 31st MARCH, 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		1,02,88,935 1 7	Brought forward ..	4,66,982 5 8	39,02,020 9 10
Receipts from Cotton Fund.	17,07,575 0 0		O. " " Writing-up ..	2,315 8 0	
Less.—Amount refunded.	30,360 0 0	16,71,209 0 0	(8) A. Dharwar Wilt	1,82,886 4 11	
			B. " " Writing-up ..	10,902 10 8	
			(4) Khandesh	26,578 5 0	
Receipts from the Board of Scientific and Industrial Research		1,176 9 0	(5) Co-ordination of Cotton Research ..	1,740 7 6	
General Suspense account		45 2 0	(6) Jalgaon Cotton Breeding	82,984 12 6	
			(7) Broach Cotton Breeding	1,18,110 8 2	
			(8) Small leaf disease survey	8,938 9 6	
			(9) Survey of Goghari cotton	4,199 5 0	
			(10) Defibrating of cotton seeds	4,878 5 9	
			(11) Plant Puller Propaganda	21,940 1 3	
			(12) Breeding of wilt-resistant cotton for Surat area	38,850 6 0	
			(13) Village Projects for improvement in cultivation of crops	2,886 11 4	
			(14) Inclusion of Northern and Westerns in dry farming at Bilapur.	6,958 12 7	
			(15) Poona Wilt Breeding	72,729 9 6	
			(16) Improvement of cotton crop in Kaira District	12,896 3 6	
			(17) Interspecific hybridisation at Surat	64,742 9 8	
			(18) Dholleras Wagad cotton at Viramgam and Bavla	55,048 15 2	
			(19) Improvement of Dharwar-American cotton	10,519 5 8	
			Total ..	11,76,488 7 1	
Carried over ..		2,09,01,365 12 7	Carried over	11,76,488 7 1	39,02,020 9 10

BALANCE SHEET AS ON 31ST MARCH. 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		2,09,61,365 12 7	Brought forward ..	11,76,438 7 1	39,62,020 9 10
			(ii) Madras.—		
			(1) Herbaceum	1,42,466 18 1	
			(2) Pempheres and Physiological ..	2,01,034 15 0	
			(3) Fodder Cholan	19,517 0 4	
			(4) Breeding of Nadam cotton ..	17,727 2 6	
			(5) Improvement of Mungari cotton ..	55,492 9 4	
			(6) Investigation of the possibilities for control of cotton steam weevil	6,165 7 0	
			(7) Improvement of Cocanadas cotton.	56,657 2 9	
			Total ..	4,99,061 12 8	
			(iii) Punjab.—		
			(1) Botanical	6,82,136 4 9	
			(2) Entomological	2,25,908 7 11	
			(3) White Fly	48,721 4 1	
			(4) Root Rot	71,048 10 10	
			(5) Spraying Trials	9,977 0 6	
			(6) Defibrating and delinting	6,112 8 9	
			(7) Survey of disease of Malformation.	1,730 10 6	
			(8) Physiological	4,09,587 1 7	
			(9) Clean-up Campaign of Spotted Bollworm	60,025 9 3	
			(10) Jassid Investigation	22,239 1 6	
			(11) Improvement of Punjab-American 239F	20,508 10 3	
Carried over ..		2,09,61,365 12 7	Carried over ..	32,33,495 9 3	39,62,020 9 10

BALANCE SHEET AS ON 31st MARCH. 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		2,09,61,365 12	Brought forward ..	32,33,495 9 3	39,62,020 9 10
			(12) Improvement of Cotton in Jhang District	4,855 0 0	
			(13) Improvement of Cotton in the South Eastern District	6,170 0 0	
			(14) Improvement of Cotton in the Lower Bari Doab Canal Colony	5,487 14 0	
			(15) Improvement of Cotton in the South Western Districts	4,309 12 0	
			Total ..	15,78,817 15 11	
			(iv) Central Provinces and Berar.—		
			(1) Botanical	4,93,449 9 4	
			(2) Entomological	12,344 13 6	
			(3) Investigation of Heliothis Obsoletea.	1,672 9 9	
			(4) C. P. & Berar Cotton Breeding Scheme	71,409 10 8	
			(5) Village Projects for extension of improvement in cultivation of crops	2,297 10 0	
			Total ..	5,81,174 4 10	
			(v) United Provinces.—		
			(1) Pink Bollworm	1,46,616 2 10	
			(2) Rohilkhand and Bundelkhand Survey	18,061 14 4	
			(3) Botanical	93,988 15 0	
Carried over ..		2,09,61,365 12 7	Carried over ..	40,94,159 8 3	39,62,020 9 10

BALANCE SHEET AS ON 31st MARCH 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		2,09,61,865 12 7	Brought forward ..	40,94,159 8 8	39,62,020 9 10
			(4) Village Projects for extension of improvement in cultivation of crops	2,528 5 3	
			(5) Scheme for hybridisation in Arbo-reum cotton	5,987 1 0	
			Total ..	2,67,182 6 5	
			(vi) Indore.—		
			(1) Institute of Plant Industry ..	20,46,948 12 0	
			(2) Cotton Genetics Research Scheme.	2,38,750 11 11	
			(3) Scheme for Cotton Physiological Research	94,189 10 9	
			Total ..	23,79,884 2 8	
			(vii) Sind.—		
			(1) Physiological	2,63,945 12 10	
			(2) Jassid Investigation	15,471 15 1	
			(3) Black-headed Cricket	9,245 1 8	
			(4) Scheme for production of long staple cotton in Sind	1,69,618 10 9	
			(5) Bollworm investigation and Clean-up Campaign	99,413 15 6	
			(6) Manurial trials in Sind	3,942 8 0	
			Total ..	5,61,637 15 5	
			(viii) Burma.—		
			(1) Capital Expenditure	2,906 15 5	
			(2) Cotton Improvement	47,790 3 9	
			Total ..	50,697 3 2	
Carried over ..		2,09,61,865 12 7	Carried over ..	70,94,894 3 9	39,62,020 9 10

BALANCE SHEET AS ON 31st MARCH. 1946.—(contd.)

RECEIPTS.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.	Rs.	a.	p.
Brought forward ..	2,09,61,865	12	7	Brought forward ..	70,94,894	3	9	39,62,020	9	10
				(ix) <i>Hyderabad.</i> —						
				(1) Botanical	4,26,263	2	9			
				(2) Cotton Survey	36,578	3	0			
				(3) Pink and Spotted Bollworm ..	88,976	10	4			
				(4) Improvement of Kumpta Cotton .	64,596	7	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	58,929	2	0			
				(7) Improvement of Cotton of the Oomras tract	56,157	9	7			
				(8) Gaorani Improvement Scheme ..	82,592	12	3			
				Total ..	7,56,094	8	5			
				(x) <i>Bikaner.</i> —						
				Bengals Cotton Improvement ..	70,377	10	11			
				(xi) <i>Baroda.</i> —						
				(1) Root Rot Scheme	92,904	15	2			
				(2) Comparative tests	4,251	5	3			
				(3) Survey of Goghari Cotton ..	3,891	14	7			
				(4) Plant Puller Propaganda ..	32,533	15	10			
				(5) Mathio Cotton at Amreli and Jagudan	43,194	2	11			
				Total ..	1,76,776	5	9			
Carried over ..	2,09,61,865	12	7	Carried over ..	80,98,142	7	10	39,62,020	9	10

BALANCE SHEET AS ON 31st MARCH, 1946.—(contd.)

RECEIPTS.	Rs. a. p.		EXPENDITURE.	Rs. a. p.		Rs. a. p.	Rs. a. p.	
Brought forward ..		2,09,61,365 12 7	Brought forward ..	80,98,142	7 10	89,62,020	9 10	
			(iii) Bengal.—					
			(1) Comilla Scheme	48,919	14 9			
			(2) Cultivation of long staple cotton..	13,712	11 8			
			Total ..	67,682	10 0			
			(iii) Mysore.—					
			Doddabail Cotton	85,522	1 9			
			(iv) Collection of Iran Cotton	3,121	12 0			
			(v) Baluchistan.—					
			Co-ordination of research on Black-headed Cricket in Sind and Baluchistan	89,229	14 5			
			(vi) Preliminary Scheme at Nawanager ..	323	12 4			
			(vii) Estimation of effects on cotton crop of the use of Plant Puller	4,143	12 5	82,38,116	6 9	
			B. SEED DISTRIBUTION AND EXTENSION SCHEMES.—					
			(i) Bombay.—					
			(1) Hubli	44,048	8 8			
			(2) Gadag	41,700	15 1			
			(3) Gadag Supplementary	20,167	11 4			
			(4) Surat	93,824	15 4			
			(5) Athani	18,086	1 7			
			(6) Khandesh Banilla	1,65,580	4 0			
			(7) Khandesh Jarla	2,08,124	12 3			
Carried over ..		2,09,61,365 12 7	Carried over ..	5,91,333	8 10	1,22,00,137	0 7	

BALANCE SHEET AS ON 31st MARCH. 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		2,09,61,365 12 7	Brought forward ..	10,88,065 13 2	1,22,00,137 0 7
			(iii) <i>Sind.</i> —		
			(1) Seed Distribution	4,28,812 12 10	
			(2) Maintenance of nucleus of pure seed of improved varieties of cotton	9,862 13 5	
			(3) Financing of Seed Distribution ..	1,26,658 10 0	
			Total ..	5,65,334 4 3	
			(iv) <i>Hyderabad</i> ..		
			Seed Scheme	51,807 13 3	
			(v) <i>Central Provinces and Berar.</i> —		
			(1) Maintenance of nucleus of pure seed of improved varieties of cotton	3,260 7 6	
			(2) Jarila Seed Distribution Scheme ..	6,229 15 0	
			Total ..	9,490 6 6	
			(vi) <i>Baroda</i>		
			(1) Navsari Seed Storage	38,497 9 4	
			(2) B. D. 8	17,330 11 9	
			(3) B. 9	13,315 13 5	
			(4) Scheme for creation of pure Wagad zone in Mehsana District ..	10,393 12 0	
			(5) Baroda Vijaya Scheme	49,700 14 0	
			(6) Suyog Scheme	15,202 0 0	
			(7) Wagotar Cotton Scheme	610 0 0	
			Total ..	1,45,140 12 6	
Carried over ..		2,09,61,365 12 7	Carried over ..	18,59,339 1 8	1,22,00,137 0 7

BALANCE SHEET AS ON 31ST MARCH, 1946.—(contd.)

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Brought forward ..		2,09,61,365 12 7	Brought forward ..	18,59,339 1 8	1,22,00,137 0 7
			(vi) Punjab.—		
			Lyallpur Ghnery	16,038 3 3	
			(vii) United Provinces.—		
			(1) C. 402	18,616 11 0	
			(2) Perso-American Cotton in Western Districts	58,546 14 0	
			Total ..	77,163 9 6	10,52,540 14 5
			C. MARKETING SCHEMES.—		
			(1) Grading and Marking of 1027 A. L. F. in Surat area	9,566 12 9	
			(2) Punjab Cotton Marketing Survey .	7,214 1 6	
			(3) Baroda better marketing of 1027 A. L. F.	17,778 6 3	
			(4) Extension and marketing of V. 434 in Central Provinces	3,64,979 5 4	
			(5) Distribution and marketing of Buri 107 cotton in Burhanpur Tehsil	24,429 0 0	4,23,962 9 10
			D. MISCELLANEOUS SCHEMES.—		
			(1) Compilation of manual trials ..	719 15 0	
			(2) Compilation of handbook dealing with pests and diseases of cotton in the Empire	2,975 5 0	
			(3) Survey of nutritional values in relation to milch buffaloes of fuzzy cotton seed and cotton seed cakes manufactured from such seeds.. .. .	7,345 5 11	
					11,040 9 11
Carried over ..		2,09,61,365 12 7	Carried over ..		1,45,87,681 2 9

BALANCE SHEET AS ON 31st MARCH, 1946.—(contd.)

RECEIPTS.	Rs.	a.	p.	EXPENDITURE.	Rs.	a.	p.
Brought forward ..	2,00,61,365	12	7	Brought forward ..	1,45,87,681	2	9
				III. <i>Technological Research.</i> —			
				A. TECHNOLOGICAL LABORATORY.—			
				(i) <i>Capital Expenditure.</i> —			
				(1) Land and Building	4,07,988	14	6
				(2) Machinery	1,23,212	1	2
				(3) Freight	7,502	2	8
				(4) Apparatus and equipment ..	41,668	5	7
				(5) Machinery and Workshop ..	5,789	8	3
				(ii) <i>Working Expenses</i>	34,26,855	10	4
				B. PROVINCIAL—	2,88,127	12	2
				C. DEVELOPMENT OF ALTERNATIVE USES OF INDIAN COTTON.—			
				(i) Capital Expenditure	29,006	7	9
				(ii) Working Expenses	55,386	13	5
				D. INVESTIGATION FOR IMPROVEMENT IN THE GINNING OF INDIAN COTTON.—			
				(i) Capital Expenditure	34,072	13	9
				(ii) Working Expenses	23,160	12	0
				E. SCHEME FOR RESEARCH ON CHEMICAL FINISHES	6,544	0	0
							44,54,315 5 7
				IV. <i>Research Studentships</i>	2,82,566	1	4
				<i>Less.</i> —Refunds from Dr. Taskir Ahmad.	3,843	10	0
				By Suspense Account	2,717	8	2
				By Hoops and Fuel Account			
				Total Expenditure.. 46,059 0 0			
				<i>Less.</i> —Receipts .. 11,557 2 0	34,501	14	0
				BY BALANCE			37,219 6 2
							16,08,427 6 9
GRAND TOTAL ..	2,00,61,865	12	7	GRAND TOTAL ..	2,00,61,865	12	7

INDIAN CENTRAL COTTON COMMITTEE.
PROVIDENT FUND ACCOUNT.
BALANCE SHEET AS ON 31st MARCH. 1946.

RECEIPTS.	Rs. a. p.	Rs. a. p.	EXPENDITURE.	Rs. a. p.	Rs. a. p.
Subscribers' Contribution account	5,70,639 0 6		Advances to subscribers	1,86,552 1 0	
<i>Less.</i> —Payments made to subscribers resigned ..	2,08,448 8 11	8,07,101 5 7	<i>Less.</i> —Recoveries made up to 31-3-46	1,18,682 1 0	17,920 0 0
Committee's Contribution account	5,58,032 3 1		Interest accrued on Government Papers credited for distribution to subscribers up to 31st March, 1946		6,375 15 4
<i>Less.</i> —Payments made to subscribers resigned and transfers to Lapse and Forfeiture account for contribution disallowed	1,97,188 14 8	8,60,893 4 10	BY BALANCE ..		7,83,628 0 4
Lapse and Forfeiture account		16,060 0 8			
Interest account	24,372 0 1				
<i>Less.</i> —Payments made to subscribers resigned ..	177 6 1	24,194 10 0			
Investment Fluctuation account		88,210 15 5			
Deposit of Mr. Dutt's contribution		1,873 11 2			
Total ..		8,07,923 15 8	Total ..		8,07,923 15 8

APPENDIX IV

STOCKS OF INDIAN COTTON ON 31st JANUARY, 1946, 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				
	1942.	1943.	1944.	1945.	1946.	1942.	1943.	1944.	1945.	1946.	1942.	1943.	1944.	1945.	1946.
Tinnevellies	27	31	17	37	32	17	15	18	23	8	44	46	35	60	40
Salems	10	20	19	..	..	6	5	4	6	5	16	25	23	6	5
Cambodias	66	99	83	83	58	38	39	49	70	15	104	138	132	153	73
Northerns & Westerns..	25	27	15	19	25	10	32	26	13	94	35	59	41	32	119
Cocanadas	4	3	3	1	5	19	5	19	19	20	23	8	22	20	25
Outside Cottons.. ..	61	55	84	66	84	4	1	5	2	1	65	56	89	68	85
Total ..	193	235	221	206	204	94	97	121	133	143	287	332	342	339	347

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.)

	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	†1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	1944-45.	1945-46.
Bombay Island	611,006	565,084	491,700	687,287	664,199	636,720	782,815	750,317	634,149	982,084	1,057,745	1,270,766	1,199,172	1,223,679	1,124,072
Ahmedabad	322,257	348,009	373,345	326,558	320,982	304,398	346,269	346,375	305,459	341,800	414,870	364,999	428,677	401,544	383,274
Bombay Province	1,132,045	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	1,936,423	1,906,606	1,910,619	1,769,283
Madras Province	260,707	292,013	278,060	312,164	365,423	412,268	422,573	480,839	507,391	525,611	594,054	647,407	506,535	603,796	566,173
United Provinces	256,820	273,573	277,230	292,424	317,011	299,073	288,320	356,331	349,340	381,025	427,305	437,441	414,210	410,596	369,018
Central Provinces and Berar.	115,018	111,203	112,660	125,014	130,298	122,987	146,587	164,616	142,869	153,825	178,791	174,385	148,020	169,727	156,116
Bengal.. ..	102,300	103,734	107,633	101,101	98,892	79,944	92,546	90,611	111,383	135,227	125,740	138,098	138,203	135,697	128,731
The Punjab and Delhi	89,631	80,854	71,939	83,897	89,430	93,836	94,742	133,347	165,274	171,652	179,987	182,104	184,950	181,384	167,948
Rest of British India	30,342	31,935	35,139	38,575	38,010	35,823	46,840	49,306	44,867	47,316	64,304	59,003	52,242	52,291	53,894
Total—British India	1,987,603	2,000,664	1,946,210	2,183,791	2,228,374	2,172,725	2,445,606	2,591,863	2,493,408	2,994,735	3,335,020	3,575,861	3,440,816	3,464,110	3,211,163
Total—Indian States	353,793	351,260	390,116	423,341	449,314	460,060	554,003	559,202	556,698	622,412	690,375	730,970	678,645	694,554	659,859
TOTAL-INDIA	2,341,396	2,351,924	2,336,326	2,607,132	2,677,688	2,632,785	2,999,609	3,151,065	3,050,106	3,617,147	4,025,395	4,306,831	4,119,461	4,158,664	3,871,022

† 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).

Cotton Year: 1st September to 31st August.

(In bales of 400 lbs. nett.)

	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	1944-45.	1945-46.
Hyderabad	31,200	33,488	33,231	45,588	51,771	49,981	63,093	68,156	67,995	72,860	83,725	83,689	78,204	71,640	67,458
Mysore	49,293	50,596	47,138	51,196	50,824	53,236	55,244	53,358	67,851	65,062	74,966	77,734	57,718	73,688	70,073
Baroda	58,534	50,587	53,612	57,146	51,903	51,761	70,639	73,278	85,573	91,519	90,642	87,542	88,628	81,964	81,845
Gwalior	45,892	43,306	49,362	56,318	72,163	70,079	89,243	94,090	58,638	95,517	94,300	90,025	93,152	87,485	73,709
Indore	95,296	91,036	111,430	114,229	113,379	106,454	147,766	140,792	120,186	138,795	148,867	149,914	144,147	154,429	141,953
Kathiawar States	18,849	18,868	26,506	35,438	37,397	42,717	48,545	44,109	43,703	50,479	60,628	72,857	70,577	71,184	69,292
Other Indian States	39,382	40,209	45,197	45,735	51,402	57,707	57,119	58,444	102,702	108,180	137,247	169,209	146,219	154,164	141,529
Pondicherry	20,257	23,170	23,610	22,991	20,355	19,065	22,307	26,475							
Total—Indian States	358,793	351,260	390,116	428,341	449,314	460,000	554,003	559,202	556,698	622,412	690,375	730,970	678,645	694,554	659,859

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

(Based on voluntary returns furnished by mills).

Cotton Year: 1st September to 31st August.

(In bales of 400 lbs. nett.)

	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	†1936-37	1937-38.	1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	1944-45.	1945-46.
Bombay Province	74,979	80,092	74,868	58,855	75,617	67,219	74,750	80,164	86,687	96,215	102,965	81,643	54,415	33,072	25,012
Madras Province	99,389	96,340	110,875	123,260	147,044	173,102	156,675	162,489	175,540	189,257	230,691	241,751	202,495	208,300	180,379
United Provinces	14,367	19,286	17,871	10,090	10,405	10,659	15,719	17,532	20,279	29,127	26,293	5,024	4,687	793	1,125
Central Provinces and Berar.	20,743	17,462	18,382	20,544	27,502	26,321	32,900	29,980	29,052	32,589	31,178	19,153	7,866	3,893	6,589
Bengal * .. ..	..	..	..	..	..	90	..	..	3	..	..	483	6,000	6,017	4,337
The Punjab and Delhi †	2,317	2,149	..	5,535	3,110	28,385	23,873	25,960	33,079	23,627	30,986	22,638	15,319	16,908	13,054
Rest of British India *	..	..	..	..	..	19,282	17,160	22,916	12,734	15,529	21,280	6,804	4,942	7,441	4,889
Total—British India	211,795	215,279	221,996	217,784	263,678	325,058	321,037	336,041	357,374	391,344	443,393	377,496	293,534	276,424	235,385
Indian States * .. ..	..	..	..	..	..	131,149	109,003	122,078	116,962	131,657	118,660	83,273	78,882	59,809	47,204
Total—INDIA * .. ..	..	..	..	..	..	456,207	430,040	458,119	474,336	523,001	562,053	460,868	372,416	336,233	282,589

* 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.