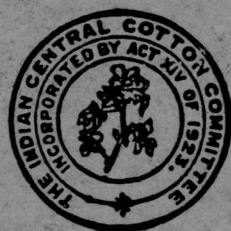


**TECHNOLOGICAL LABORATORY**

**INDIAN CENTRAL COTTON  
COMMITTEE**



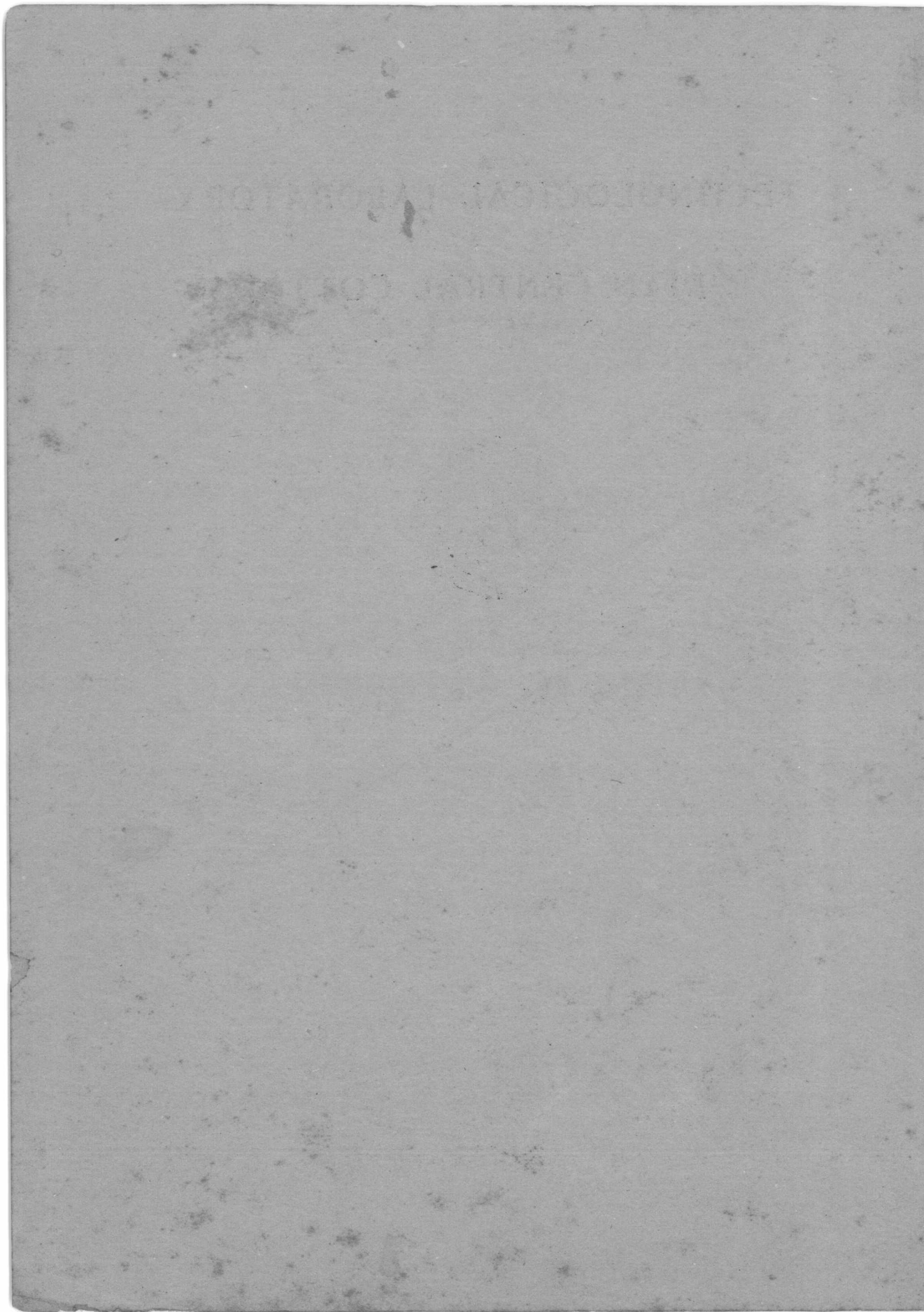
**ANNUAL REPORT**

OF THE  
DIRECTOR

TECHNOLOGICAL LABORATORY

FOR THE  
YEAR ENDING 31st MAY, 1963

**PRICE Rs. 5.50**



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COMMISSION



ANNUAL REPORT

1998-1999

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**THIRTY-NINTH ANNUAL REPORT OF THE DIRECTOR,  
TECHNOLOGICAL LABORATORY, MATUNGA,**

*For the Year Ending 31st May, 1963*

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This is the Thirty-ninth Annual Report of the Technological Laboratory, and deals with the work done during the year 1962-63. It is gratifying to record that the Laboratory continued to render valuable service to the Cotton Breeders and other research workers, as in the past, as will be borne out by the details presented below.

It will be noted from the figures given in Table 1 (page 6) that the number of samples received for all tests during the year under review was 5,103 as against 5,667 during the previous year. As already observed in the last report, this figure is round about the normal number that can be expected to be handled annually. The total number of samples received from the State Departments of Agriculture for full spinning, micro-spinning, fibre and standard tests was 3,069. The number of samples received for micro-spinning tests alone was 2,160.

The work done on these samples is summarised in Table 2 (page 7) from which it will be seen that during the year under review, 5,037 samples were tested as against 5,689 last year, registering a small decrease. However, 3,223 samples were spun against 2,962 samples last year—762 reports comprising the results for 5,037 samples were issued during the year as against 801 comprising the results of 5,689 last year. Further, the Cotton Breeders were provided with the technological data on their samples in time for the next sowing, in accordance with the scheduled programme. Laboratory reports proved very useful to the Breeders due to the determination of larger number of properties on each sample.

It will be noticed from the figures given in Table 7 (page 11) that 1,725 samples were received in the Testing House of the Laboratory from commercial and Government bodies as against 1,690 samples during last year.

During this year, mill tests were arranged to be carried out on 20 improved varieties from various States, along with their controls, and reports were sent to the concerned Officers. However, considerable difficulty was experienced in arranging for the mill tests on some others. Efforts are being made to secure the cooperation of a few more mills for undertaking tests on these.

As mentioned in the last report, the research activities mainly on structural, developmental and agronomic aspects of the fibre were continued. Several investigations were completed and bulletins on them were published and some more are under publication.

Shri N. Balasubramanian was awarded the M. Sc. Degree in Physics (Textiles) for the thesis submitted by him to the University of Bombay.

In accordance with the recommendations of the Staff Reviewing Committee, the salary scales of the Research Staff of the Laboratory were revised by the Government of India and the new scales were given effect to during the present year.

The Laboratory continued to participate in the calibration programme of the United States Department of Agriculture for Micronaire and Pressley strength tester. A proposal has been made by the Indian Central Cotton Committee for enrolling this Laboratory as a member of the International Cotton Calibration Committee. Accordingly, the Government of India have taken up the question with the United States Government and the matter is reported to be still under their consideration. A similar calibration programme for the breeding stations in India was being continued as mentioned in the last report.

A project for the "Investigation of the microbial decomposition of cellulose with special reference to the effect of Indian bacterial organisms on cotton and cotton fabrics, to provide basic information for the improvement of cotton products" was approved both by the PL. 480 authorities in the U.S.A. and by the Government of India and started functioning from January 1963. The required technical staff is being recruited and the necessary equipment is being procured. A second project, *viz.*, "Investigation of the preparation of radio-resistant and radio-sensitive celluloses to obtain basic information on the chemistry of cotton cellulose" is under the consideration of the Government of India. A third project on "The effects of high energy radiation on the induction and half-life of excited, free and/or ionised radicals in cotton cellulose," which was prepared by the United States Department of Agriculture and offered for investigation at this Laboratory under the same programme, has been submitted to the Government of India for their approval.

The Director of the Laboratory was nominated by the Government of India as a delegate representing the country at the 22nd Plenary Session of the International Cotton Advisory Committee held at Bangalore in April-May 1963.

The construction of the new building in connection with the expansion and modernisation programme of the Laboratory is progressing. The electrification of the ground floor is being carried out and the construction of the first floor is nearing completion. The entire construction is expected to be completed within a few months and it is hoped that the building will be ready for occupation by the end of 1963.

As stated in the last report, orders for the blowroom machinery to the tune of Rs. 2,91,600 were placed with Messrs. Indian Textile Engineers Pvt. Ltd., and the machinery is expected to be delivered by the end of 1963. A request has been made to the Government of India for expediting the sanction of foreign exchange for the remaining items of machinery so that the expansion and modernisation programme can be put into effect at an early date, as desired by the Indian Central Cotton Committee.

The work of the Laboratory during the period under review is described in the following sections :—

**I. TESTING WORK :**

1. General
2. Spinning Section
3. Fibre Testing Section
4. Testing House
5. Ginning Section
6. Some Important Test Results :
  - (A.) Agricultural Samples
  - (B.) Standard Cottons
  - (C.) Trade Varieties

**II. RESEARCH INVESTIGATIONS :**

- A. Summary of Work in Progress.
- B. Publications.

**III. MISCELLANEOUS :**

A technical summary of the work done during the year is attached to this report as Appendix I.



## I. TESTING WORK

## 1. GENERAL

Table 1 gives the number of samples received at the Laboratory for various tests under different heads during the year, together with the corresponding figures for the previous two years and averages for 3 five-year periods for purposes of comparison :—

TABLE 1  
Number of samples received

Type of sample	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
1. Agri. Dept. Strains :						
(a) Full Spg. tests .. .. .	807	728	896	1,128	902	880
(b) Micro Spg. tests .. .. .	—	1,081	2,101	2,638	1,874	2,160
(c) Fibre tests alone .. .. .	128	325	322	100	367	3
2. Standard cotton samples .. .. .	17	20	21	24	20	26
3. Trade variety samples .. .. .	37	41	74	80	114	79
4. Technological Research Samples ..	63	135	277	267	488	74
5. Commercial samples. (Tested on payment ):-						
(a) Spinning tests .. .. .	68	89	61	111	24	38
(b) Fibre tests .. .. .	110	161	166	310	38	130
(c) Yarn tests .. .. .	188	233	240	263	182	178
(d) Cloth tests .. .. .	115	390	218	195	166	189
(e) Moisture tests .. .. .	5	168	1,013	1,004	1,258	1,175
6. Fibre tests for E.I.C.A. .. .. .	@	@	116	99	203	130
7. Miscellaneous .. .. .	151	157	50	10	31	41
Total .. .. .	1,689	3,528	5,555	6,229	5,667	5,103

@ Included under item 7.

It will be seen from the figures given in the above Table that the total number of samples received during the period was 5,103, which is slightly less than that received last year.

Table 2 gives the number of samples tested at the Laboratory for various types of tests under different heads during the period under review together with the corresponding figures for the previous two years.

**TABLE 2**  
Number of samples tested

Type of test	1960-61	1961-62	1962-63
Full Spinning .. .. .	650	926	929
Micro Spinning .. .. .	2,069	2,029	2,194
Fibre tests alone .. .. .	932	471	299
Yarn tests .. .. .	263	171	185
Cloth tests .. .. .	195	170	195
Moisture tests .. .. .	1,004	1,471	955
Technological Research .. .. .	271	432	252
Miscellaneous .. .. .	9	19	28
<b>Total .. .. .</b>	<b>5,393</b>	<b>5,689</b>	<b>5,037</b>

It will be noted that 5,037 samples were tested during this year as against 5,689 last year.

It had been mentioned in the last Annual report that 2,079 samples of the previous year remained to be tested on the 1st June, 1962. This, together with 5,103 samples received during 1962-63, made up a total of 7,182 samples out of which 5,037 samples were tested during the year under report leaving a balance of 2,145 samples.

Table 3 gives the number of test reports, classified under various categories, issued during the period together with the corresponding figures for the previous two years and for the five year periods, 1948-53, 1953-58, and 1958-63.

**TABLE 3**  
Number of reports issued

Type of report	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
Spinning test .. .. .	220	328	432	408	478	489
Fibre test .. .. .	73	104	116	132	88	81
Yarn test .. .. .	109	92	105	122	97	77
Cloth test .. .. .	56	189	102	96	96	83
Moisture tests .. .. .	3	11	31	39	35	35
Miscellaneous .. .. .	2	9	7	2	7	7
<b>Total .. .. .</b>	<b>463</b>	<b>733</b>	<b>793</b>	<b>799</b>	<b>801</b>	<b>762</b>

As will be seen from the above table, the total number of reports issued during the period remained practically of the same order as in the past two years.

## 2. SPINNING SECTION

Tables 4 and 5 give the distribution of samples and counts spun at the Laboratory during the year together with the corresponding figures for the previous two years and the recent three quinquennia.

**TABLE 4**  
Number of samples spun

State	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
Maharashtra .. .. .	429	1,038	1,547	816	824	849
Gujarat .. .. .						
Mysore .. .. .	—	80	383	402	329	337
Madras .. .. .	94	120	57	58	41	59
Uttar Pradesh .. .. .	29	84	194	242	124	256
Madhya Pradesh .. .. .	113	232	147	156	187	118
Punjab .. .. .	61	110	89	43	129	159
Rajasthan .. .. .	2	35	30	31	28	27
Andhra Pradesh .. .. .	—	70	125	135	149	107
Kerala .. .. .	—	—	84	74	1	251
Bihar .. .. .	—	—	10*	—	—	10
Others .. .. .	18	53	15	1	21	10
Total .. .. .	746	1,822	2,681	2,699	2,845	3,030
Standard cottons .. .. .	18	21	22	22	15	29
Trade tests .. .. .	233	213	225	120	92	119
Technological Research .. .. .						
Grand Total .. .. .	997	2,056	2,928	3,040	2,962	3,223

\* For 1962-63 only.



TABLE 5  
Number of yarns spun

State	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
Maharashtra .. .. .	728	1,508	2,478	1,367	1,087	1,380
Gujarat .. .. .				1,212	1,763	1,317
Mysore .. .. .	—	153	664	707	538	473
Madras .. .. .	198	236	122	153	114	85
Uttar Pradesh .. .. .	71	169	324	361	204	384
Punjab .. .. .	112	221	155	63	210	248
Madhya Pradesh .. .. .	154	338	286	307	322	186
Rajasthan .. .. .	—	12	59	80	56	42
Andhra Pradesh .. .. .	—	48	168	193	205	153
Kerala .. .. .	—	—	98	93	3	251
Bihar .. .. .	—	—	16*	—	—	16
Others .. .. .	443	499	29	3	26	30
Total : .. .. .	1,706	3,184	4,399	4,539	4,528	4,565
Standard cottons .. .. .	115	139	112	138	96	88
Trade tests .. .. .	753	564	480	347	275	310
Technological Research .. .. .				199	23	152
Grand Total: .. .. .	2,574	3,887	4,991	5,223	4,922	5,115

\* For 1962-63 only.

These Tables show that the numbers of samples and yarns spun during the year were more than those of last year.

### 3. FIBRE TESTING SECTION

Samples on which fibre tests were done by the Fibre Testing Section fall under the following categories:—

- (i) Samples received from the Government Agricultural Farms.
- (ii) Standard Indian cottons, on which more elaborate tests than on all other types of samples are done.

- (iii) Commercial samples received from mills, trade organisations, East India Cotton Association, etc.
- (iv) Samples connected with ginning, technological and other investigations undertaken at the Laboratory, and
- (v) Miscellaneous.

The number of samples tested for fibre properties under different categories in the current year together with the corresponding figures for the previous two years and average for the period 1948-53, 1953-58 and 1958-63 for purposes of comparison are given in Table 6 which shows that during the period under review, fibre tests were made on 1,551 samples.

TABLE 6  
Number of samples tested for Fibre Properties

Type of sample	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
Agricultural (Large) .. ..	475	701	851	841	829	836
„ (Small) .. ..	190	447	835	969	693	287
Standard cottons .. ..	17	22	21	26	17	24
Trade Variety Cottons .. ..				21	53	72
Commercial (Paid tests) .. ..	197	315	340	282	64	154
East India Cotton Association } .. ..				99	203	130
Technological Research .. ..	58	72	36	57	46	9
Ginning Investigations .. ..	64	51	28	10	28	28
Miscellaneous .. ..	27	24	20	—	23	11
<b>Total .. ..</b>	<b>1,028</b>	<b>1,632</b>	<b>2,131</b>	<b>2,305</b>	<b>1,956</b>	<b>1,551</b>

#### 4. TESTING HOUSE

The Testing House of the Laboratory continued to receive a large number of samples of all types for various tests showing the usefulness of the Institution to the industry and the trade. The table below shows the number of samples received during the period under review. It will be seen from the figures that the total number of samples received during the year was 1,725, which compares favourably with that of the pervious year.

TABLE 7  
Number of samples received (Testing House)

	Average			1960-61	1961-62	1962-63
	1948-53	1953-58	1958-63			
Spinning tests .. .. .	68	89	61	111	24	38
Fibre tests .. .. .	110	161	166	310	38	130
Yarn tests .. .. .	188	233	240	263	182	178
Cloth tests .. .. .	115	390	218	195	166	189
Moisture tests .. .. .	5	168	1013	1004	1258	1175
Miscellaneous tests .. .. .	6	29	22	9	22	15
Total .. .. .	492	1070	1720	1892	1690	1725

It is gratifying to note that various Commercial and Government organisations are continuing to take advantage of the facilities offered by the Testing House for getting authoritative and technical reports on many items. Some of these Organisations are individual merchants, textile mills, manufacturing concerns, Foreign Government departments, Central and State Government departments, Bombay Municipal Corporation, B.E.S. & T. Undertaking, etc.

Apart from the usual tests of routine nature some of the special interesting investigations carried out by the Testing House in the year under report, are listed below:—

1. Two samples of cloth were received for testing to ascertain whether they were adequately treated for mildew resistance. Necessary tests were carried out and report issued accordingly.
2. A sample of pineapple fibre, 3 samples of pineapple fibre yarn, and 5 samples of cloth made from pineapple fibre yarn were received for standardising the quality. Necessary tests were carried out.
3. Abrasion tests were carried out on 14 samples of cotton healds with different treatments of varnish, to ascertain the best type of treatment for resistance to wear and tear.
4. Two samples of cloth were received from a firm to ascertain the causes for change in colour of the fabric to yellowish brown after the treatment during vulcanisation at 135°C. Necessary tests were carried out and report issued.
5. Thirty-two samples of staple fibre were received for testing mean fibre-length, fineness, fibre-strength (wet & dry) and percentage of staple fibre and other material in the samples.



6. Two samples of nylon yarn were received for carrying out tests for denier, twist, strength and number of filaments as per BISFA rules.

The fees received for carrying out the tests during the year amounted to Rs. 21,111 as against Rs. 24,007 during the previous year.

#### 5. GINNING SECTION

Most of the work done in this section during the year under report is described under the head 'Research Investigations—Summary of work in Progress' and an outline of the chief items is given below:-

A leaflet on the Pre-cleaning and ginning tests on 134-Co2-M cotton was written up and sent for publication. Further, the pre-cleaning and ginning tests on Digvijay cotton were completed and the lint samples are under test for fibre quality and spinning value.

The fabrication of an extractor was continued and an appreciable progress was made in this work.

About 22 trade varieties of 1961-62 season and about 36 varieties of 1962-63 season were ginned and their ginning percentage determined.

About 175 small samples obtained from the agronomic and other experiments were ginned in the Laboratory Gin and their ginning percentages determined.

Roller ginned lint samples obtained from different factories in Gujarat State for the determination of percentages of cutseed and fullseed present in the samples were tested and the reports issued to the officers concerned.

The Senior Research Assistant (Ginning) was deputed to study the working of a semi-Automatic feeding device for single roller gins used in the ginning factories at Miyagam and Sadhli in Gujarat State, and report on the feasibility of its adoption in similar ginning factories in other States. A report on this subject giving the merits, drawbacks etc. of the above unit has been submitted for consideration.

As stated last year, the fabrication of Laboratory gin has been entrusted to a local firm in Bombay and necessary help and guidance were given by the Senior Research Assistant (Ginning) to ensure satisfactory working of gins. The firm has supplied 6 gins during the period under report, out of which 4 have been despatched to different cotton breeding and marketing centres.

#### 6. SOME IMPORTANT TEST RESULTS

Although the results contained in the test reports, mentioned earlier, were mainly intended for the cotton breeders and other research workers, who had sent the samples, a few of them deserve particular attention, being of general interest. These are described below.

## A. Agricultural Samples

## (a) MAHARASHTRA

(1) *Varieties Y1, C.J. 73, A. K. 235, and A. K. 277 :*

Samples of these varieties were received from a number of stations for tests during this year. The performance of C.J. 73 at Jalgaon and Shevgaon, of A.K. 235 at Buldana and Nimbala and of A.K. 277 at Nimbala were better than that of Virnar which was used as control. At other places, the spinning performance of these varieties were more or less equal to that of 197-3.

(2) *Ten Desi varieties tested at Akola, Yeotmal, Buldana, Washim, and Nimbala :*

The nine varieties, A.K. 235, A.K. 277, A.K. 14, H. 2, I. 24, 183, 331, 1422, and 1946 were tried against Virnar at five places viz., Akola, Yeotmal, Buldana, Washim and Nimbala. The strains 331, H. 2 and A.K. 235 were found very promising.

(3) *Permanent Cotton Plots :*

Three samples of Buri 147 from the I, II and III pickings respectively were received for tests from the permanent cotton plots laid at Wandli (Nagpur District). The first and the second picking samples gave good spinning performance. The third picking sample, however, was not up to the mark probably because of severe bollworm attack. Similarly samples of the first, second and third pickings of Buri 147 cotton grown in the permanent cotton plot at Amaravati were tested. It was observed that the third picking sample gave a better spinning performance than the first two.

(4) *Improved strains from Dhulia :*

Ten improved strains viz., 97-41, 97-46, 97-120, 97-166, 97-187, 113-54, 113-93, 113-128, 113-181 and 200-107 evolved at Dhulia and received for tests gave good spinning performance, with H.S.C. above 40s and were found to be promising.

(5) *Varietal trials of Buri 147, 170-Co2 and Laxmi :*

Samples of these varieties grown at Kashil, Saidapur and Phalton were received for tests. It was observed that Buri 147 and 170-Co2 were a little longer than Laxmi while 170-Co2 gave a better spinning performance than the other two. All the samples received from Kashil were better in spinning performance than those received from the other places.

## (b) GUJARAT STATE

(6) *Comparative tests on BA-2-W and Sanjay :*

The two varieties BA-2-W and Sanjay were raised at four different places viz., Botad and Gadhda in Bhavnagar district and Babra and Lathi in Amreli

district. Fibre and spinning tests on samples received were taken up for a comparative study. Mean values of the fibre properties and the spinning values of the two varieties were found of the same order. Among the centres, the differences were not significant in fibre length and strength ; but in fibre weight the samples raised at Babra and Lathi were slightly finer. The samples from Babra gave slightly better spinning performance.

(7) *Comparative performance of Digvijay and Vijalpa :*

Samples of Digvijay and Vijalpa were received for tests during 1961-62 from eight places viz., Avidha, Bardoli, Bhacharvada, Broach, Dharoli, Hansot, Surat and Valod. The test results showed that on an average the difference in the two varieties in fibre properties was negligible ; but the spinning performance of Digvijay was definitely higher than that of Vijalpa, the mean difference being about eight counts. The spinning performance differed from place to place, and samples from Broach, Bhacharvada, Valod, and Avidha gave higher spinning value than the rest.

(8) *Six varieties in three different centres :*

The six varieties, 115, 190, 199, Vijalpa, Suyog and Digvijay raised in 1961-62 at three different places, Hansot, Bardoli and Valod, were subjected to fibre and spinning tests. A comparison of the mean values showed that the varieties 115, 190, 199 and Suyog were slightly longer in staple than Vijalpa and Digvijay, while Suyog was coarser than the others. The Pressley strength index for Digvijay was significantly higher than that for strain 115, but the differences between other varieties were non-significant. The spinning value of Digvijay was distinctly higher than the rest.

(9) *Irrigated and Rainfed samples :*

Samples of Deviraj (170-Co2) raised under irrigated and rainfed conditions were received during 1961-62 from four places Manavadar, Kutiyana, Upleta and Dhrangadhra. Test results on these showed that the fibre length of the samples raised at Upleta and Dhrangadhra under irrigated conditions was significantly higher than those of rainfed samples. The irrigated sample from Kutiyana also was slightly longer in staple than the rainfed ; but the samples from Manavadar gave the same fibre length. In fibre fineness and strength both the place effect and the effect of irrigation were non-significant. The differences in spinning performance between places were also non-significant, the irrigated samples had an H.S.C. only 2 to 3 counts more than the rainfed.

(10) *Mill tests on improved varieties :*

(i) Mill and Laboratory tests were carried out on samples of 115 and Vijalpa (2087) raised at Surat in 1961-62. Comparative test results are given below :—



## Lea Strength (lb) 30s yarns

Variety		Mill test	Laboratory test
115	..	57.7	55.4
Vijalpa (2087)	..	51.3	47.5

It will be seen that 115 had given definitely better yarn strength than Vijalpa.

(ii) A sample of I.S.C. 67 was sent for mill tests from Sadhli in Baroda district. As the Control sample was not received, no comparison could be made. This sample could be spun to 38s combed yarns in the mills. At the Laboratory, it was found suitable for 37s yarns (without combing). At the mill, the strength for 38s combed yarns was 51.8 lb and in the Laboratory for 40s yarns it was 37.1 lb.

(iii) A sample of I.S.C. 67 raised in 1961-62 was sent for mill tests from Dhansura. No control sample could be sent. In the mills, when spun to 38s carded yarns, it gave a strength of 50.9 lb. At the Laboratory, when spun to 40s yarns it gave a strength of 35.9 lb. and was adjudged suitable for 33s.

(iv) Four samples of hybrid cotton, I.S.C. 67 × S.I., B.C. 68 × S.I. and B.C. 68 × Moco from Kholwad and B.C. 68 × Moco from Chanasma were tested in the mills and the laboratory. Their comparative performance is indicated below :—

Variety	Mill test		Laboratory test	
	Count	Strength (lb)	Count	Strength (lb)
I.S.C. 67 x S. I.-Kholwad ..	80s	26.5	60s	28.6
B. C. 68 x S. I.-Kholwad ..	80s	25.5	60s	26.8
B. C. 68 x Moco-Kholwad ..	80s	21.4	60s	29.1
B. C. 68 x Moco Chanasma ..	80s	23.9	60s	31.3

It may be pointed out that the mills had spun these samples on 4R-HD system in the ring frame after combing them to the extent of 16-30%. Hence the mill test results of each cotton are not strictly comparable with the Laboratory test results.

(11) *Permanent Cotton Plots :*

Samples of three different pickings of Kalyan cotton raised at Kadi and Digvijay cotton raised at Broach were received for tests. It was observed that

the first picking sample of Kalyan gave better spinning performance than the second and third pickings, while in the case of Digvijay, first and third picking samples gave the same spinning value but slightly higher than that of the second picking.

## (c) MYSORE STATE

(12) *I.H. X-11 and I.H.U.-8 against Laxmi at two centres :*

Samples of these varieties grown at two places Haveri and Gadag had been received for tests. I.H. X-11 gave a poorer spinning performance than Laxmi at both these places, while I.H.U.-8 was poorer than Laxmi at Gadag, but equal at Haveri.

(13) *Sea Island Andrews cottons :*

Five special samples of this cotton grown in Mandya were tested and it was observed that these gave a very good spinning performance, three of the samples having been adjudged suitable for spinning 72s count. These had a mean fibre length 1.28" to 1.32" and mean fibre weight ranging from 0.123 to 0.144  $10^{-6}$  oz/in.

(14) *Mill tests on improved varieties :*

Samples of four cottons M.A. 5, 14-2, 30-1 and Sea Island Andrews cotton were tested at this Laboratory and a Mill. The comparative results of the cottons are indicated below :—

Variety	Mill test		Laboratory test	
	Count	Strength (lb)	Count	Strength (lb)
Sea Island Andrews	.. 100s	17.9	80s	23.1
M.A.5	.. 30s	54.2	30s	46.6
14-2	.. 30s	54.4	30s	47.8
30-1	.. 30s	54.4	30s	45.6

## (d) ANDHRA PRADESH

(15) *L. 147 from cultivator's fields at three centres :*

Samples of L. 147 cotton from three centres viz. Utnoor, Nirala and Boath in Adilabad District were tested. It was observed that these samples from Andhra Pradesh were somewhat weaker, shorter, more wasty and inferior in their spinning performance as compared to the samples received from places in Madhya Pradesh and Maharashtra.

## (e) MADRAS

## (16) 216 F cotton grown in rice fallows :

Samples of this cotton grown in the rice fallows of Tanjore and Tiruchirapalli districts were received for tests. The results are indicated below :—

Place	M. f. l. (in)	M. f. w. (10 <sup>-6</sup> oz/in)	M.C.	P.S.I.	H.S.C.
Auduthurai ..	0.91	.149	.76	9.4	37
Manaparai ..	0.90	.136	.75	8.5	35
„ ..	0.90	.146	.75	8.7	42

As compared to the average quality of the crop grown in the Punjab, these samples were somewhat shorter in staple but gave a slightly better spinning performance.

## (f) MADHYA PRADESH

## (17) Badnawar-1 cotton :

Seven samples of Badnawar-1 cotton were received for tests during the season from several places in the State. Results of the tests on the samples are summarised below :—

Place	M.f.l. (in)	M.f.wt. (10 <sup>-6</sup> oz/in)	M.C.	P.S.I.	B.L.	C.L.	H.S.C.	Remarks
Dhar ..	.99	.110	.64	8.3	10.0	8.5	45	Agri. Dept.
Badnawar ..	1.04	.135	.70	8.2	7.2	8.1	45	„
Jawad* ..	.80	.102	.66	7.8	14.4	8.9	26	„
Khandwa ..	.98	.132	.71	8.2	10.6	8.2	33	„
Badnawar ..	.99	.141	.80	8.1	8.2	7.8	34	Cultivators
„ ..	.96	.107	.64	7.6	7.5	7.7	32	Foundation stock
„ ..	.98	.098	.57	8.8	18.1	11.0	29	Cultivators

\*Severe attack of frost, jassids and aphids etc.

## (18) Mill tests on Narmada cottons :

Mill and Laboratory tests were carried out on samples of Narmada cotton raised at Khandwa. The comparative results at the Mill and the Laboratory were as follows :—

	Counts	Lea Strength (lb)
Mill ..	30s	56.6
Laboratory ..	30s	55.8



## (g) RAJASTHAN

(19) *Mill tests on C. Indore 1 :*

Mill and Laboratory tests were carried out on samples of this cotton supplied by the District Agricultural Officer, Chittoor. The comparative results are indicated below :—

		Counts	Lea Strength (lb)
Mill	..	30s	48.3
Laboratory	..	30s	47.2

(20) *Improved varieties :*

Samples of the improved varieties L.L.54, L.L.55, L.L.56 and L.L.80 were received from the Cotton Botanist, Sriganaganagar, for tests during the season. The samples of L.L.55 and L.L.56 gave a good spinning performance.

## (h) UTTAR PRADESH

(21) *Permanent cotton plots :*

Mention was made in the last report of tests on samples of 216F cotton from different pickings raised at Raya in the 1959-60 and 1960-61 seasons. The results of the tests on the samples received for the 1961-62 season were in conformity with the observations of the last two years. The third picking sample was finer, had lower maturity coefficient and gave better spinning performance than the others.

(22) *35/1, UP. No. 1, 320F and 216F cottons :*

Samples of these cottons from several places had been received for tests. Their spinning performance did not differ very much from place to place. The average H.S.C. to which these cottons were adjudged suitable for spinning during the season were as follows :

Variety		H.S.C.	Variety	H.S.C.
35/1	..	15	320F	31
U.P. No. 1	..	20	216F	31

(23) *Mill tests on improved varieties :*

Six varieties of cotton *viz.*, M.4/43, M.4/58, 216F, 197-3 × 35/1 and [(197-3 × C.520) × 197-3] × C.520(8) and Raniben were tested in a mill and at the Laboratory. The comparative results are shown below :—

Variety	Mill test		Laboratory test	
	Count	Strength (lb)	Count	Strength (lb)
M. 4/43	30s	40.8	30s	50.6
M. 4/58	30s	36.9	30s	53.6
216F (Control)	30s	39.5	30s	47.0
197-3 x 35/1	20s	79.7	20s	84.0
[(197-3 x C. 520) x 197-3] x C. 520 (8)	20s	86.2	20s	84.5
Raniben (Control)	20s	67.6	20s	75.3

## (j) PUNJAB

(24) *Improved strains evolved at Abohar and Jullundur :*

Eight improved strains A.101, A.102, A.136, A.143, A.146, A.148, A.161 and A.162 evolved at Abohar were received for tests and it was observed that they had a mean fibre length of 1" and above and were spinnable to 37s counts and above. Among these, A.136 and A.162 only appeared to have a better spinning capacity than LL.54.

Nine improved strains J.2, J.34, J.41, J.57, J.101, J.102, J.104, J.106 and J.108 evolved at Jullundur were tested at the Laboratory and it was observed that they had a staple length of about 1", and were spinnable between 28s to 37s. As compared with 320F cotton, strains J. 101 and J. 106 were found promising.

## (k) GENERAL

(25) *Tests on improved varieties from distributed seed at various stages of multiplication :*

Samples belonging to different stages of Deviraj, G.1946, M.A.5, Jayadhar and Laxmi were received for tests from different centres during the year.

(26) *Results for extra-long staple (1.1/16" and above) cottons of 1961-62 season tested from different States :*

The test results of full scale spinning carried out on extra-long staple material developed in various States under different schemes of the Indian Central Cotton Committee are given in Table 8 (page 20). This would be of help to the breeders to draw on the material for use in their breeding programme.

TABLE 8

Results for extra-long staple cottons (1-1/16" and above) of 1961-62 Season.

S. No.	Name of variety	Place	Mean fibre length (inch)	Mean fibre weight per inch (10 <sup>-6</sup> oz)	Maturity coefficient	Pressley strength index (lb/mg.)	Highest standard count
<b>I. Gujarat State</b>							
1.	Hybrids	Different centres	1.15 to 1.32	0.082 to 0.091	0.47 to 0.56	7.6 to 8.0	60s to 70s
2.	I.S.C. 67	Surat	1.12	0.108	0.64	7.4	32s
3.	B.C. 68 x S.I.	"	1.13	0.088	0.53	8.3	about 60s
4.	I.S.C. 67 x S.I.	"	1.14	0.089	0.55	7.5	"
5.	I.S.C. 67-5-B	Junagadh	1.16	0.097	0.60	6.9	32s
6.	I.S.C. 67-470	"	1.14	0.105	0.64	8.0	43s
7.	I.S.C. 67-577	"	1.14	0.102	0.62	7.8	34s
8.	I.S.C. 67-579	"	1.12	0.103	0.64	7.3	35s
9.	I.S.C. 67-B-21	"	1.08	0.109	0.66	8.3	36s
10.	I.S.C. 67	"	1.18	0.101	0.62	7.1	34s
11.	B.C. 68 x Moco	"	1.08	0.108	0.64	9.1	above 60s
12.	I.S.C. 67	Halvad	1.22	0.115	0.65	6.9	38s
13.	Deviraj	"	1.10	0.144	0.73	7.3	39s
14.	Devitej	"	1.26	0.130	0.70	7.4	41s
15.	134-Co2M-21	"	1.17	0.127	0.70	8.1	39s
16.	I.S.C. 67	Sadhli	1.22	0.098	0.60	7.7	46s
17.	"	Wankaner	1.20	0.126	0.69	7.6	42s
18.	"	Upleta	1.14	0.121	0.71	7.4	42s
19.	"	Samni	1.11	0.144	0.74	7.9	42s
20.	"	Athwa	1.13	0.119	0.67	8.1	44s
21.	"	Bardoli	1.07	0.099	0.62	7.8	32s
<b>II. Maharashtra State</b>							
22.	Buri 147	Jalgaon	1.11	0.176	0.81	7.7	45s
23.	Buri 0394	"	1.07	0.184	0.82	8.0	46s
24.	97-41	Dhulia	1.24	0.147	0.75	7.6	50s
25.	97-46	"	1.30	0.125	0.70	8.2	47s
26.	97-166	"	1.22	0.139	0.74	7.7	50s
27.	97-187	"	1.07	0.099	0.61	8.5	42s
28.	113-54	"	1.19	0.097	0.60	9.0	45s
29.	200-72	"	1.28	0.121	0.69	8.0	37s
30.	200-74	"	1.32	0.122	0.69	7.4	36s
31.	200-75	"	1.24	0.131	0.72	7.2	about 40s
32.	97-63	"	1.12	0.138	0.73	8.4	39s
33.	97-120	"	1.19	0.130	0.71	9.1	48s
34.	200-107	"	1.16	0.119	0.67	8.2	41s
35.	113-93	"	1.13	0.105	0.63	8.7	46s
36.	113-181	"	1.20	0.101	0.61	8.4	43s
37.	113-128	"	1.19	0.116	0.66	8.1	41s
38.	170-Co2	Amravati	1.10	0.117	0.68	7.8	42s
39.	I.S.C. 67	Akola	1.10	0.140	0.76	8.3	39s
40.	"	Achalpur	1.11	0.113	0.68	7.8	40s
41.	170-Co2	Jath (Sangli)	1.08	0.155	0.83	7.2	39s
42.	134-Co2	Puntamba	1.18	0.128	0.72	7.6	38s
43.	I.S.C. 67-4	"	1.15	0.119	0.69	7.2	41s
44.	I.S.C. 67	Jeur (Karmala)	1.09	0.105	0.63	7.4	32s
45.	170-Co2	Kopergaon	1.10	0.141	0.75	7.1	43s
46.	I.S.C. 67	"	1.12	0.120	0.69	7.2	46s
47.	134-Co2M-21	"	1.15	0.130	0.73	7.8	46s
<b>III. Punjab State</b>							
48.	A. 101	Abohar	1.12	0.104	0.59	8.4	39s
49.	A. 102	"	1.09	0.105	0.64	8.2	38s
50.	A. 143	"	1.08	0.127	0.71	8.4	42s
51.	A. 146	"	1.10	0.105	0.64	8.4	37s
52.	A. 148	"	1.16	0.107	0.64	8.0	40s
53.	A. 162	"	1.14	0.114	0.68	8.8	44s
<b>IV. Mysore State</b>							
54.	Sea Island Andrews	Mandya	1.28 to 1.32	0.123 to 0.144	0.69 to 0.74	7.0 to 7.4	66s to 72s



### B. Standard Indian Cottons

As in the past, extensive fibre and spinning tests were carried out on the Standard Indian Cottons for the 1961-62 season and a Technological Bulletin (Series A No. 110) embodying the results obtained for these cottons has been prepared and is under print. Out of the 24 varieties tested during the 1961-62 season, four had recorded an improvement, seven had maintained their performance while ten had registered a decline in spinning value. Three cottons were tested for the first time this year. The comparative performance of the various cottons in each State was as shown below :—

#### Spinning performance of Standard Cottons during 1961-62 as compared to that in 1960-61 season

State	Definitely better	Approximately same	Definitely poorer
Maharashtra	Jarila* Parbhani Am. 1.	Virnar, Gaorani 6, Gaorani-12, H. 420**	—
Gujarat	Digvijay, Vijay	Vijalpa, 1027 A.L.F., Kalyan	—
Mysore	—	—	Jayadhar, Laxmi, Westerns Hagari 1.
Andhra Pradesh	—	—	N-14
Madras	—	—	M.C.U. 1 (Winter) M.C.U. 2 (Summer), K2, K5.
Punjab	—	—	L. S. S., 320F.

\* As compared to 1959-60 season sample.

\*\* As compared to 1958-59 season sample.

Some of the standard cottons of the 1962-63 season have also been received for tests. Tests on them are in progress.

### C. Trade Varieties

Samples of fair average quality of the principal trade varieties of Indian Cottons of 1961-62 season were obtained with the assistance of the East India Cotton Association wherever possible and in other cases through the State Agricultural Departments. Representative kapas samples of the major trade varieties were also obtained through the co-operation of the State Agricultural Departments for the estimation of their ginning percentages. The fibre and spinning test results, ginning percentage, and other results obtained for each variety were, as in the past, published as Technological Circulars as early in the season as possible to be useful to the Cotton trade and the industry. The trade varieties on which such circulars were issued during the year are shown in pages 59-60. The technological circulars relating to the 1961-62 season, excepting a few less important ones, were later compiled and published as a Technological Bulletin (Series A No. 111) entitled 'Technological report on trade varieties of Indian Cottons 1962'.

Some of the trade varieties of the 1962-63 season have also been received and tested, while tests on others are in progress.

## II. RESEARCH INVESTIGATIONS

### A. SUMMARY OF WORK IN PROGRESS

#### (a) INVESTIGATIONS ON GINNING :

#### 1. Pre-cleaning and Ginning Tests :—(Item No. G. 1 in the Programme of Work)

It was mentioned in the previous report that the pre-cleaning and ginning tests as well as the spinning, fibre and other tests on 134-Co2-M cotton were completed and the observations from the results obtained were also given. During the period under review a leaflet was written up based on these results and sent for publication. Besides, the pre-cleaning and ginning tests on Digvijay cotton were completed and the lint samples were under test. From the results of pre-cleaning, ginning and fibre tests on Digvijay cotton, the following observations were made:—

(i) *Pre-cleaning* :—The output per hour in H. E. Opener was about five times that in the other two openers, while the power consumed by Platt's opener was more than twice that by F.E.C. and four times that by H.E. The amount of trash removed by F.E.C. was slightly more than that removed by the other two openers being about 2%.

(ii) *Effect of Pre-cleaning* :—(a) When ginned in saw gin, the highest output of lint per hour, and the lowest power consumption were observed in the case of unopened samples, while the reverse was observed in the case of samples opened in the Platts' opener.

(b) When ginned in roller gins, the differences in output of lint per hour, power consumption and ginning percentage were not conspicuous.

(iii) *Comparison of gins* :—As usual, saw ginning gave about one per cent lower ginning percentage than roller ginning.

(iv) *Effect of feed in saw gin* :—The output of lint per hour was increased and power consumption was lowered with the increase in feed steps from No. 1 to No. 4 with the saw shaft speed of 680 RPM, while the differences in the ginning percentage and fibre properties were not conspicuous.

(v) *Effect of overlap and speed in Double Roller gin* :—The change in overlap alone, did not show any marked effect in the output of lint per hour and power consumption, while the higher speed of 1030 OPM of beater gave slightly higher output of lint per hour than the lower speed of 960 OPM.

(vi) *Effect of overlap and speed in Single Roller gin* :—The change in overlap roller speed did not show any marked effect in the output of lint per hour, power consumption, ginning percentage and fibre properties.

This work was done by Shri D. G. Shete.

**2. Investigation on the formation of neps during ginning : (Item No. G. 2 in the Programme of Work).**

(i) Fifteen samples of Hybrid cotton viz. Grade I, Grade II and general lot, subjected to various pre-cleaning and ginning treatments, were tested for nep contents at the lint and card sliver stages.

Grade I, on the whole, had less neps at *kapas* and lint stages as compared to Grade II and general lot samples. Neps in the card webs were very high in all the grades irrespective of different pre-treatments.

(ii) Ten samples each of Digvijay and 134-Co2-M cottons subjected to various pre-cleaning and ginning treatments were also tested for nep contents.

This work was carried out by Dr. S. M. Betrabet.

**3. Economic and technical survey of the existing gins in India :—(Item No. G. 3 in the Programme of Work).**

During this period, the compilation of data on all-India basis was undertaken. However, since the percentage of satisfactory replies received for any question differed widely from State to State, it was considered that an overall analysis may not be reliable. Further, the results compiled from the survey were compared with those of the previous survey as far as possible. It was observed that in the main particulars, the present findings did not differ substantially from those of the previous survey, although in many cases the comparison could not be made strictly for reasons already mentioned. On the whole, it is to be concluded that the present survey does not throw more light on the position of the existing gins in our country than the previous survey. If the objective is to be achieved, it would be necessary that the survey should be carried out by deputing qualified and experienced personnel for field investigation as suggested in the last Annual Report. This is for the consideration of the Committee.

**4. Fabrication of an Extractor :—(Item No. G. 4 in the Programme of Work).**

The mounting of all the seven rollers on the angle iron frame with the necessary fittings on them was completed. The driving arrangement to obtain the required speed and the direction of rotation of a few of the rollers and motorising arrangement have been completed. The work of fabricating a specially shaped steel wire screen, sheet metal work for removal of hulls and immature locks and positioning and strengthening the necessary parts of various places, by welding is under progress. The design for the drives of the remaining rollers is under consideration and a suitable design for the same will be made after completion of the work in hand.

This work is being done by Shri D. G. Shete.



## (b) INVESTIGATIONS ON FIBRE PROPERTIES

**5. Work of pulling of the fibre from seed in relation to fibre properties and percentage of seed-coat removal :—(Item No. F. 1 in the Programme of Work.)**

During the period under review the paper on this investigation was written up and arrangements were being made for its publication.

This work was carried out by Shri Jai Prakash.

**6. Study of variation between seeds of the same strain :—(Item No. F 2 in the Programme of Work).**

(a) *Bundle strength* :—The paper entitled “The variation of the bundle strength at different regions of a cotton-seed” was sent for publication.

This work was done by Shri V. G. Munshi.

(b) *Chalazal-fibre immaturity* :—A paper on this subject was published in the July, 1962 issue of the Indian Cotton Growing Review.

This work was done by Shri Jai Prakash and Shri V. G. Munshi.

**7. Study of the properties of fibres collected from bolls of different ages.—(Item No. F 3 in the Programme of Work).**

(a) *Structural properties* :—Changes in the structural properties during the cell wall thickening of cotton fibres were being investigated. During the period under review, degree of thickening, convolution angle, fibre reversals and bundle strength were determined on the fibres from the side and chalazal regions of seeds extracted from bolls of various ages of Vijalpa and 170-Co-2 cottons of 1960-61 season ; determination of birefringence on the same was in progress.

A paper entitled, “Structural properties of cotton fibres : Part IV—Secondary cell wall deposition in relation to convolution angle, birefringence, structural reversals and tensile strength” is being drafted, incorporating the entire data obtained on the fibre development studies on Vijalpa for four seasons and 170-Co-2 for three seasons.

In accordance with the decision taken in February, 1961 to undertake the study on the development of long staple Indian Cottons at PIRRCOM Centres, preserved cotton bolls of various ages of L.L. 54 and M.C.U. 3 varieties were obtained from Sirsa and Coimbatore respectively. Determination of degree of thickening on L.L. 54 cotton of 1960-61 season at 6 stages of development and of 1961-62 season at two extreme stages of development viz., 18 and 48 days old, was completed. Similar studies on M.C.U. 3 cotton of 1961-62 season at 5 stages of development were also completed during the period under review. The samples of cotton bolls received from Sirsa gave some erratic results and the matter is being discussed with the Head of the Centre.

A comprehensive programme of work to study the effect of water stress and manuring on the fibre development of Indo-American cotton strain I.S.C. 67 and improved herbaceum strain 199 has been planned and will be undertaken from the next season in collaboration with Shri P. S. Pandya, Cotton Specialist, Gujarat State.

This work is being done by Dr. S. M. Betrabet.

(b) *Chemical Analysis of the fibres* :—The degree of polymerisation was determined for fibres collected from the bolls of Vijalpa cotton (1960-61) of four different ages, viz., 38, 45, 52 and 59 days. Estimation of wax content of these samples was also carried out. The D. P. and wax content data obtained for different stages of Vijalpa, 170-Co2, Laxmi and Jayadhar cottons are being analysed.

This work is being done by Shri S. N. Pandey.

**8. Study of properties of fibres from different regions of the seed:—***(Item No. F. 4 in the Programme of Work).*

It had been mentioned in the last Annual Report that X-ray diffraction photographs had been recorded and D. P. measurements completed on fibres from the chalazal and side regions of seeds of 22 cotton samples. The bundle strength tests had been completed on 21 samples while the maturity tests had been completed on 18 samples and the X-ray angle measurements on seven samples only. During the period under review the bundle strength and maturity tests on the remaining samples were completed. However, due to the breakdown of the X-ray unit and Photo-electric Densitometer, the X-ray angle measurements could be completed on only seven more samples. Further work is in progress.

This work was being done by Shri Jai Prakash, Dr. V. Sundaram, Shri S. N. Pandey and Shri V. G. Munshi.

**9. X-ray studies on the relationships between structural features and the physical properties of cotton :—***(Item No. F 5 (a) in the Programme of Work).*

As the X-ray unit was not working satisfactorily and as the Photo-electric Densitometer was out of order for considerable time, very little progress could be made on this investigation. The X-ray angles were determined in the case of 7 samples belonging to different species. Further work is in progress.

This work is being carried out by Dr. V. Sundaram.

**10. Inheritance of X-ray angle :—***(Item No. F 5 (b) in the Programme of Work).*

Experimental work on this problem could not be started yet as the single plant selections of the desired crosses and their parents were not received during this period. However, these samples from F1 generation of the crosses of M.C.U. 3 cotton with AHA-1-9-38 and Able 51 are shortly expected from PIRRCOM Centre, Coimbatore, through the kind co-operation of Dr. V. Santhanam. The investigation would be started as soon as the above mentioned samples are received.

This work will be done by Dr. V. Sundaram and Shri Jai Prakash.

11. **Study of structural properties of cotton and other fibres** :—(Item No. F 6 in the Programme of Work).

(a) *Study of convolution angle* :—Relationship between convolution angle and bundle strength, species-wise, is being investigated for the last few years. In all, 81 cottons have been tested so far, which includes 6 West Indies Sea Island cottons tested during the period under review.

A paper entitled, 'Structural properties of cotton fibres : Part III—interspecies relationship between convolution angle and strength' embodying the results so far obtained in this investigation, has been communicated for publication.

The important conclusions are as follows :—

- (i) Highly significant correlation coefficient between convolution angle and Pressley Strength Index was observed for *G. arboreum bengalense* (−0.97) and Egyptian *G. barbadense* (−0.93), thereby indicating a close dependence of strength on fibrillar orientation in these two species.
- (ii) The correlation coefficient between the two entities was small for *G. herbaceum* and Indian *G. hirsutum* cottons showing that factors other than fibrillar orientation overshadow their influence on the strength of cottons belonging to these two species.
- (iii) In spite of interspecific difference, it was observed that a common regression line could be fitted to the entire data and that the overall correlation coefficient (−0.73) between convolution angle and strength for all the cottons was highly significant.

This work was done by Dr. S. M. Betrabet.

(b & c) (1) *Birefringence and Reversals in Cotton* :—Reversals were determined on 11 more cottons during the period under review.

A paper entitled "Structural properties of cotton fibres : Part II—Birefringence, structural reversals in relation to mechanical properties" comprising all the data obtained so far in this investigation, was presented at the Fourth Technological Conference held at Ahmedabad in December, 1962 and the same has been accepted for publication in Textile Research Journal.

The important conclusions are as follows :—

- (i) Birefringence and spiral angle are significantly correlated with bundle strength both at zero and 1/8" gauge, toughness and stiffness.
- (ii) Meredith's observation that average spiral angle in the originally unconvoluted fibres may be the same for all varieties of cotton has also been substantiated.



- (iii) *Desi* cottons have very few reversals as compared to *G. hirsutum* and *G. barbadense* cottons. Hence, the number of reversals in a cotton appear to be more of a genetic character and it would be worth investigating whether Wakeham and Spicers' observations of preferential breakage at the point of reversals holds good for *desi* cottons
- (iv) Average distance between reversals is found to be highly correlated to the cotangent of spiral angle at constant breadth of cells just as in the case of wood tracheids and bamboo fibres as observed by Meredith.
- (v) The manner in which varieties of cottons, selected for investigation, influence the trend of results is indicated.

This work was done by Dr. S. M. Betrabet.

(b & c) (2) *Cotton oxycelluloses* :—Under certain experimental conditions, sodium-metaperiodate preferentially attacks the—OH groups in 2 and 3 positions of glucose molecules, converting them to—CHO groups. The effect of introducing —COOH and —CH<sub>2</sub>OH groups in place of —CHO by further treatment on structural properties of cotton is being investigated.

Oxycelluloses varying in copper number from 1.55 to 14.22 were studied last year. During the period under review, highly oxidised samples having copper number 41.5 and 59.5 were prepared and further reduced by introducing —CH<sub>2</sub>OH groups. Single fibre strength, birefringence, quality number etc. were determined on these samples.

This study was further extended to oxycelluloses wherein—OH groups in the sixth position of glucose molecules are preferentially attacked by dichromate-oxalic acid solution. Subsequent changes in the fibre strength and optical properties due to the introduction of —COOH and —CH<sub>2</sub>OH groups in place of aldehyde groups, as in the case of meta-periodate oxycelluloses, have also been followed. In all, 21 samples of dichromate-oxalic acid oxycelluloses were tested for single fibre strength and birefringence during the period under review.

Two cottons having very high number of reversals were also modified into oxycelluloses varying in copper numbers to study the changes brought about in the number of reversals as they are the highly oriented regions in the fibres.

A note entitled, "Birefringence, density and tensile behaviour of oxycelluloses" incorporating the results obtained on 23 meta-periodate oxycelluloses has been communicated for publication in the Journal of Textile Institute. A detailed communication will follow on completing the gross morphological studies on all the oxycelluloses.

This work is being done by Dr. S. M. Betrabet and Shri V. G. Munshi in collaboration with Professor E. H. Daruwalla of University Department of Chemical Technology.

(d) *Structural properties of some cellulose fibres* :—Effect of alkalies on the swelling behaviour of raw and delignified bast fibres is in progress for the last three years. During the period under review the method of delignification was standardised and the effect of delignification on the swelling behaviour of two bast fibres in NaOH at six different concentrations was studied; percentage swelling of these two bast fibres, in raw state, in LiOH at five different concentrations was also determined.

This work is being done by Dr. S. M. Betrabet with the assistance of Shri G. G. Phadnis.

12. **Effect of high energy irradiation on cotton** :—(*Item No. F 8 in the Programme of Work*).

It was stated in the last annual report that the Research Project on this problem submitted to the Government for getting financial assistance from P.L. 480 Funds of U.S.A, was received for certain modifications suggested by the USDA Authorities. In view of the National Emergency, Government of India also wanted the entire foreign exchange involved in the project to be eliminated before its consideration. During the period under review, the necessary changes were made and the modified project was sent to the Government of India for forwarding the same to the U. S. Government for final approval.

During their visit to Technological Laboratory, last year, P. L.480 experts, Mr. S. B. Detwiler Jr. and E. F. St. Clair had given the outline of another scheme connected with the above subject with a view to examining the feasibility of undertaking that scheme also at the Technological Laboratory. After ascertaining the possibility of undertaking the work on that scheme with the co-operation of the Tata Institute of Fundamental Research, the details of the second project entitled, "The effect of high energy radiation on the induction and half life of excited, free and/or ionized radicals in cotton cellulose", were also finalised and sent to the Government of India for being forwarded to the U.S. Government.

Further, preliminary studies on the effect of gamma ray irradiation on M.C.U. 2 cotton were also carried out by getting the samples irradiated to seven different dosages (*i.e.*,  $1 \times 10^5$ ,  $5 \times 10^5$ ,  $1 \times 10^6$ ,  $5 \times 10^6$ ,  $1.1 \times 10^7$ ,  $5 \times 10^7$  and  $1 \times 10^8$  roentgens) at a flux density of  $1.48 \times 10^5$  r/hour. Bundle strength tests showed a progressive fall in strength from a value of 40 gm/tex value for the control to about 24.2 gm/tex for the sample irradiated to a dosage of  $1 \times 10^7$  r. The samples irradiated at dosages higher than  $1 \times 10^7$  r could not be tested for strength as they had, more or less, powdered. The results indicated that irradiation with gamma-rays could be successfully carried out without much trouble as suitable containers can be obtained easily. Further work will be continued.

This work is being done by Dr. V. Sundaram and Shri Jai Prakash.

13. **The comparison of stelometer value with (a) Pressley Strength-index (zero gauge length) and (b) intrinsic strength as measured on single fibres (1/8" gauge length) :—**(Item No. F 9 in the Programme of Work).

The detailed statistical analysis of the results of 20 cottons incorporating the values of single thread-strength and lea-strength for 20s count was carried out and the paper was being written up.

This work was done by Shri V. G. Munshi and Dr. V. Sundaram.

14. **Comparison of different methods of measuring fibre maturity :—**(Item No. F 10 in the Programme of Work).

A note on determination of fibre maturity using 'Cotton Grader' was published in September, 1962 issue of the Indian Cotton Growing Review.

The detailed statistical analysis of the data collected on 80 samples was in progress.

This work was being done by Dr. V. Sundaram and Shri K. N. Seshan.

15. **Stress-Strain Studies on cotton using Instron Tensile Tester :—**

**(a) Bundle strength at various gauge lengths to determine the bundle strength gradient for different varieties of cotton:—**(Item No. F 11 (a) in the Programme of Work).

Bundle strength tests reported to have been completed earlier on 22 cottons at zero, 1 mm, 2 mm, 3.175 mm, 4 mm and 6 mm on Instron tensile tester were finalised during this period and the effective slip length at each of these gauge lengths was worked out utilising the procedure suggested by R. S. Orr and co-workers.

Eight more cottons belonging to barbadense group were added to the above 22 and their bundle strengths at various gauge lengths are being determined. It is proposed to calculate later the bundle strength gradient for all these 30 cottons and examine its relationship with structural properties.

**(b) Cotton roving strength in relation to fibre properties :—**(Item F 11 (b) in the Programme of Work).

As mentioned in last year's annual report, the necessary changes were made in the twist tester to determine the minimum twist of cohesion of the roving when held at a particular tension. After standardising the testing condition, with regard to test length of the roving and the tension to be applied to it, forty-two samples of roving were tested for minimum twist of cohesion. These samples in the form of the lint cotton were also tested for mean fibre length, fibre length irregularity percentage and fibre fineness by micronaire. On graphical analysis of data, it is observed, as expected, that the minimum twist required to be given to the roving increases with increase in fibre weight per unit length and with decrease in staple length of the cotton. Further work is in progress regarding the effect of storage, hank number and relative humidity on the minimum twist of cohesion of roving.



**(c) Comparison of different methods of testing bundle strength and the effect of rate of loading on strength :—(Item F 11 (c) in the Programme of Work).**

In continuation of last annual report, a further set of 18 cottons were tested by three different operators on both Stelometer and Pressley machine in order to confirm the accuracy of the conversion factor worked out earlier for converting bundle strength on Stelometer to its equivalent on the Pressley instrument. The data are to be analysed.

Further, a paper entitled, "Examination and standardisation of the test methods for the evaluation of fibre properties of cottons" was written up during this period.

The above items of work are being done by Shri Jai Prakash.

**16. Investigation to see whether separate micronaire scales are necessary for different species of cotton :—(Item No. F 13 in the Programme of Work).**

The data collected upto the time when the last annual report was submitted was analysed during this period and a note was written up in the form of a letter to the Editor of Textile Research Journal, which has since been published in the March, 1963 issue of the Journal. Further, data on 35 cottons belonging to *G. arboreum (indicum)* and *G. arboreum (bengalense)* were collected. The statistical analysis of the entire data is in progress.

The above work is being done by Shri Jai Prakash.

**17. Variation of fibre bundle strength with relative humidity :—(Item No. F 14 in the Programme of Work.)**

It was reported in the last annual report that bundle strength test on 12 cottons were completed at 7 levels of R. H. ranging from 25% to 83% both at zero and 1/8" gauge lengths. On analysing the results, the conclusions were found to be somewhat at variance with those reported in a publication from U.S.A. Hence, the main conclusions were written up and published in the November, 1962 issue of Textile Research Journal.

Further work was continued on the 12 samples reported above, for bundle strength tests at zero and 1/8" gauge lengths at still higher relative humidities of 88% and 92%. In addition, one cotton sample out of the 12 mentioned earlier was dewaxed, slack mercerized and degraded to different extents by treatment with HCl. The bundle strength test at both zero gauge and 1/8" gauge lengths on these modified samples were also completed at six levels of relative humidities. Further work is in progress.

This work is being carried out by Shri Jai Prakash.

**18. Effect of swelling agents on structural and mechanical properties of cotton fibres :**  
—(*Item No. F 15 in the Programme of Work*).

In continuation of last annual report where 10 samples were reported to have been mercerized slack with 20% NaOH and then washed after stretching to their normal length on Instron, they were further mercerized at four more stretches (—8%, —4%, +4% and 8%) during the period under review following the same technique. All these forty samples together with the ten samples mentioned in the last annual report mercerized to original length, were tested for bundle strength at zero and 1/8" gauge lengths. A progressive increase in bundle strength was noted with the increase in stretch applied to the sample during the mercerization process. Further work is in progress.

This investigation is being carried out by Shri Jai Prakash.

**19. Nickerson Hunter Colorimeter Tests :—**(*Item No. F 16 in the Programme of Work*).

(a) **Effect of storage :**

The reflectance percentage and degree of yellowness of the 16 samples stored in two lots, one in conditioned and another in unconditioned room, were determined both before and after the monsoon in 1962 and before the monsoon in 1963.

(b) **Colour chart for Indian grade standards :**

It had been mentioned in the last annual report that in co-operation with the E.I.C.A. Ltd., an investigation has been undertaken to determine the contribution of different factors such as colour, the amount of foreign matter etc. to the grade of the cotton. During the present year about 720 samples belonging to various grades of trade varieties of Indian cottons were tested on the colorimeter for reflectance percentage and degree of yellowness. Further work could not be continued due to the breakdown of the instrument.

This work was being carried out by Shri N. Balasubramanian and Dr. V. Sundaram.

**20. Standardisation of Digital Fibrograph :—**(*Item No. F 17 in the Programme of Work*).

The full paper presented at the third Technological Conference organised by Bombay Textile Research Association in January, 1962 was communicated for publication.

Further, data were also collected on the comparative performance of the manual and Digital Fibrograph for 25 cottons. Further work is in progress.

This work is being done by Shri Jai Prakash.

21. **Standardisation of the Vibroscope** :—(*Item No. F 18 in the Programme of Work*).

The calibration and standardisation was started with the help of single fibre weighing balance. However, the work had to be temporarily suspended because the single fibre weighing balance was showing some erratic performance due to occasional shifting of the initial position. This work will be resumed again after the single fibre weighing balance is adjusted to give satisfactory performance.

This work is being done by Shri Jai Prakash.

22. **An Evaluation of the performance of the Port-Ar Instrument** :—(*Item not included in the Programme of Work*).

A paper embodying the results reported in the last annual report was communicated for publication in the Indian Cotton Growing Review.

This work was carried out by Dr. V. Sundaram with the assistance of Shri K. N. Seshan.

(c) INVESTIGATIONS ON FIBRE PROPERTIES AND YARN CHARACTERISTICS

23. **Variation of fibre weight of single fibre in relation to yarn irregularity** :—(*Item No. Y 2 in the Programme of Work*).

It had been mentioned in the last annual report that the variation in fineness and strength of single fibres had been tested in the case of six cottons. The irregularities of 20s yarns spun out of four of these samples were tested during the period under review. Further work could not be carried out as the single fibre balance was giving erratic values. It is expected that the defect in the balance will be rectified shortly and further work taken up thereafter.

This work was done by Shri N. Balasubramanian and is being continued by Dr. V. Sundaram.

24. **Effect of fibre properties on yarn evenness** :—(*Item No. Y 5 in the Programme of Work*).

The results of this investigation were communicated for publication in the form of a letter to the Editor, Journal of the Textile Institute (U.K.)

This work was done by Shri N. Balasubramanian.



25. **Studies on lustre behaviour of cotton fibres and yarn :—**(Item No. Y 6 in the Programme of Work).

Lustre measurements were carried out on all the ten samples mercerized to different stretches, i. e.—8%,—4%, + 4% and + 8% reported under item No. 18 above. It was found that the contrast ratio increased progressively with increase in stretch upto + 4% and after that there was a fall in the ratio. The reasons for this behaviour are being investigated by determining the circularity and birefringence of cotton fibres mercerized to different stretches.

This work is being carried out by Shri Jai Prakash with the assistance of Shri P. G. Oka.

26. **Regression coefficients between fibre properties and spinning value on tract-wise basis :—**(Item No. Y 8 in the Programme of Work).

Data available were being collected. Regression equations will be worked out for those tracts where sufficient data are available.

This work is being done by Dr. V. Sundaram and Shri G. S. Rajaraman.

27. **Upgrading of cotton by double roving and high draft in relation to fibre properties :—**(Item No. Y 9 in the Programme of Work).

A note on the results obtained on 40s yarn was published in the January 1963 issue of the Indian Cotton Growing Review.

Further, a detailed analysis is being made of the results on all counts.

This work is being done by Dr. V. Sundaram.

28. **Determination of the extent of immaturity that could be tolerated in long staple cottons in reference to their final spinning performance and nep potentiality :—**(Item No. Y 10 in the Programme of Work).

The data relating to fibre properties and spinning performance of long staple cottons such as Sea Island Andrews, 134-Co2-M, I.S.C. 67, 170-Co2, etc., already tested at the Laboratory were compiled and analysed. As it was felt that there was not sufficient variation in the maturity values of samples belonging to these varieties tested at the Laboratory, the various Cotton Specialists and Cotton Breeders have been addressed requesting for samples having wide variations in maturity. After receipt of these samples, necessary tests will be carried out and the results analysed.

This work will be done by Dr. V. Sundaram.

## (d) INVESTIGATIONS ON SPINNING AND YARN CHARACTERISTICS

29. **Standardisation of yarn evenness** :—(*Item No. S 1 in the Programme of Work*).

It had been mentioned in the last annual report that the work on the standardisations of the methods for the evaluation of yarn appearance by comparison with photographic standards prepared by A.S.T.M. was in progress. A paper entitled "A comparative study of the visual assessment of the yarn irregularity with the Uster Evenness Tester results", based on previous results using the Laboratory method for the visual assessment of yarn evenness was accepted for publication in the Indian Cotton Growing Review.

This work was done by Shri N. Balasubramanian.

30. **Study of evenness at different stages of processing from card to ring frame with different systems of processing** :—(*Item No. S 2 in the Programme of Work*).

The results mentioned in the last annual report were published in the form of a letter to the Editor to the Textile Research Journal (U.S.A.) November, 1962.

This work was carried out by Shri N. Balasubramanian.

31. **Effect of distribution of draft in the speed frames and change of draft in the ring frame on the evenness of the product** :—(*Item No. S 3 in the Programme of Work*).

The influence of draft distribution between Slubber and Intermediate frames on the irregularity of the intermediate roving was investigated at two different total drafts. The results indicated that provided the individual drafts are kept within reasonable limits the draft distribution could be varied over a fairly wide range without having any appreciable effect on the uniformity of the final product. A paper based on the investigation has been accepted for publication in the Indian Textile Journal.

This work was carried out by Shri N. Balasubramanian.

32. **Relation between yarn mass irregularity and yarn strength irregularity** :—(*Item No. S 4 in the Programme of Work*).

The results of this investigation are being analysed.

This work was done by Shri N. Balasubramanian and is being continued by Dr. V. Sundaram.

33. **Variance-length curve studies** :—(*Item No. S 5 in the Programme of Work*).

A full paper embodying the results of this investigation was communicated for publication in the Textile Research Journal (U.S.A.)

This work was carried out by Shri N. Balasubramanian.

**34. Combing of good quality Indian Cottons :—***(Item No. S 6 in the Programme of Work).*

It had been mentioned in the last annual report that combing tests had been completed on 134-Co2-M, I.S.C. 67, L. L. 54 and A.R.B.P. 52. The test results were analysed and the following conclusions were drawn :—Combing to the extent of 16-18% showed a substantial improvement in H.S.C. to the extent of 19 counts in the case of L.L. 54 and 14 counts in the case of I.S.C. 67, whereas in the case of 134-Co2-M the improvement was only to the extent of 7 counts in H.S.C. The performance of both L.L. 54 and I.S.C. 67 after combing to 16-18% was comparable to that of carded A.R.B.P. 52.

This work was carried out by Shri V. V. Gupte.

**35. Study of the variation in yarn strength at different portions of the bobbin :—***(Item No. S 10 in the Programme of Work).*

It has been mentioned in the last annual report that a paper on this subject was written up for publication. The paper has now been accepted for publication in the July 1963 issue of the Indian Cotton Growing Review.

This work was done by Shri V. V. Gupte, Shri V. Venkataraman and Shri H. B. Joshi.

**36. Comparison of strength and extension values of single thread by different methods of tests :—***(Item No. S 12 in the Programme of Work).*

The data collected on this problem were analysed graphically by plotting the single thread strength values obtained by the three instruments for both 20s and 30s counts. It was observed that while Scott tester and Instron gave, more or less, similar values in the entire range of the strength tested so far, Goodbrands' single thread strength tester generally gave progressively lower values than the other two instruments, especially in the region of high strength. The reasons for this behaviour are being looked into by carrying out some more comparative tests on Scott tester and Goodbrands' single thread tester for yarns of lower counts.

This work is being done by Shri Hari Rao Navkal, Dr. V. Sundaram and Shri Jai Prakash.

**37. Investigation on the effects of different processing treatments on the spinning value of M.A. 5 :—***(Item No. S 13 in the Programme of Work).*

The paper on the above subject has been accepted for publication in the September, 1963 issue of the Indian Cotton Growing Review.

This work was done by Shri Harirao Navkal and Shri V. V. Gupte.



**38. Skein Strength of the yarn in the metric system :—(Item No. S 14 in the Programme of Work).**

During the past few years, considerable work was carried out at the Laboratory on the above subject with special reference to the tex system of yarn numbering as it was expected that this system would be adopted in this country. Based on the work at the Laboratory, it was shown that the yarn quality as measured by skein breaking strength could be conveniently denoted by a factor termed yarn strength index (Y.S.I.) and that Y.S.I. was very nearly equal to the factor C.S.P. (Count Strength Product) followed in the English Cotton system. However, the Government of India decided that the French Count should be used to designate yarn fineness consequent to the adoption of the Metric System. Hence the results of the earlier experiments were re-analysed using the French count for yarn numbering and a new measure of yarn quality F.S.P. (which is the product of the French count and the metric skein breaking strength in Kilograms) was evaluated ; F.S.P. was found to be nearly equal to  $\frac{1}{2}$  C.S.P., based on the results of 90 samples of yarn ranging from 10s to 80s English Cotton counts. A regression equation for calculating F.S.P. from C.S.P. was also derived. A paper based on these findings was communicated for publication.

This work was done by Dr. V. Sundaram.

**39. Relationship between single thread strength measured at 500 mm. test length and at 12" test length at a constant rate of traverse machine :—(Item No. S 15 in the Programme of Work).**

It had been mentioned in the last annual report that tests had been completed on 17 samples of 20s count, 16 of 30s count and 14 of 40s count. Tests were carried out on the requisite number of samples so as to complete 20 samples each of 20s, 30s and 40s counts. The results were being analysed.

This work was carried out by Dr. V. Sundaram.

**40. Variation of yarn strength with relative humidity :—(Item No. S 16 in the Programme of Work).**

Based on the preliminary results obtained last year, twelve samples of cotton were selected. Six of these were spun into 20s, 24s, and 30s counts while the remaining six were spun into 30s, 34s, and 40s counts. All the 36 samples of yarn thus obtained were tested for metric skein strength, after necessary pre-conditioning, in atmosphere of 35%, 45%, 55% and 65% relative humidity. Further work on the skein strength at higher levels of humidity and on single thread strength at various humidities is in progress.

This work was done by Dr. V. Sundaram.

## (e) CHEMICAL INVESTIGATIONS

**41. Evaluation of D. P. values of Indian cottons by different methods.**—(*Item No. C 1 in the Programme of Work*).

D. P. estimation by different methods was continued during this period. D. P. of 8 cotton samples was carried out in Cannon Fenske Viscometer tubes (series 300) for solution of 0.5 per cent concentration in cupriethylenediamine. Tests were also made for viscosity on 4 cotton samples at different concentrations namely 0.4, 0.3, 0.2, 0.1 and 0.05 per cent in cupriethylenediamine solvent. D. P. tests by cuprammonium method with X-type tube was also continued and five more cotton samples were tested during the period.

Results obtained by both the methods will be analysed and a paper will be written up for publication.

This work is being done by Shri S. N. Pandey.

**42. Estimation of pectin and wax content and their relation to fibre strength and moisture absorption :**—(*Item No. C 3 in the Programme of Work*).

Study on this problem was continued during this period and the wax content was determined for six more cotton samples. Moisture absorption at various humidity levels was determined for three cottons in raw as well as in dewaxed conditions. In all, 16 cotton samples have been tested for wax content and 10 for moisture absorption at various humidity levels.

Wax content was also determined on fibres from side and chalazal regions of five cottons during this period. The results obtained for wax content on side and chalazal fibres of 20 cottons, were analysed and a paper was written up and submitted for publication. It was observed that the wax content was higher in fibres from the chalazal region than in those from the side regions of seeds of the same cotton. It was not possible to carry out pectin estimation on cotton fibres as the spectrophotometer was out of order.

This work was done by Shri S. N. Pandey.

**43. Studies in the chemical modification of cottons :**—(*Item No. C 4 in the programme of Work*).

Two raw cotton samples were treated with ethylenediamine, ethanolamine and ethylamine. Treatment with ethylenediamine was carried out on one cotton sample, with three different concentrations *viz.*, 50 per cent, 80 per cent and anhydrous amine, for four hours at 20°C. Crystallinities of treated as well as control samples were determined by Iodine-absorption method.

A cotton sample was also treated with 25 per cent and 50 per cent solution of sodium hydroxide for four hours at 20°C and reduction in crystallinity was determined by the same method as mentioned above. Further work on this problem is in progress.

This work is being done by Shri S. N. Pandey.

**44. Study on the ash and mineral contents of Indian cottons : (Item No. C 5 in the Programme of Work)**

The ash and various mineral constituents in five cotton samples were estimated during this period. In all 25 cotton samples, belonging to four different species have been tested. These results were summarised and a paper has been submitted for publication. Some of the interesting results obtained in this study may be mentioned here briefly. Mean ash content of cottons from four different species indicated that cottons belonging to *G. arboreum* and *G. barbadense* species had lower ash content as compared to those of the other two species viz., *G. herbaceum* and *G. hirsutum*. It was also observed that potash constituted the major part of cotton ash. *G. arboreum* cottons contained high percentage of phosphate as against the other three species. Calcium content in *G. hirsutum* cottons was higher than that in the other three species.

This work was done by Shri S. N. Pandey.

**45. Determination of the oil content of different varieties of cotton seeds : (Item No. C 6 in the Programme of Work).**

(i) 186 cotton seed samples from different stations were tested for oil content during this year and the reports were sent to the respective breeding stations.

(ii) **Estimation of oil content of cotton seed by different methods :**

The usual soxhlet method for oil estimation is time consuming ; hence to expedite the work, investigation was taken on oil extraction by use of a centrifuge. Preliminary experiments were carried out by using different timings such as 2, 3, 4, 5, 6, 7 & 8 minutes and speeds, 2,500, 2,600, 2,700 and 2,800 r. p. m. It was found that with a speed of 2,500 r. p. m., centrifuging for 5 minutes was suitable for the purpose as the values given by this method were very close to those obtained by soxhlet extraction. Oil content estimations were carried out on 40 cotton seed samples belonging to different botanical species by both the methods viz., centrifuge and solvent extraction. The results are being analysed.

The above items of work were done by Kum. I. G. Bhatt and Shri S. N. Pandey.

(f) MISCELLANEOUS INVESTIGATIONS

**46. Reduction of neps in neppy Indian Cottons :—(Item No. M 1 in the Programme of Work).**

Single plant produce (1961-62 season) of about 100 plants each of 134-C02-M, I.S.C. 67 and M.C.U. 2 cottons, together with control samples representing the general crop of the year were tested for neps and other important fibre properties. Seeds of the strains selected on the basis of neppiness were sent for propagation during 1962-63 season.

This work was done by Dr. S. M. Betrabet.



**47. Study of the effects of different agronomic treatments on fibre properties : (Item No. M 2 of the Programme of Work).**

**(i) Effect of different frequencies of irrigation and manurial trials :**

The statistical analysis of the data for three seasons was in progress.

**(ii) Effect of differential irrigation (different frequencies of irrigation and intensities of irrigation) and levels of nitrogen.**

The consolidated results of the three seasons are being analysed.

**(iii) Effect of alpha-naphthalene-acetic acid :**

As mentioned in the last report, this experiment was continued for the fourth season.

150 seeds were selected from each of 56 samples (Desi and 320-F cottons) and the weight of each seed, the lint weight per seed, and the ginning percentage were determined.

Mean-fibre length was determined using Balls sorter on 28 samples each of Desi and 320-F cottons.

**(iv) The fertilizer experiments of Dharwar :**

*NP experiment* :—The statistical analysis showed that bundle strength and the upper-half-mean were significantly affected by N-treatments and unaffected by P-treatments. The upper-half-mean increased with increasing doses of nitrogen, being maximum at N3 level (60 lbs). On the other hand the bundle strength was adversely affected by increase in nitrogen dose and the mean value of bundle strength decreased from 35.0 g/t at No-level (0 lbs/acre) to 33.8 g/t at N3-level (60 lb/acre).

**(v) Agronomic experiment at Sirsa :**

In the previous report, it had been mentioned that upper-half-mean and bundle strength (zero-gauge-length) were measured on 108 samples of 1960-61 season. During the period under review, micronaire fineness and maturity coefficient (using a spacer on the Micronaire) were determined on these samples.

The samples from the 1961-62 crop were not received as the experiment was spoiled at the PIRRCOM Centre, due to unavoidable reasons.

**(vi) Samples from I. A. R. I. investigations on phosphorous fertilization of cotton by Radio-Tracer Technique :**

72 samples of 216F cotton (1960-61 season) which had been already tested for the ginning percentage, were tested for mean-fibre-length, micronaire-fineness, maturity-coefficient and bundle strength (zero-gauge-length). The samples belonging to 1961-62 season were tested for meanfibre length and micronaire fineness. The other properties will be determined on these samples.

The above items of work are being done by Shri V. G. Munshi.

**48. Effect of change in the conditions of growth on the physical character and spinning performance of cotton : (Item No. M. 3 in the Programme of Work).**

**(i) Study of three varieties grown in three localities in Madras State :**

It had been mentioned in the last annual report that a paper had been communicated for publication based on the results in a study of three varieties (P. 216 F, P. 23F. and H. 14) grown at three localities (Aduthurai, Coimbatore and Palur) in Madras State. This paper was published in the November, 1962 issue of the Indian Cotton Growing Review.

This work was done by Dr. V. Sundaram and Shri Jai Prakash.

**(ii) Place-effect study on 170-Co. 2 Cotton :**

It had been mentioned in the last annual report that it was proposed to investigate the spinning performance and fibre characteristics including structural aspects of 170-Co. 2 cotton grown at five different places, viz., Arbhavi in Mysore State, Kopergaon, Khasapur and Niphad in Maharashtra State and Sagdividi Farm (Junagadh) in Gujarat State. Spinning and fibre tests were carried out on samples belonging to the 1961-62 season during the period under review. The tests will be continued for a few more seasons and the results analysed after collection of sufficient data.

This work was done by Dr. V. Sundaram.

**49. Investigation on the microbial decomposition of cotton cellulose etc : (Item No. M 5 in the Programme of Work.)**

Financial sanction of the 4 year project under P. L. 480 has been received from U.S. Department of Agriculture and although technically the project came into effect from 3rd January, 1963, work actually commenced from the 1st March, 1963. Firms owning cotton godowns, textile mills, fisheries department etc., have been contacted to obtain samples for the project work. Equipment, chemicals, glassware etc. are being procured for the project. It is expected that by the middle of June, 1963 the entire technical staff will have been appointed and the experimental work would then commence.

This work is being done by Dr. S. M. Betrabet.

**50. Comparative performance of three interspecific varieties of cotton : (Not included in the Programme of Work)**

A revised paper based on the results mentioned in the last annual report was communicated for publication in the Indian Cotton Growing Review.

This work was done by Dr. V. Sundaram.

## B. PUBLICATIONS

A list of publications issued by this Laboratory during the year is given in Appendix II. Four of these which were issued as Technological Bulletins of the Laboratory are summarised below :—

### 1. Technological Bulletin, Series A, No. 109.

*Up-Grading Indian Cottons of good quality by the use of double roving on double apron drafting system and its relation to their fibre properties.*

Fifty-eight different cottons were spun into 40s counts in two different ways— one using the normal three roller system with single roving in the creel and the second using Casablanca High Draft System using double roving in the creel.

The following conclusions have been drawn from this study :—

- (i) The spinning value of a cotton as determined by the count strength product is likely to be raised by about 18 to 19 per cent by using Casablanca High Draft System and employing double roving in the creel over the value obtained by ordinary three roller method of spinning with single roving.
- (ii) Greater benefits are likely to be derived by this aid by cottons having higher mean fibre length.
- (iii) Finer cottons may respond better to this treatment.
- (iv) Cottons with higher Pressley Strength Index may also give a better result with this method of up-grading cottons.

### 2. Technological Bulletin Series B, No. 83.

*Study of the Variation of Fibre Maturity from Single Seeds in Relation to Seed and Embryo Weights.*

This investigation reports the results regarding the variation of maturity coefficient for fibres from the side and chalazal regions of each of the 50 seeds from a cotton in relation to seed and embryo weights. It was inferred from the study on 15 cottons that the maturity of side region fibres is usually higher than that of the chalazal region fibres. The difference between the two expressed as a percentage of maturity co-efficient of fibres from chalazal region was found to be highly related to the number of neps per gram in the corresponding yarns of 20s count. Chalazal fibre maturity was also found to be highly associated with seed weight within a variety.



### 3. Technological Bulletin Series B, No. 84.

*A Note on the Determination of Cotton Fibre Maturity using the 'Cotton Grader.'*

A new Hungarian Instrument 'Cotton Grader' was tested in the Laboratory with a view to assess its suitability for measuring fibre maturity. Results obtained on 40 cottons indicated a high correlation of + 0.92 between 'Cotton Grader' value and maturity coefficient obtained by the Caustic Soda swelling method. It was also observed that the maturity coefficient was correlated better with the 'Cotton Grader' values than with the difference of Micronaire values measured with and without 3/8" spacer. A regression equation for calculating maturity coefficient from 'Cotton Grader' values was also derived.

### 4. Technological Bulletin Series B, No. 85.

*Studies on the Effect of Conditions of Growth on the Strength and Structure of Cotton Fibres. Part I. Preliminary Investigations on the Effect of Locality of Growth.*

The effect of three localities (Coimbatore, Aduthurai and Palur) of growth on the fibre strength, fibre structure (fibrillar orientation as determined by 40 per cent X-ray angle) and the inter-relationship between these two characteristics was studied on three varieties of cotton (P. 216F, P. 23F and H. 14) grown during the seasons 1956-57, 1957-58 and 1958-59. In general, it was observed that an increase in fibre strength of a variety was reflected by a decrease in its X-ray angle. This relationship was observed in the case of all the varieties grown in these localities during the three seasons studied. Whenever the locality effect tended to lower the fibre strength, there was a corresponding increase in X-ray angle. Further, all the three varieties recorded relatively lower fibre strength and higher X-ray angle when they were grown at Coimbatore than when grown at Aduthurai or Palur. It may, therefore, be concluded from the results obtained so far that the locality of growth considerably affects the fibre strength and structure (fibrillar orientation) of cotton fibres without affecting the inter-relationship between these two characteristics.

## III. MISCELLANEOUS

### (i) Visitors :

Among the distinguished persons who visited this laboratory during the year under review, mention may be made of the following :—

1. Mr. J. W. Pumpelly, O.B.E., Gordin Unit System, Inc. Dallas, Texas (U.S.A.)
2. Mr. J. C. H. Hurd, F.T.I., Leicester College of Technology, Leicester (England).
3. Mr. R. D. Campbell of the Murray Company of Texas, Inc. Dallas, Texas (U.S.A.)

4. Mr. A. A. Webber, M/s. Murray Company of Texas, Inc. Nairobi.
  5. Shri G. R. Kamath, Secretary to the Government of India, Ministry of Food and Agriculture, New Delhi.
  6. Mr. C. Underwood, Technical Adviser, Colombo Plan, The South India Textile Research Association, Coimbatore.
  7. Mr. Shibayama, Managing Director, M/s. Pantex Company Ltd., Osaka, Japan.
  8. Mr. J. Ishikawa, Managing Director, M/s. Keisokki Company, Limited, Osaka, Japan.
  9. Mr. Justin J. Gutknecht, Cotton Technologist, I.R.C.T., Paris.
  10. Mr. George W. Pfeifferberger, Vice President, Plains Cotton Growers, Texas, U.S.A.
  11. Mr. Dmitri Kostiukhin
  12. Mr. Nik Rioumine
  13. Mr. A. Skoortsov
  14. Mr. F. Khodjaev
  15. Mr. E. Guaznov
- } Members of the U.S.S.R. delegation to the International Cotton Advisory Committee at 22nd Plenary session held at Bangalore.
16. Shri A. D. Pandit,  
Vice President, I.C.A.R.,  
New Delhi.
  17. Shri A. S. Bhatnagar,  
Secretary, I.C.A.R., New Delhi
  18. Dr. S. M. Sikka, Additional Agricultural Commissioner with the Government of India, I.C.A.R., New Delhi.
  19. Shri Prem Narain, Financial Adviser in the Ministry of Food and Agriculture, Government of India, New Delhi.
- } Members of the Staff Reviewing Committee.

As usual, a large number of students from various Technological Institutions also visited this Laboratory.

**(ii) Staff Reviewing Committee.**

The President and members of the Ad-hoc Staff Reviewing Committee visited the Laboratory on the 19th October, 1962, and acquainted themselves with the work of the different sections. On the basis of their recommendations, the various scientific and technical posts at the Laboratory were redesignated providing improved scales of pay to discourage the flight of trained research staff to other avenues of employment and to provide adequate prospects to really promising staff. The existing staff has been fitted into the new scales.

**(iii) Membership of Committees Etc.**

Dr. R. L. N. Iyengar, Director, has been appointed as a member of :

1. The Senate, the Academic Council and the Board of Studies in Physics of the University of Bombay,
2. The Board of Visitors of the Department of Chemical Technology,
3. The Board of Management of the Victoria Jubilee Technical Institute,
4. The Textile Division Council of the Indian Standards Institution (TDC) and of its Sub-Committees, viz., 'Textile Standards Sectional Committee' (TDC 1) and 'Cotton Yarn and Cloth Sectional Committee' (TDC 2).

Besides, the Government of India nominated Dr. R. L. N. Iyengar as a member of the Indian Delegation to the Plenary Session of the International Cotton Advisory Committee held at Bangalore from the 29th April to the 8th May, 1963.

Dr. V. Sundaram, Senior Scientific Officer, was appointed as alternate member to Dr. R. L. N. Iyengar in the Sub-Committees TDC 1 and TDC 2 mentioned above.

Dr. S. M. Betrabet, Senior Scientific Officer, was appointed as a member of Sub-Committee for Biological Test Methods, TDC 5:10, of the Indian Standards Institution.

Shri R. P. Neogi, Senior Scientific Officer (Spinning) was appointed as a member on the Cotton Healds and Reeds Sectional Committee (TDC 22) of the Indian Standards Institution.

**(iv) University Recognition and Awards :**

Dr. V. Sundaram, Senior Scientific Officer has been recognised as a University teacher for guiding students registered at this Laboratory for the M. Sc. degree in textile Physics by research.

Shri N. Balasubramanian, Junior Research Officer was declared eligible for the M.Sc. degree in Textile Physics by the University of Bombay on the basis of a thesis submitted by him.



**(v) Appointments :**

Dr. V. Sundaram, Shri Jai Prakash, Dr. S. M. Betrabet, Senior Research Officers were appointed to the upgraded posts of Senior Scientific Officers with effect from the 21st January, 1963. Shri R. P. Neogi was appointed as Senior Scientific Officer (Spinning) with effect from the same date.

Sarvashri V. G. Munshi and S. N. Pandey, Junior Research Officers were appointed to the upgraded posts of Junior Scientific Officers with effect from the 21st June, 1962

Shri G. S. Rajaraman, Assistant Statistician, Indian Central Cotton Committee was appointed as Junior Scientific Officer (Statistics) with effect from the 2nd January, 1963.

Dr. C. J. Shah who was appointed as Junior Scientific Officer (Physics) with effect from the 16th January, 1963, resigned his post at the Technological Laboratory from the 11th April, 1963.

The following appointments were made in the Junior Staff :

Name	Designation	Date of appointment
Shri V. Venugopalan	Jr. Assistant (Testing)	10th July, 1962.
„ N. Tejappa	-do-	13th July, 1962.
„ K. M. George	-do-	16th July, 1962.
„ K. M. Vijayaraghavan	-do-	5th September 1962.
„ K. V. Babu	-do-	1st November, 1962.
„ R. G. Parekh	-do-	22nd November, 1962.
„ G. K. Advani	-do-	23rd November, 1962.
„ H. M. Basu	Second Spinning Asst.	11th December, 1962
„ V. D. Ponkshe	Stenographer G. II	9th January, 1963.
Kum. Indira G. Bhat	Bio-chemist*	1st March, 1963
Shri A. H. Sawant	L.D.C.*	1st April, 1963.

Shri T. G. Shankarnarayan, Junior Assistant (Testing), was appointed as Senior Assistant (Technological) at Bulandshahr.

\* Appointments made under P.L. 480 Project.

**(vi) Retirement and Resignations.**

Shri V. Venkataraman, Junior Research Officer, having attained the age of 60 years retired from the service of the Committee with effect from the 10th July, 1962.

Shri R. G. Panvalkar, Senior Assistant (Testing) having attained the age of 60 years retired from the services of the Committee with effect from the 13th September, 1962.

Shri N. Balasubramanian, Junior Research Officer, having secured a Commonwealth Scholarship, proceeded to the U. K. for higher studies after resigning his post.

Among the junior staff, resignations were received from the following members which were accepted with effect from the dates indicated against their names:

Name	Designation of post held	Resignation accepted from
Shri A. V. Ravindranathan	Jr. Assistant (Testing)	1-7-1962
Kum. K. M. Advani	-do-	20-4-1962
Shri K. N. Seshan	-do-	1-9-1962
„ H. Vittala	-do-	2-9-1962
„ N. Geo Paul	Research Assistant	23-5-1963
„ P. Vasudevan	Stenographer, Grade II	4-1-1963

Shri G. K. Advani who was appointed temporarily in a leave vacancy of Junior Assistant (Testing), was relieved from service with effect from the 11th April, 1963.

**(vii) Training :**

Shri Jai Prakash, Senior Scientific Officer, has been selected for a Fellowship under the Colombo Plan for advanced training in U.K. He is expected to proceed for the training in September 1963.

The Government of India have accepted the proposals for the training of Dr. S. M. Betrabet, Senior Scientific Officer in the U.K. under the Colombo Plan, in Textile Microscopy and Micro-Biology.

Shri V. G. Munshi, Junior Scientific Officer has been deputed for training in Electronics Instrumentation at the Central Electronics Engineering Research Institute, Pilani (Rajasthan) for a period of six months from the 15th April, 1963.

Shri H. V. Tamhankar, Senior Research Assistant (Electrical) underwent training in instrumentation in Textile Industry conducted by M/s Blue Star Engineering Co., Bombay from the 4th June, 1962 to the 11th July, 1962.

Shri Om Prakash Bansal, Senior Assistant (Technological) at Abohar was given training at the Laboratory for 3 months from the 30th July, 1962.

Sarvashri S. K. Iyer, E.S. Abraham and R. C. Sankalia, Junior Assistants (Technological) at Coimbatore, Dharwar and Surat respectively were deputed to this Laboratory for the refresher course for 13 days from the 10th to 22nd September, 1962. Sarvashri Y. R. Yardi and N. B. Joshi, Junior Assistants (Technological) at Dharwar and Indore attended the refresher course from the 24th September, to the 6th October, 1962.

In view of the need for strictest possible economy in travelling allowance during the present emergency, the refresher course for the Senior Assistants (Technological) and the conference of Senior Assistants (Technological) and Senior Staff of the Laboratory which were scheduled to be held in December, 1962, were postponed indefinitely. However, the Senior Assistants Stationed at Sriganganagar and Nandyal were called for a refresher course from the 11th to the 22nd December, 1962 as they took charge of these stations very recently and some more training was considered essential in their cases.

**(viii) Short Course in Cotton Technology.**

The following were selected for training in the elements of spinning and methods of testing fibres, yarn and cloth and application of statistical methods for a period of six months commencing from the 2nd July, 1962 :—

Shri Dilip A. Kapadia	M/s. The Hindustan Spinning & Weaving Co. Ltd., Bombay.
„ P. Vanniarajan	M/s. V. P. S. Ayyemperumal Nadar & Sons (Pvt.) Ltd., Virudhunagar.
„ A. N. Undalkar	M/s. The Swadeshi Mills Ltd., Kurla.
„ R. Thiagarajan	M/s. Thanjavur Textiles Ltd., Thanjavur.
„ Narendra Bahadur Singh Narpatsingh Thakur.	M/s. Shree Niwas Cotton Mills Ltd., Bombay.
„ Shyam P. Narulla	M/s. Podar Mills Ltd., Bombay.



**(ix) Conferences and symposium.**

Dr. S. M. Betrabet, Senior Scientific Officer, submitted a paper on "Structural Properties of Cotton Fibres, Part II—Birefringence and structural reversals in relation to mechanical properties" to the fourth Joint Technological Conference held at Ahmedabad from the 3rd to the 5th December 1962, under the auspices of the Ahmedabad Textile Industry's Research Association.

Shri S. N. Pandey, Junior Scientific Officer, attended the 'Research and Industry Meet' on Cotton Linters held at Hyderabad on the 28th and 29th September, 1962. He also delivered a lecture on "Chemically modified cottons" which was arranged under the joint auspices of the Technological Laboratory and the Bombay Branch of the Textile Institute.

**(x) Exhibition.**

Baer Sorter Patterns of good quality Indian cottons for the Indian Industrial and Trade Exhibition which the Government of India had decided to organise in Moscow in June-July 1963, were prepared and forwarded to the Indian Central Cotton Committee.

**(xi) P. L. 480 Project.**

The Government of India, Department of Agriculture, had accepted a grant of Rs. 1,44,230/- from the United States Department of Agriculture, Agricultural Research Service, Far Eastern Regional Research Office, American Embassy, New Delhi, for the project entitled, "Investigation of the microbial decomposition of cellulose with special reference to the effect of Indian bacterial organisms on cotton and cotton fabrics, to provide basic information for the improvement of cotton products." Although the agreement was signed on the 3rd January, 1963, the first instalment of the advance, amounting to Rs. 27,339/- was received by the Committee only on the 5th March, 1963. Consequently, much headway could not be made in this project. Every effort was being made to procure the required equipment, apparatus and chemicals. A Bio-Chemist had already been appointed in the project and action had been taken to recruit a Micro-biologist and a Technical Assistant. The ancillary staff were also recruited in the project. The first fiscal report for the period ending the 30th April, 1963, was also submitted to the United States Department of Agriculture, Agricultural Research Service, in accordance with the terms of the agreement.

Another Project, "Investigation of the preparation of radioresistant and radiosensitive cellulose to obtain basic information on the chemistry of cotton cellulose" was revised and submitted to the Government of India for consideration.

Further, a third proposal, "Effects of high energy radiation on the induction and half-life of excited, free and/or ionised radicals in cotton cellulose" was prepared and forwarded to the Government of India for consideration and also for the approval of the Technological Research Sub-Committee of the Indian Central Cotton Committee.

**(xii) Laboratory Equipment.**

Additions to the Laboratory equipment during the period under review are given below :—

- (1) Standard Model Martindale Wear Tester.
- (2) Soxhlet Extraction Apparatus.
- (3) Air Compressor for Micronaire.
- (4) Semi-self indicating scales (Avery).
- (5) Constant Temperature thermostatic water bath.
- (6) Micronaire, New Model No. 80400.
- (7) Digital Fibrograph, Model 183.
- (8) Yarn Testing Machine (Lea) No. 18 with dial 0-100 kgs.
- (9) Refrigerator.

**(xiii) Instruments fabricated**

The following instruments were fabricated locally, tested and supplied during the period :—

	Quantity
(1) Laboratory Gins ..	4
(2) Halo Length Discs ..	23

**(xiv) Library.**

The number of books in the Library at the beginning of the year was 1,723. During the year, 74 books were added bringing the total to 1,797. The number of bound volumes at the end of the year was 1,624. The Laboratory was getting as many as 73 important Scientific Journals dealing with the textile and allied subjects. Of these, 53 were subscribed, while the other 20 were on exchange or free basis.

**(xv) Staff Research Council.**

Three meetings of the Staff Research Council were held. Programme of work of the Laboratory and the progress made on the research problems in hand were discussed at these meetings. In one of these meetings, the Annual report of the Director was considered and in another, the interim report for the period June to November 1962 was discussed.

**(xvi) Transport.**

The Government of India approved of the transfer of the Jeep station wagon belonging to the Kerala Unit of the Scheme for Development and Improvement of Sea Island Cotton, to Bombay for the use of the Technological Laboratory. The station wagon had proved to be an useful addition to the Laboratory.

**(xvii) Economy in Expenditure.**

In view of the present National Emergency, utmost economy was exercised in respect of expenditure. All expenditure which was not of essential nature, was either postponed or avoided. Grant of leave to the staff was restricted and sanctioned only in unavoidable cases. The appointment of substitutes in leave vacancies were not made wherever avoidable. Paper correspondence was restricted to the minimum consistent to the need for economy. The Third All-India Spinners, Breeders and Ginners Conference scheduled to be held at the Laboratory in February-March 1963, was postponed.

**ACKNOWLEDGEMENT.**

I take this opportunity to express my gratitude and deep indebtedness to the office-bearers of the Indian Central Cotton Committee for their keen interest in the work of the Laboratory and for the valuable suggestions thereon. My grateful thanks are due to the East India Cotton Association Ltd., Bombay, and their Sworn Surveyors for kindly grading a large number of experimental, trade, standard and technological samples of cotton and also for their kind co-operation in supplying the samples of different grades and their data.

My thanks are also due to the authorities of the Ahmedabad Textile Industry's Research Association for arranging mill tests on some of the samples in their member-mills and also to the authorities of various mills who conducted the mill tests.

I also wish to place on record my sincere thanks to the technical and administrative staff of the Laboratory for their willing and loyal co-operation, without which the work described in the present report could not have been accomplished.

R. L. N. IYENGAR



## APPENDIX I

## TECHNICAL SUMMARY

This report gives an account of the work carried out at the Laboratory during the year 1962-63. Good progress has been recorded in the various activities, as will be seen from the report, a summary of which is given below :—

## A. TESTS MADE AT THE LABORATORY

The total number of samples received for all types of tests during the year was 5,103 as against 5,667 during the previous year. As already observed in the last report, this figure is roundabout the normal number that can be expected to be handled annually. The number of samples tested during the year was 5,037 against 5,689 last year.

## B. TESTS FOR THE STATE AGRICULTURAL DEPARTMENTS

The total number of samples received for various types of tests from the Agricultural Departments of various States was 3,069 as against 3,163 last year. The reports on the test results evaluating the quality of new strains proved to be of great utility to the cotton breeders in selection work. Some of them belonged to the improved varieties under various stages of multiplication. A few items of special interest are summarised below :—

1. Samples of Digvijay and Vijalpa of 1961-62 season were received from eight places and tested. It was observed that whereas the fibre properties did not differ much between these, the spinning performance of Digvijay was definitely superior.

2. Among nine improved strains evolved at Jullundur and received for tests, the strains J. 101 and J. 106 were found to be promising.

3. Mill tests were arranged to be carried out on 20 improved varieties including their controls during the year from various States and reports were sent to the concerned officers.

4. Results of tests on all samples of extra long staple varieties 1-1/16" and above belonging to the 1961-62 season received for tests are given in this report for the benefit of the cotton breeders.

## C. TESTS FOR THE COTTON TRADE AND THE TEXTILE INDUSTRY

Technological bulletins on trade varieties of fair average quality and on standard cottons raised in the experimental stations were published for general information. Technological Circulars on the trade varieties were issued as soon as tests were completed. These publications proved very useful to the cotton trade and industry.

The testing house of the Laboratory received 1,725 samples for various types of tests during the year against 1,690 last year. Tests on some of these were of a special nature, details of which are referred to in the main report.

#### D. RESEARCH INVESTIGATIONS

Substantial progress was recorded during the year in most of the items of research work. Progress on each item is very briefly dealt with below :—

##### (a) Investigation on ginning :

1. A leaflet based on the results of the pre-cleaning and ginning tests as well as the spinning, fibre and other tests on 134-Co2-M cotton was sent for publication. The lint samples of Digvijay cotton were under test.
2. Fifteen samples of Hybrid cotton *viz.*, Grade I, Grade II and general lot received from the Cotton Specialist, Gujarat were subjected to various pre-cleaning and ginning tests and then tested for nep contents. Grade I, on the whole, had less neps at kapas and lint stages as compared to the others. Neps in the card webs were very high in all cases irrespective of different pretreatments.
3. The replies received to the questionnaire sent in connection with the Economic and Technical Survey of the existing gins in India were consolidated on all-India basis. This survey did not throw more light on the position of the existing gins in the country than the earlier one.
4. Fabrication of the extractor was continued and good progress has been made.

##### (b) Investigations on fibre properties :

5. The investigation 'Work of pulling of the fibres from seed in relation to fibre properties and percentage of seed-coat removal' has been completed and a paper on it has been written.
6. A paper entitled 'The variation of the bundle strength of fibres from different regions of a cotton seed' was sent for publication. Another paper entitled 'Study of the variation of fibre maturity from single seeds in relation to seed and embryo weights' was published in the July, 1962 issue of the Indian Cotton Growing Review.
7. A paper entitled 'Structural properties of cotton fibres Part IV—secondary cell wall deposition in relation to convolution angle, birefringence, structural reversals and tensile strength' has been drafted incorporating the entire data obtained on the fibre development studies on Vijalpa and 170-Co2 cottons. In connection with the study on the development of long staple Indian cottons at PIRRCOM Centres, cotton bolls of different ages of LL. 54 and M.C.U. 3 varieties were obtained and some tests made on these.

8. Study of bundle strength, X-ray angle, D. P. value and maturity of fibres from different regions on the seed were continued.
9. Studies on the relationship of X-ray angle with the D. P. value and the strength were continued.
10. The investigation on the relationship between convolution angle and bundle strength species-wise was continued and a paper entitled 'Structural properties of cotton fibres—Part II—Birefringence, structural reversals in relation to mechanical properties' has been communicated for publication.
11. Studies of optical properties and tensile behaviour were carried out on two highly oxidised metaperiodate oxycelluloses. 21 samples of dichromate-oxalic acid oxycelluloses were also tested for the same properties. A note on this study was communicated for publication.
12. In connection with the study of structural properties of other cellulosic fibres, the method of delignification was standardised and the effect of delignification on the swelling behaviour of two bast fibres was investigated.
13. A modified project on the lines suggested by the P.L. 480 authorities for the investigation 'effect of high energy irradiation on cotton' was submitted. Proposals for another project 'the effect of high energy irradiation on the induction and half life of excited, free and/or ionised radicals in cotton cellulose' were also prepared and submitted.
14. Test results regarding the investigation 'Comparison of Stelometer value with Pressley Strength Index and intrinsic strength' were being analysed.
15. Detailed statistical analysis of the data regarding the investigation 'comparison of different methods of measuring fibre maturity' was in progress. A note on 'determination of fibre maturity using *Cotton Grader*' was published in the Indian Cotton Growing Review, September 1962 issue.
16. The study to determine the bundle strength gradient for different Indian cottons was continued and tests were being made on eight more cottons.
17. The testing conditions with regard to the length of the roving and the tension to be applied to it were standardised and 42 samples of roving were tested for minimum twist of cohesion.
18. For comparison of different methods of testing bundle strength, a set of 18 cottons were tested on Stelometer and Pressley Strength Tester.
19. A part of the data regarding the investigation to see whether separate micronaire scales are necessary for different species of cotton was analysed and published in the form of a letter to the Editor, Textile Research Journal.



20. To study the variation of the fibre bundle strength with relative humidity, the data collected during the last year were analysed and the main conclusions were published as a letter to the Editor, Textile Research Journal. Further tests were made on the 12 samples under study.

21. Regarding the study 'the effect of swelling agents on structural and mechanical properties of cotton fibres', ten samples under tests were mercerised at four more stretches and all the fifty derived samples were tested for bundle strength.

22. To study the effect of storage of cotton, the reflectance percentage and degree of yellowness of samples stored in two lots, one in conditioned and the other in unconditioned room, were determined with the Nickerson-Hunter Cotton Colorimeter both before and after the monsoon in 1962.

23. About 720 samples belonging to different grades of Trade varieties of cotton were tested on the Cotton Colorimeter for preparation of colour chart of Indian grade standards in co-operation with the East India Cotton Association Ltd.

24. Some findings of the investigation for the standardisation of the testing procedure in the Digital Fibrograph were incorporated in a paper and sent for publication. Tests were made on 23 Cottons for the comparative performance of Manual and Digital Fibrographs.

25. A paper on the evaluation of the performance of the Port-Ar instrument was communicated for publication.

**(c) Investigations on fibre properties and yarn characteristics :**

26. Regarding the investigation 'variation of fibre weight of single fibres in relation to yarn irregularity', four samples of 20s yarns were tested for irregularity.

27. The results of the investigation 'Effect of fibre properties on yarn evenness' were communicated for publication.

28. Lustre measurements were carried out on ten samples mercerised to different stretches to study the lustre behaviour of cotton fibre and yarn. It was found that the contrast ratio increased progressively with the increase in stretches upto + 4% and after that there was a fall in the ratio.

29. A note on the results obtained on 40s yarns relating to the study of upgrading of good quality Indian cottons by the use of double roving was published in the Indian Cotton Growing Review, January, 1963, issue.

**(d) Investigation on spinning and yarn characteristics :**

30. A paper entitled 'A comparative study of the visual assessment of the yarn irregularity with the Uster Evenness Tester Results' was accepted for publication in the Indian Cotton Growing Review.

31. Test results on the study of the effect of different systems of processing yarns were published in the form of a letter to the Editor, Textile Research Journal.

32. A paper on the investigation 'Effect of distribution of draft in the speed frames on the evenness of the product' has been accepted for publication in the Indian Textile Journal.

33. A paper embodying the results of the investigation on the variance-length curve studies was communicated for publication.

34. The test results of the investigation on the combing of good quality Indian cottons were analysed and it was found that combing to the extent of 16-18% showed an improvement in spinning value to the extent of 19 counts in the case of L.L. 54, 14 in the case of I.S.C. 67 and 7 in the case of 134-Co2-M.

35. The test results on the comparison of strength and extension values of single thread by different methods of tests showed that while Scott tester and Instron gave similar values, the Goodbrands single thread strength tester gave lower values than the other two instruments.

36. The results of the experiments on the investigation 'skein strength of the yarn in the metric system', were reanalysed using the French count for yarn numbering and a new measure of yarn quality (F.S.P.). The F.S.P. was nearly equal to half of C.S.P. A paper based on the findings was communicated for publication.

37. Further tests were carried out on the investigation of relationship between single thread strength measured at 500 mm and 12" test lengths.

83. Testing of the samples at levels upto 65% R. H. was completed for the investigation of variation of yarn strength with relative humidity; tests at higher levels of R. H. were in progress.

**(e) Chemical investigations :**

39. The evaluation of D. P. values of Indian cottons by different methods was continued during the period.

40. Investigation on the estimation of pectin and wax content and their relationship to fibre strength and moisture absorption was continued. It was observed that the wax content was higher in the fibres from the chalazal region than in those from the side regions of seeds of the same cotton.

41. Work on the standardisation of methods for studies in the chemical modification of cotton was in progress.

42. A study on the ash and mineral contents of Indian cottons was being made. It was observed that the cottons belonging to *G. arboreum* and *G. barbadense* species had more ash content than the others.

43. Forty cotton seed samples were tested for oil content by the centrifuge and solvent extraction methods. The results were being analysed for comparing the two methods.

**(f) Miscellaneous investigations :**

44. Single plant produce of about 100 plants each of 134-Co2-M, I.S.C. 67, and M.C.U. 2 cottons were tested for neps and other important fibre properties in connection with the study of reduction of neps in neppy Indian cottons. Seeds of selected strains were sent for propagation.

45. The study of the effects of different agronomic treatments such as different frequencies of irrigation, different intensities of irrigation, manurial treatments, hormone treatments etc. on seed and lint weights, ginning percentage and fibre properties was continued during the period. The fertilizer (N.P.) experiment at Dharwar showed that while the upper half mean increased with increasing dose of N, the bundle strength was adversely affected.

46. Samples of 170-Co2 cotton grown at five different places were tested for spinning and fibre properties for investigating the place effect. The tests will be continued for a few more seasons and the results analysed thereafter.

47. An investigation on the microbial decomposition of cotton cellulose etc. has been commenced.

48. A revised paper based on the results of tests carried out last year on the comparative performance of three interspecific varieties 170-Co2, 134-Co2-M, and I.S.C. 67 was sent for publication.



## APPENDIX II

## LIST OF PUBLICATIONS

(A) **Technological Bulletins :**

- (1) Series A, No. 109, 'Up-grading Indian cottons of good quality by the use of double roving on double apron drafting system and its relation to their fibre properties' by V. V. Gupte and R. L. N. Iyengar—reprinted from Indian Cotton Growing Review. January, 1963.
- (2) Series A, No. 110 'Technological reports on Standard Indian Cottons—1962' by R. L. N. Iyengar.
- (3) Series A, No. 111, 'Technological Reports on Trade Varieties of Indian Cottons—1962' by R. L. N. Iyengar.
- (4) Series B, No. 83, 'Study of the variation of fibre maturity from single seeds in relation to seed and embryo weights' by Jai Prakash, V. G. Munshi and R. L. N. Iyengar,—reprinted from Indian Cotton Growing Review, July, 1962.
- (5) Series B, No. 84, 'A note on the determination of cotton fibre maturity using *Cotton Grader*' by V. Sundaram and R. L. N. Iyengar—reprinted from Indian Cotton Growing Review, September, 1962.
- (6) Series B, No. 85, 'Studies on the effect of conditions of growth on the strength and structure of cotton fibre. Part I. Preliminary investigations on the effect of locality of growth' by V. Sundaram, Jai Prakash and R. L. N. Iyengar—reprinted from Indian Cotton Growing Review, November, 1962.

(B) **Technological Leaflets :**

- (1) Leaflet No. 73, Pre-cleaning and ginning tests on Indian Cottons—(38), tests on 134-Co2-M (1959-60 season) by R. L. N. Iyengar and D. G. Shete.

(C) **Articles and Papers :**(a) **Published :**

- (1) 'Up-grading by apron drafting' by N. Balasubramanian and R. L. N. Iyengar, letter to Editor, Textile Research Journal, U.S.A. November, 1962.
- (2) 'Effect of relative humidity on the bundle strength at zero and 1/8" gauge lengths' by Jai Prakash and R. L. N. Iyengar, letter to Editor, Textile Research Journal U.S.A., November, 1962.

- (3) 'Suitability of Micronaire instrument for fineness determination of Indian cottons' by Jai Prakash and R. L. N. Iyengar, letter to the Editor, Textile Research Journal, U.S.A., March, 1963.

**(b) Sent for Publication :**

- (1) 'Effect of different processing treatments on spinning quality of M.A. 5 cotton' by Harirao Navkal, V. V. Gupte and R. L. N. Iyengar.
- (2) 'Variation in counts and strength of yarn due to its position on bobbin' by V. V. Gupte, V. Venkataraman, H. B. Joshi and R. L. N. Iyengar.
- (3) 'Influence of draft distribution on irregularity' by N. Balasubramanian.
- (4) 'Evaluation of length parameters obtained with the Digital Fibrograph with special reference to length non-uniformity' by Jai Prakash.
- (5) 'Relationship between yarn irregularity, draft and fibre properties' by N. Balasubramanian and R. L. N. Iyengar.
- (6) 'Contribution to the study of B. L. Curve of cotton yarns' by N. Balasubramanian.
- (7) 'Comparative performance of three interspecific varieties of cotton' by V. Sundaram and R. L. N. Iyengar.
- (8) 'An evaluation of the performance of Port-Ar instrument with respect to the Micronaire instrument for the measurement of fibre fineness' by V. Sundaram and K. N. Seshan.
- (9) 'Structural properties of cotton fibres. Part II, Birefringence and structural reversals in relation to mechanical properties' by S.M. Betrabet, K.P.R. Pillay and R. L. N. Iyengar, (contribution to the 4th Technological conference held at ATIRA, Ahmedabad, December, 1962).
- (10) 'Some observations on the differential technological behaviour of cottons belonging to different species. Part I : Old world (Desi) cottons *arboreum* and *herbaceum*' by Jai Prakash and R. L. N. Iyengar.
- (11) 'Structural properties of cotton fibres : Part III, interspecies relationship between convolution angle and strength' by S. M. Betrabet and R. L. N. Iyengar.
- (12) 'Birefringence, density and tensile behaviour of celluloses' by E. H. Daruwala, S. M. Betrabet, C. J. Jacob and V. G. Munshi.
- (13) 'The variation of bundle strength at different regions of cotton seeds' by V. G. Munshi and R. L. N. Iyengar.
- (14) 'Metric skein breaking strength of yarns numbered in French Counts' by R. L. N. Iyengar and V. Sundaram.

**(D) Technological Circulars.**

Technological Circular No.	Variety	Fibre and Spinning Test Report No.	Month of Publication
<b>1961-62 Season</b>			
1266	Digvijay (Cambay)	6766	June 1962
1267	Deviraj (Nagar)	6767	-do-
1268	Virnar (Berar)	6768	-do-
1269	P.A. 320F	6769	-do-
1270	Digvijay (Dabhoi)	6831	August 1962
1271	Wagad (Surendarnagar)	6832	-do-
1272	Vijalpa (Surat)	6833	-do-
1273	Jaydhar (Hubli)	6834	-do-
1274	Jaydhar (Bagalkot)	6835	-do-
1275	A. R. B. P. 52	6836	-do-
1276	A. R. Jinja	6837	-do-
1277	Digvijay (Kapadvanj)	6838	-do-
1278	Kalyan (Bavla)	6839	-do-
1279	Laxmi (Gadag)	6840	-do-
1280	Kalyan (Viramgam)	6841	-do-
1281	Digvijay (Palej)	6842	-do-
1282	M. A. 5	6843	-do-
1283	Westerns (Adoni)	6844	-do-
1284	Vijalpa (Navsari)	6849	September 1962
1285	Kalyan (Saurashtra)	6850	-do-
1286	P. A. H. 14	6891	October 1962
1287	P. A. 216F	6892	-do-
1288	Laxmi (Adoni)	6893	-do-
1289	Gaorani 22	6901	November 1962
1290	A-51-9 (Khandwa)	6902	-do-
1291	C. Indore-1	6903	-do-
1292	Gaorani 6 (Umri)	6904	-do-
1293	Parbhani American 1	6922	November 1962
1294	L. L. 54	6953	-do-
1295	Tinnevelly	6954	-do-
1296	Karunganni-2 (Sattur)	6955	-do-
1297	K. 6 (Pandyam)	6956	-do-



Technological Circular No.	Variety	Fibre and Spinning Test Report No.	Month of Publication
1298	Vijalpa (Rajpipla)	6959	December 1962
1299	M. C. U. 1 (Coimbatore)	6960	-do-
1300	M. C. U. 3 (9030G)	6961	-do-
1301	M. C. U. 2 (Summer)	7048	January 1963
1302	Deviraj (Manavadar)	7083	February 1963
1303	Devitej (Idar)	7084	-do-
1304	Gaorani 6 (Bhainsa)	7085	-do-
1305	Nandyal 14	7086	-do-
1306	Buri 147 (Pathorat)	7203	May 1963
<b>1962-63 Season</b>			
1307	Daulat	7209	-do-
1308	Virnar (E. Khandesh)	7210	-do-
1309	Vijalpa (Surat)	7211	-do-
1310	Digvijay (Dabhoi)	7212	-do-
1311	Deviraj (Nagar)	7213	-do-
1312	P. A. H. 14	7223	-do-
1313	Vijalpa (Rajpipla)	7224	-do-
1314	Kalyan (Bavla)	7225	-do-
1315	Digvijay (Palej)	7226	-do-
1316	Bengal Desi (Punjab)	7230	-do-
1317	Deviraj (Manavadar)	7231	-do-
1318	Buri 0394 (E. Nimar)	7241	-do-

## APPENDIX III

SCIENTIFIC AND TECHNICAL STAFF IN THE TECHNOLOGICAL  
LABORATORY*(as on the 31st May, 1963)*

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<b>Director :</b>	Dr. R. L. N. Iyengar, D. Sc., F. T. I.
<b>Senior Scientific Officers :</b>	Dr. V. Sundaram, M. Sc., Ph. D., A. R. I. C. Shri Jai Prakash, M. Sc. Dr. S. M. Betrabet, M. Sc., Ph. D. Shri R. P. Neogi, B. Sc., B.Sc (Tech.) (Manch.)
<b>Junior Scientific Officers :</b>	Shri V. G. Munshi, M. Sc. ,, S. N. Pandey, M. Sc. ,, G. S. Rajaraman, M. A. One Post Vacant
<b>Senior Research Assistants :</b>	Shri K. G. Deo ,, H. R. Nayak ,, K. S. Marar, B. A. ,, P. S. Sambamurthy ,, P. V. Nachane, B. Sc. ,, S. Samson, B. Sc., LL. B. ,, S. B. Mogre, M. Sc. ,, D. G. Shete, L. M. E. ,, H. V. Tamhankar, L. M. E., L. E. E. ,, S. A. Shankarnarayan, B. Sc. (Text.)
<b>Research Assistants :</b>	Shri P. D. Vakil ,, C. A. S. Aiyar, B. Sc. ,, K. Venkateswaran, B. A. ,, S. Ramanathan ,, S. S. Malik, M.A. (Maths.) M.A. (Stat.)

**Research Assistants :**

Shri K. S. Bhyrappa, L. T. T.  
 „ A. M. Basu, B. Sc., B. Sc (Tech.)  
 „ Y. N. Tendulkar  
 „ R. Braganza, B. Sc.  
 „ P. G. Oka, B. Sc.  
 Smt. S. B. Pai, B. Sc. (Hons)  
 Shri G. G. Phadnis, B. Sc.  
 „ M. S. Sawant, B. Sc.  
 Smt. K. L. Datar, B. Sc.  
 Shri S. R. Ganatra, B. Sc.  
 „ A. W. Shringarpure, B. Sc.  
 „ S. G. Nayar, B. Sc., LL. B.  
 „ C. V. Raman, B. A.  
 „ S. Srinivasan, B. Sc.  
 „ A. Rajagopalan, B. Sc.  
 „ A. V. Ukidve, B. Sc.  
 „ K. S. Shama Rao, B. Sc.  
 „ N. Venkatramu, B. Sc.  
 „ B. M. Petkar, B. Sc.  
 „ K. R. Kamath, B. Sc.  
 Kum. K. G. Tavkar, B. Sc. (Hons)  
 Shri A. K. Anthony, B. Sc.  
 „ K. Chandran, B. A.  
 Kum. S. Janaki, B. Sc.  
 Shri P. K. Jairam, B. Sc.  
 „ S. N. Nagvekar, B. Sc.  
 (Two posts vacant)

**Junior Assistants (Testing):**

Shri V. Venugopalan, B. Sc.  
 „ N. Thejappa, B. Sc.  
 „ K. M. George, B. Sc.  
 „ K. M. Vijayaraghavan, B. Sc.  
 „ K. V. Babu, B. Sc.  
 „ R. G. Parekh, B. Sc.

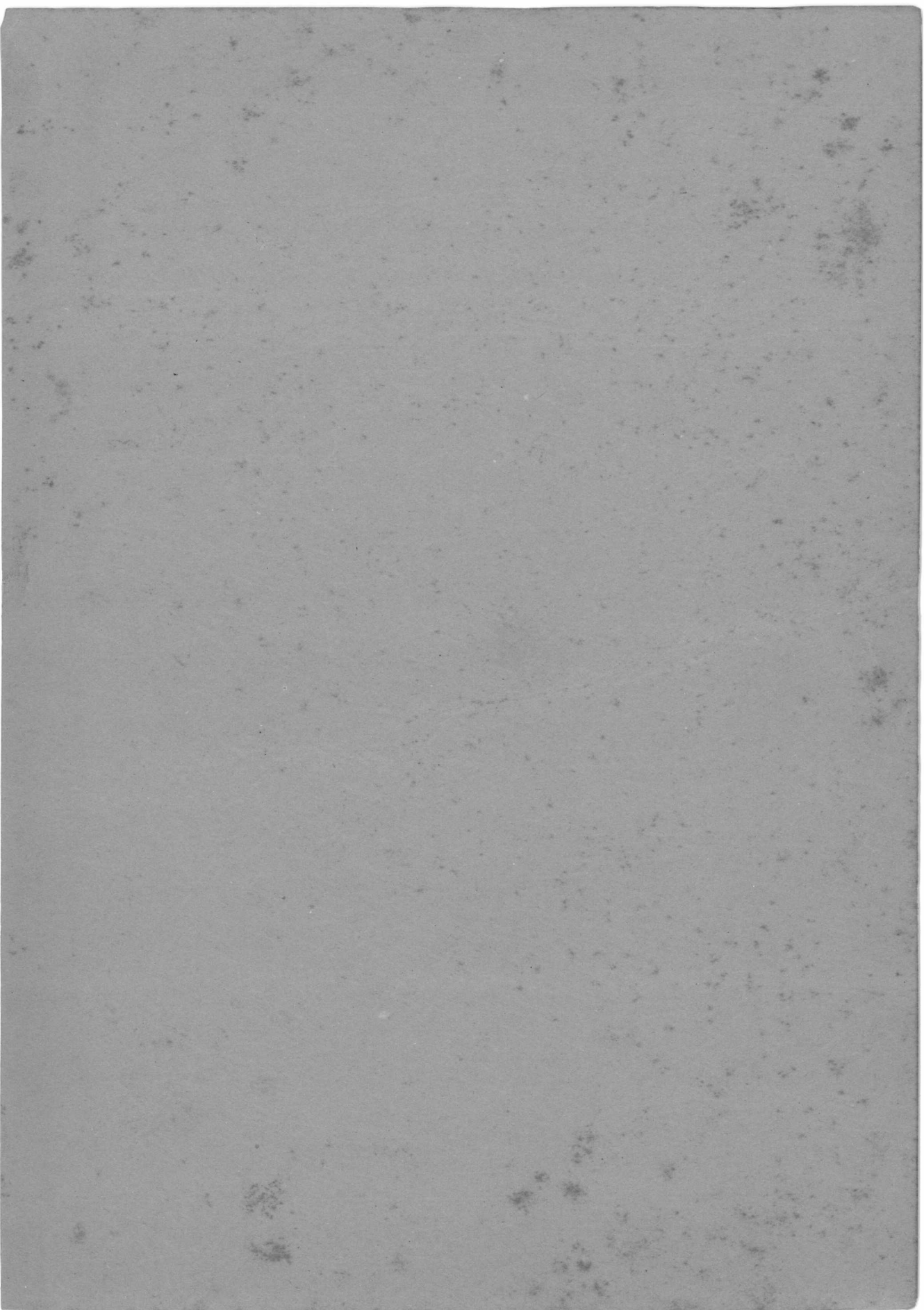
**Draughtsman :**

(Post vacant)

**P. L. 480 Project Staff :**

Bio-chemist—Kum. I. G. Bhatt, M. Sc.  
 Microbiologist—Post vacant  
 Technical Assistant—Post vacant





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