TECHNOLOGICAL LABORATORY

INDIAN CENTRAL COTTON COMMITTEE

ANNUAL REPORT

OF THE

DIRECTOR

TECHNOLOGICAL LABORATORY

FOR THE

YEAR ENDING 31st MAY, 1962.

PRICE Rs. 7.50

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THIRTY-EIGHTH ANNUAL REPORT OF THE DIRECTOR, TECHNOLOGICAL LABORATORY, MATUNGA,

For the Year Ending 31st May, 1962

This is the Thirty-eighth Annual Report of the Technological Laboratory, and deals with the work done during the year 1961-62. It will be observed from the data presented, that good progress has been made during the year in all categories of work, outstripping the peak figures in certain categories.

It will be noted from the figures given in Table 1, that the number of samples received for all tests during the year under review was 5,667, which is somewhat less than 6,229 received last year, but higher than 5,357 and 5,476 received during the previous two years. It would appear that the number of samples would stabilise round about the figure of 5,500, which is the average for the last five years. The total number of samples received from the State Departments of Agriculture for full-scale spinning, micro-spinning, fibre and standard tests was 3,163. The number of samples received for micro-spinning tests alone was 1,874.

The work done on these samples is summarised in Tables 2, 3, 4 and 5 from which it will be seen that during the year under review, 5,689 samples were tested as against 5,393 last year, registering an increase of 15 per cent. 2,962 samples were spun as against 3,040 last year. 801 reports comprising the results for 5,689 samples were issued as against 799 comprising the results for 5,393 samples issued 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 more 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 36 that 1,690 samples were received for tests in the Testing House of the Laboratory from commercial and Government bodies as against 1,882 of last year. The decrease may partly be due to the directive of the Indian Central Cotton Committee that a circular letter be sent to all the Millowners' Associations to instruct their member mills to send their samples for tests to the respective research institutions under them and not to this Laboratory.

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 either published or sent for publication.

The Laboratory continued to participate in the calibration programme of the United States Department of Agriculture for micronaire and Pressley strength tester.

A similar calibration programme for the breeding stations in India was also being continued as mentioned in the last Report.

The Laboratory was recognised as a Post-graduate Institution by the University of Bombay for a further period of three years from the 2nd July, 1961 for guiding students for the M. Sc. and Ph. D. degrees in Physics (Textiles) by research.

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" submitted by the Laboratory to be carried out under P. L. 480 Programme of the U. S. A. has been approved by the Government of India and the American Authorities. Final sanction from the Government of India is expected shortly. Detailed proposals in connection with a second project under P. L. 480 programme on the "Investigation of the preparation of radio-resistant and radio-sensitive celluloses to obtain basic information on the chemistry of cotton cellulose" will be submitted to the Government of India shortly. 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" prepared by the U.S.D.A. was offered for investigation at the Laboratory under P.L. 480. This is under consideration.

In the January-February, 1962 issue of the Indian Standards Institution Bulletin, the very valuable contribution made by this Laboratory for the specification (IS: 1671-1960) on the method for determination of skein breaking load (strength) tenacity and yarn-strength index of cotton yarn (by constant rate of traverse machine) has been reported. This was given expression to at the eleventh meeting of the Textile Division Council of the Institution held in Bombay on the 11th August 1961.

Mention may be made here of the great hardship experienced in the Spinning Section of the Laboratory. Although the incumbent of the post of Spinning Master retired from service from the 17th November, 1961, the post still remains unfilled. Further, one of the posts of 2nd Spinning Assistant has also remained vacant throughout the year. Despite advertising the posts, it has not been possible to recruit suitably qualified persons because of the lower pay scale attached to these posts. This matter, along with other problems, was considered by the Ad-hoc Staff Reviewing Committee appointed by the Government of India and it has recommended improved scales of pay to the research and technical staff consistent with the highly technical and specialised nature of work done at the Laboratory and in order to bring them on par with the salary scales prevailing for comparable posts in similar research institutions. The recommendations are awaiting the sanction of the Government of India and unless the sanction is received soon and the posts are filled up early, the difficulty mentioned above of carrying out the important routine spinning tests, progressing the existing research problems and taking up new problems involving spinning will persist even during the ensuing year.

The work connected with the construction of the ground floor of the new building and additions and alterations to the existing Spinning Laboratory building has been

completed by the Central Public Works Department, except for the installation of electric power. The construction of the additional floor over the new building which was also sanctioned by the Government of India is expected to be taken shortly. As there has been an inordinate delay in the construction, the Ministry of Food & Agriculture has been requested to address the Ministry concerned to instruct the Central Public Works Department to expedite the construction.

The Government of India have now released foreign exchange amounting to Rs. 3,22,864 during the licensing period October 1961 to March, 1962 out of the total requirement of Rs. 7,55,214 needed for the purchase of machinery and equipments for the expansion and modernization of the Laboratory. Order for the complete Blow Room Machinery involving foreign exchange to the tune of Rs. 2,91,600 has been placed with Messrs. Indian Textile Engineers Private Ltd., Bombay. Steps are also being taken to procure machinery worth Rs. 31,264 from Japan against the above foreign exchange. The Government of India have been requested to expedite sanction for the remaining foreign exchange during the current licensing period.

Table 1 gives the number of samples received at the Laboratory for various tests under different heads during the period under review together with the corresponding figures for the previous four years and averages for the three five-year periods for purposes of comparison.

TABLE 1.

Number of samples received.

Type of sample	Average			1-6-57 to 31-5-58	1-6-58 to 31-5-59	1-6-59 to 31-5-60	1-6-60 to 31-5-61	1-6-61 to 31-5-62
	1943-1948	1948-1953	1953-1958					
1. Agri. Dept.'s strains.								
Fullspg. tests	372	807	728	905	832	737	1128	902
Micro-spg.tests	..	..	1,081	1,626	1,607	2,226	2,638	1,874
2. Standard cottons	20	17	20	23	25	12	24	20
3. Technological samples	267	63	135	251	234	320	271	488
4. Trade Varieties cottons	38	37	41	35	46	53	80	114
5. Spg. tests (Paid)	73	76	92	78	63	61	112	25
6. Fibre tests (Paid)	261	169	269	330	176	313	402	240*
7. Fibre tests (Agr.)	..	128	325	594	766	373	100	367
8. Yarn tests	97	190	233	243	405	174	263	182
9. Cloth tests	95	105	391	373	354	188	195	166
10. Samples for valuation	147	83	41	81	41	..	..	..
11. Moisture tests	2	5	140	473	825	881	1,006	1,258
12. Miscellaneous	8	9	32	32	102	19	10	31
Total	1,380	1,689	3,528	5,044	5,476	5,357	6,229	5,667

* Includes 203 samples received from the East India Cotton Association.

It will be seen from the figures given in the above table that the total number of samples received during the period under review was 5,667 which is somewhat less than 6,229 received last year, but higher than 5,357 and 5,476 received during the previous years. It would appear that the number of samples would stabilise round about the figure of 5500, which is about the average for the last five years, but this remains to be seen.

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 four years.

TABLE 2

Number of samples tested

Type of test	1957-58	1958-59	1959-60	1960-61	1961-62
Spinning with fibre test / ,, without fibre test	2,277	2,531	2,545	2,719	2,955
Fibre test	713	971	891	932	471
Yarn test	243	405	174	263	171
Cloth test	373	354	188	195	170
Moisture test	615	806	821	1,004	1,471
Valuation test	81	41	..	..	..
Technological test	251	234	320	271	432
Miscellaneous test	16	50	16	9	19
Total ..	4,569	5,392	4,955	5,393	5,689

It will be noted that 5,689 samples were tested during this year as against 5,393 last year, showing an increase of five per cent.

It had been mentioned in the last Annual Report that 2,101 samples of the previous year remained to be tested on the 1st June, 1961. This, together with 5,667 samples received during 1961-62 made up a total of 7,768 samples out of which 5,689 samples were tested during the year under report leaving a balance of 2,079 samples.

Table 3 gives the number of test reports, classified under various categories, issued during this period together with the corresponding figures for the previous four years and also for the three five-year periods, 1943-48, 1948-53 and 1953-58.

TABLE 3

Number of reports issued

Type of Report	Average			1957-1958	1958-1959	1959-1960	1960-1961	1961-1962
	1943-1948	1948-1953	1953-1958					
Spinning Test	149	220	328	339	368	418	408	478
Fibre Test	54	73	104	135	102	178	132	88
Yarn Test	47	109	92	94	145	84	122	97
Cloth Test	50	56	189	152	150	83	96	96
Moisture Test ..	..	3	11	28	24	34	39	35
Miscellaneous ..	2	2	9	7	15	6	2	7
Total ..	302	463	733	755	804	803	799	801

As will be seen from the above Table, the total number of reports issued during the period under review remained practically the same as in the previous three years. However, it should be mentioned that last year 799 reports comprising the results for 5,393 samples (vide Table 2) were issued, while in the current season, 801 reports comprising the results for 5,689 samples (vide Table 2) were issued, thus showing that the average number of samples included in each report was 6 per cent higher in the current season as compared with last year.

The work done during the year under review will be described under the following heads:—

I. Spinning Section (Spinning Test)
II. Testing House
III. Fibre Testing Section (Fibre Tests)
IV. Research Work
V. Ginning Section
VI. Publications
VII. Summary
VIII. Miscellaneous.

I. SPINNING SECTION.

Tables 4 and 5 give the distribution of samples and counts spun at the Laboratory during this period together with the corresponding figures for the previous four years and the averages for the three five-year periods. Consequent on the reorganisation of the States, the data for the different periods are not comparable in some of the States.

TABLE 4

Number of samples spun

State	Average 1943-1948	Average 1948-1953	Average 1953-1958	1957-1958	1958-1959	1959-1960	1960-1961	1961-1962
Maharashtra } Gujarat } ..	208	429	1038	1696	1398	{ 514 / 736	816 / 741	824 / 1012
Mysore	..	..	80	180	491	354	402	329
Madras	24	94	120	119	67	61	58	41
Uttar Pradesh ..	28	29	84	113	153	197	242	124
Madhya Pradesh ..	30	113	232	213	144	131	156	187
Punjab	35	61	110	70	54	58	43	129
Rajasthan	..	2	35	..	41	25	31	28
Andhra	..	..	70	97	122	111	135	149
Kerala	..	..	..	..	24	71	74	1
Miscellaneous ..	5	18	53	78	42	3	1	21
Total ..	330	746	1,822	2,566	2,536	2,261	2,699	2,845
Standard cottons ..	22	18	21	20	27	16	22	15
Trade tests	233	233	213	224	183	359	120	92
Tech. tests							199	10
Grand Total ..	585	997	2,056	2,810	2,746	2,636	3,040	2,962*

*2,029 are Micro-spinning samples.

TABLE 5.

Number of yarns spun.

State	Average 1943-1948	Average 1948-1953	Average 1953-1958	1957-1958	1958-1959	1959-1960	1960-1961	1961-1962
Maharashtra } Gujarat } ..	329	728	1,508	2,448	2,093	{ 898 / 1,271	1,367 / 1,212	1,087 / 1,763
Mysore	..	..	153	318	875	729	707	538
Madras	67	198	236	217	135	121	153	114
Uttar Pradesh ..	83	71	169	224	278	395	361	204
Punjab	103	112	221	134	74	180	63	210
Madhya Pradesh ..	28	154	338	374	310	305	307	322
Rajasthan	..	..	12	..	89	27	80	56
Andhra	..	..	48	119	146	143	193	205
Kerala	..	..	..	..	64	79	93	3
Miscellaneous ..	393	443	499	120	80	6	3	26
Total ..	1,003	1,706	3,184	3,954	4,144	4,154	4,539	4,528
Standard tests ..	152	115	139	130	141	96	138	96
Trade tests } ..	657	753	564	500	492	704	{ 347	275
Tech. tests } ..							{ 199	23
Grand Total ..	1,812	2,574	3,887	4,584	4,777	4,954	5,223	4,922*

*2,029 are Micro-spinning.

Tables 4 and 5 show that the number of samples spun remained practically the same as last year, while the number of counts spun registered a small decrease of 6

per cent. An additional count is also spun in the high draft system on all varieties having mean fibre-length of 1″ and above.

It may be stated here that although these tests were of a routine nature, a few deserve particular mention as they relate to special experiments; these are described below.

A. AGRICULTURAL SAMPLES.

I. MAHARASHTRA STATE

1. *Six Desi varieties raised in six different centres in Vidarbha.*—The six Desi varieties, AK. 235, AK. 277, AK. 14, 331, 183 and Virnar were raised in the six centres, Yeotmal, Akola, Buldana, Washim, Nagpur and Nimbala in Vidarbha area of Maharashtra State in the 1960-61 season in order to find out which improved variety would prove better than the control, Virnar. Similar tests on these varieties raised in the four centres, Yeotmal, Akola, Buldana and Nagpur, were carried out last year and their test results were discussed in the last report. It was observed, on statistical analysis of these results, that among the varieties, 331 was significantly longer and finer in staple and gave significantly better spinning value than Virnar as in the case of last year. Among the localities, these cottons when raised at Nimbala and Nagpur were significantly longer in staple than when raised in the other localities. Furthermore, these cottons when grown at Nimbala gave significantly better spinning value than when raised in the other centres and at Washim they gave the poorest spinning performance and had the lowest mean fibre-length.

2. *Eleven varieties raised in three centres in Jalgaon and Dhulia districts.*—The eleven varieties W-81, Y-1, C.J.73, Virnar, (7070B14 × V)-6-8-4, (7070B14 × V)-6-8-15 (7066CF × V) Bulk 2-5, (7125-2 × V) EB-9-4-2, [(7036CF × V)Dh^2- Sel 1-2] 1-2, [(7-36CF × V)Dh^2-sel 1-2] 1-5-5, and [(7036CF × V)Dh^2-sel 1-2] 2-3-2 were raised in three centres, Jalgaon, Chopda and Dhulia in the 1960-61 season. They were subjected to full fibre and spinning tests. After analysing the results statistically, it was found that in this season, among the localities, these samples when raised at Jalgaon were significantly longer in staple and gave significantly better spinning performance than when grown at Chopda and Dhulia. As regards the varieties, C.J. 73, as usual, was significantly longer in staple and gave the best spinning performance among them. (7070B-14 × V)-6-8-15 also yielded significantly better spinning value than Virnar (Control).

3. *Interspecific hybrids in Maharashtra.*—The three hybrids, 170-Co2, 134-Co2M-21 and I. S. C. 67 were tried in five different centres, Pimpri, Jeur, Puntamba, Sree-rampur and Nanded in the 1960-61 season. It was found on statistical analysis that I. S. C. 67 had the finest staple, 134-Co2M-21 came next while 170-Co2 took the third place. But, I. S. C. 67 was less mature than the other two samples. 170-Co2 gave a significantly lower strength index value than the other two samples. On

the whole, I. S. C. 67 gave the best spinning performance. Among the localities, these samples, when raised at Pimpri had the longest staple, were more mature and gave appreciably better spinning performance than when raised in the other localities. These samples when raised at Nanded gave the next best spinning value.

4. *Mill tests on improved varieties* (*Maharashtra*).—(i) *AK.* 235, *AK.* 277 *and AK.* 14 *against Virnar*. Mill and Laboratory tests were carried out on these four varieties raised at Akola in the 1960-61 season. Comparative results of tests obtained at the mill and in the Laboratory are given in Table 6 below:

TABLE 6

Lea strength (lb) for 30s yarns.

Variety	Mill test	Laboratory test
AK. 235	58.7	47.8
AK. 277	54.9	50.7
AK. 14	60.6	53.9
Virnar	58.4	46.8

It may be observed that AK. 14 alone gave somewhat stronger yarns than Virnar according to the mill test. It gave definitely stronger yarns than Virnar according to the Laboratory test. Furthermore, AK. 277 also yielded stronger yarns than Virnar by the Laboratory test.

(ii) *Gaorani* 3883 *against Gaorani* 46. Mill and Laboratory tests were carried out on samples of these two varieties, Gaorani 3883 and Gaorani 46, raised at Nanded in the 1960-61 season. Comparative results of tests obtained at the mill and at the Laboratory are given in Table 7 below :

TABLE 7

Lea strength (lb.) for 30s yarns

	Mill Test	*LaboratoryTest*
Gaorani 3883	51.5	55.7
Gaorani 46	54.7	45.2

It may be noted that Gaorani 3883 had given a lower yarn-strength than Gaorani 46 in the mill, while the Laboratory tests had shown that Gaorani 3883 is definitely superior to Gaorani 46 in yarn-strength.

5. *Establishment of permanent cotton plots.*—(i) *Gaorani* 22. Samples of Gaorani 22 raised at Somnathpur (Osmanabad) of three different pickings in the 1960-61 season were subjected to full fibre and spinning tests.

It was observed that the last picked sample was longer and much finer in staple than the earlier picked samples.

(ii) *Daulat.* Small samples of Daulat raised at Parbhani of three different pickings of 1960-61 season were received for tests. They were subjected to fibre and micro-spinning tests.

The results indicated that except for strength index, there was little difference in the results for these properties in the three different pickings.

II. GUJARAT STATE.

6. *Four varieties raised in ten different centres in Gujarat.*—The four varieties, Vijalpa (2087), Digvijay, Vijay and Culture 92, were raised in ten different centres in Gujarat in the 1960-61 season. The names of the centres are Kadiadra, Broach, Derol, Jambusar, Samni, Palej, Karjan, Hadmatia, Tuljapur, and Rayannomal. The samples were subjected to full fibre and spinning tests. It was found, on statistical analysis of the results, that Culture 92 was significantly longer and finer in staple and was significantly less mature than the other three samples. Vijalpa (2087) gave appreciably lower spinning value than the other three samples among which there is nothing much to choose in this respect. With regard to the centres, these samples when raised at Tuljapur were significantly shorter in staple than when raised in other centres. But, these along with those raised at Kadiadra were significantly finer in staple and less mature than the samples grown in the other centres. It is noteworthy that these samples raised at Kadiadra gave appreciably better spinning value than when raised in the other centres. Samples raised at Tuljapur were the poorest in spinning value in consonance with their fibre properties.

7. *Four hybrids raised in eight different centres in Gujarat.*—The four hybrids, Deviraj, Devitej, 134-Co2M-21 and I. S. C. 67, were raised in the eight centres, Bardoli, Kholwad, Kim, Dabhoi, Halwad, Amreli, Vijapur and Thasra, in Gujarat in the 1960-61 season with a view to finding out the suitability of these varieties in these centres. All the 32 samples were subjected to full fibre and spinning tests and it was observed, from statistical analysis of the results, that Deviraj was definitely shorter and coarser in staple than the other three varieties. I. S. C. 67 had the finest staple among them and was also the lowest mature. In strength index value, 134-Co2M-21 scored over the other three hybrids. I. S. C. 67 had the highest spinning value, but it was not significantly different from the others. Among the different centres, it was found that these hybrids when grown at Dabhoi gave the best spinning performance while those raised at Thasra and Kim were the poorest in spinning quality.

8. *District trials on cultivators' field on* 134-*Co2M*, 170-*Co2 and Kalyan in Kutch.* The three varieties, 134-Co2M, 170-Co2 and Kalyan, were raised in cultivators' fields in eleven different places in Kutch *viz.*, Jambudi, Mota Reha, Tharauada, Bhuj-

pur, Gadhshisha, Sherdi, Kathada, Shikara, Murzer, Lakhimpur, and Tera in order to find out their performances. Small kapas samples of each of the varieties were received from all these Centres. They were ginned in the Laboratory and micro-spinning tests were carried out on the lint samples.

It was observed that, on the whole, 170-Co2 gave one per cent higher ginning percentage than 134-Co2M. 170-Co2 also yielded, on an average, stronger yarns than 134-Co2 M. Furthermore, these samples yielded the strongest yarns when raised at Gadhshisha, Sherdi and Kathada.

9. *Mill tests on improved varieties (Gujarat).*—(i) 115 *against Vijalpa* (2087).—Mill and Laboratory tests were carried out on samples of these two varieties, 115 and Vijalpa, raised in two centres, Navsari and Bardoli, in the 1960-61 season. Comparative results of tests obtained at the mill and at the Laboratory are given in Table 8 below:

TABLE 8

Lea strength (lb) for 40s yarns.

Variety	Navsari		Bardoli	
	Mill test	Laboratory test	Mill test	Laboratory test
115	39.3	34.5	34.4	33.7
Vijalpa (2087)	32.6	33.2	33.5	34.6

At Navsari, 115 has given definitely better yarn strength than Vijalpa by the mill test while this is not the case at Bardoli. 115 has recorded practically the same yarn-strength both at Navsari and Bardoli by the Laboratory test.

(ii) *I. S. C. 67 against Deviraj and Devitej.* Mill and Laboratory tests were carried out on Deviraj and I. S. C. 67 raised at Bodeli in the 1960-61 season. Similar tests were carried out on Devitej and I. S. C. 67 raised at Talod in the same season. But, in the latter case, sample of I. S. C. 67 was not supplied to the Laboratory and, therefore, no Laboratory tests were available for this sample. Comparative results of tests at the mill and at the Laboratory are given in Table 9 below.

TABLE 9

Lea strength (lb) for 40s yarns.

	Bodeli		Talod	
	Deviraj	I.S.C. 67	Devitej	I.S.C. 67
Mill test	45.8	42.6	49.4	50.0
Laboratory test	39.0	37.4	40.3	—

It may be noticed that Deviraj has given some-what better yarn strength than I. S. C. 67, both by the mill test and the Laboratory test. Devitej and I.S.C. 67 on the other hand, have given practically the same yarn-strength at the mill.

(iii) *Hybrid B. C.* 68 × *S. I. V*135. A sample of this hybrid cotton raised at Idar in the 1960-61 season was tested both at the Laboratory and at the mill. At the Laboratory, it was found that it had a mean fibre-length of 1.34″, was fine but of low maturity. It had good strength index of 8. 8. It sustained a waste loss of 9 per cent in the blow-room and as much as 20 per cent in the card. It was, therefore, very wasty indeed as the total loss was in the neighbourhood of 30 per cent. The yarns obtained were very neppy and it was found suitable for spinning 80s carded yarns.

The mill carried out tests on a 100 lbs. sample after combing to the extent of 24 per cent. The test results obtained at the mill on the combed yarns are given below:

TABLE 10

Lea test results.

	100s	120s	150s
Counts actual	100.5	119.0	151.9
Lea strength lb.	21.9	17.9	11.0
Count-strength product	2201	2130	1671

The mill has made the following remarks. "The cotton is very immature. With the usual settings for such counts, the blow-room loss, card loss and the nep-count were very much higher than our normal mill standards using Sudan/Egyptian cottons. When worked on our standard settings for such cottons (Sudan/Egyptian) to give 25% comber waste extraction, this cotton gave an extraction as high as 32%. The settings in comber had to be altered to give 25% waste. The comber web of the cotton was full of neps. The weaker fibres are mainly responsible for giving higher waste extraction and nep counts. The count-strength products obtained for 100s, 120s and 150s are in line with our standards. We consider this cotton is suitable for 100s/ 120s if the appearance of yarn does not matter".

10. *Establishment of permanent cotton plots.—Vijalpa, Digvijay and Kalyan.* Samples of three different pickings of Vijalpa raised in Ankleswar, of Digvijay raised in Broach and of Kalyan raised in Kadi in permanent cotton plots in the 1960-61 season were received for tests.

It was observed that the 3rd picking sample gave better spinning performance in the case of Vijalpa while in all other cases, there was little difference in the fibre and spinning quality of the samples from different pickings.

11. *Agronomic Experiments* (*Gujarat*).—(i) *Deviraj* (170-*Co*.2) *in rain-fed and irrigated conditions in Saurashtra.* Mention was made in the previous reports that acreage under rain-fed conditions of Deviraj was increasing as the farmers preferred

to grow without irrigation. Tests for rainfed and irrigated samples from six centres were made in the 1958-59 and 1959-60 seasons and their results discussed in the last report. In the 1960-61 season, such samples were received from three centres, Upleta, Agatrai and Manavadar.

It was seen from the test results that the irrigated sample gave definitely better spinning performance than the corresponding rain-fed sample both at Manavadar and Agatrai. Both samples, however, gave practically the same spinning performance at Upleta.

(ii) *Spacing Experiments for Sanjay at Amreli.* Three replicated samples of each of the six spacings, 18″×6″, 27″×9″, 27″×6″, 36″×9″ and 36″×6″, carried out on Sanjay cotton in the 1960-61 season at Amreli were received for tests. Fibre and micro-spinning tests were carried out on them.

It was observed that the differences in the properties of samples with different spacings were small and non-significant.

(iii) *Agronomic trials on* 170-Co2 *at Junagadh.* An experiment was conducted with three irrigations I_1, (2 irrigations), I_2 (3 irrigations) and I_3 (4 irrigations), with three dates of sowing D_1 (27-5-60), D_2 (15-6-60) and D_3 (3-7-60), with three spacings S_1 (9″×36″), S_2 (18″×36″) and S_3 (27″×36″) and three levels of nitrogen, N_1 (O lb/acre), N_2 (20 lbs/acre) and N_3 (40 lbs./ acre). The 81 samples were subjected to micro-spinning tests.

It was found, on statistical analysis of these results, that the two main effects, Irrigation and Date of sowing, were significant. Samples with 3 and 4 irrigations yielded better yarn-strength than those with 2 irrigations. Samples sown on 15-6-60 were found to be superior in yarn-strength to those sown earlier as well as later.

III. Mysore State:

12. *Mill tests on improved varieties* (Mysore State).—14-2 *and* 30-1 *against M. A.* 5. Mention was made in the last Annual Report that mill and Laboratory tests were carried out on the 1959-60 samples of these three varieties. Similar tests were made on the 1960-61 samples also. Comparative results of tests obtained at the mill and the Laboratory for the three varieties in both the seasons are summarised in Table 11 below.

TABLE 11

Lea strength (lb) for 30s yarns.

	1959-60		1960-61	
	Mill test	Laboratory test	Mill test	Laboratory test
14-2	55.6	55.6	49.6	51.2
30-1	58.2	54.7	52.3	51.2
M.A.5	49.5	52.2	53.0	49.1

In 1959-60, 30-1 and 14-2 have both given stronger yarns than M. A. 5 both by the mill test and by the Laboratory test, the difference being more significant in the mill. In 1960-61, on the other hand, 14-2 and 30-1 have not come upto the level of M. A. 5 in yarn strength according to the mill test, while they have recorded somewhat better yarn-strength than M. A. 5 according to the Laboratory test.

13. *Agronomic Experiments (Mysore State).* (i) *Water-cum-manurial trial on* 170-Co2 *at Arbhavi.* Ten samples of 170-Co2 grown in connection with the Ghataprabha Water Requirement Scheme, with five manurial treatments at two water levels were received from Arbhavi in Belgaum district in the 1960-61 season. The samples received nine irrigations in each case. The two water-levels were 2 acre-inches per turn and 3-acre-inches per turn. The five manurial treatments were (1) O lbs Nitrogen per acre (2) 30 lbs N per acre in 1:2 ratio of ammonium sulphate and groundnut cake (3) 30 lbs N per acre + 15 lbs. P_2O_5+15 lbs. K_2O (4) 60 lbs N per acre in 1:2 ratio of ammonium sulphate & groundnut cake and (5) 60 lbs N per acre + 30 lbs P_2O_5 + 30 lbs K_2O

It was noted from test results that these treatments did not have any significant effect on fibre-properties except that the sample with 3 acre-inches per turn and 30 lbs N per acre + 15 lbs P_2O_5 + 15 lbs K_2O recorded a lower mean fibre-length as compared with the others. This sample also gave the lowest spinning value.

(ii) *Fortnightly sowing date experiment on Andrews at Mandya.* Sea Island Andrews cotton was raised with six different sowing dates, 20-4-60, 5-5-60, 20-5-60, 5-6-60, 20-6-60 and 5-7-60, at Mandya in the 1960-61 season in order to find out its effects on its quality. They were subjected to full fibre and spinning tests and the results showed that the ginning percentages were lower for the three later sown samples than the earlier sown samples. The mean fibre length was also lower for these later sown samples. The two latest samples were the least mature. The later sown samples were also likely to give lower spinning value.

(iii) *N. P. K. trials on Andrews cotton.* 32 small samples of Andrews cotton of eight manurial treatments, N, P, K, N + P, N + K, P + K, N + P + K and control (cattle manure) each with four replications raised at Hallikere Research Farms, Bhadravati in the 1960-61 season were received for tests. Application of N was at 200 lbs per acre as ammonium sulphate, P_2O_5 at 200 lbs per acre as superphosphate and K_2O at 80 lbs per acre as muriate of potash. These samples were subjected to micro-spinning tests and it was found that none of the manurially treated samples gave better yarn-strength than the control (cattle manure) sample.

(iv) *D. S. N. Experiment on Andrews cotton.* 27 small samples of Andrews cotton with three dates of sowing, D_0, D_1, D_2, three spacings, S_0, S_1, S_2 and three manurial treatments, N_0, N_1, N_2, raised in the Hallikere Research Farms, Bhadravati in the 1960-61 season were received and subjected to micro spinning tests.

Statistical analysis of the results indicated that none of the different treatments produced any significant effect on yarn-strength.

(v) *Study of different treatments on Andrews at Bhadravati.* Mention was made in the last report that samples of different treatments such as mulching trials, place effect, chilean nitrate vs. ammonium sulphate trial, insecticidal trial, manurial trials, white-flowered vs. yellow-flowered types etc. of Andrews cotton raised at Mangalore in the 1959-60 season were subjected to micro-spinning tests. These results were discussed therein. Similar tests including flat vs. ridge, lime and rock phosphate trial, topping experiment etc., were carried out on the same cotton grown at Bhadravati in the 1960-61 season. It was found that the sample grown in ridges gave somewhat better yarn-strength than that raised in flat. Similarly, no-mulching sample gave somewhat better yarn strength than both the mulched samples.

In the topping experiment, the sample topped after four weeks recorded better yarn-strength than those topped at 3, 5 and 6 weeks and no topping.

IV. Andhra Pradesh.

14. *P 216F raised in the rice fallows in Kistna District.*—Full fibre and spinning tests were carried out on a sample of a P 216F cotton raised in the rice fallows in Kistna district in the 1960 season in the cultivators' holdings. It had a mean fibre-length of 0.94″ with a mean fibre-weight per inch of 0.134 (10^{-6}) oz. Its strength index value was very good and was medium mature. It was found suitable for spinning upto 35s standard counts which is a good performance.

15. *Sea Island Andrews in Andhra Pradesh.* A small sample of Andrews cotton raised at Nandyal in the 1960-61 season was received for tests. It was reported that there was severe boll-worm attack which was prevented by spraying endrine to the maximum extent. The crop was sown on 4-6-60. Rainfall during growth period was 23.35″ (June 1960 to March 1961). The crop gave an yield of 880 lbs. of seed-cotton per acre with a ginning percentage of 32 per cent. It had a mean fibre-length of 1.28″. When spun by micro-spinning technique, it gave a test of 33 lbs. for 60s yarns.

16. *Mill tests on improved varieties (Andhra Pradesh). 5975 against N 14.* Mill and Laboratory tests were carried out on the Farm and Cultivators' samples of 5975 and the control sample of N 14 raised at Nandyal in the 1960-61 season. Comparative results of tests obtained at the mill and at the Laboratory are given in Table 12.

TABLE 12

Lea strength (lb) for 30s yarns.

Variety	Mill test	Laboratory test
5975 (Farm)	62.2	55.2
„ (Cultivators')	65.3	61.5
Nandyal 14	57.4	47.5

Both samples of 5975 have given definitely better yarn strength than Nandya 14 both by the mill test and by the Laboratory test. It is noteworthy that the cultivators' sample of 5975 has yielded better yarn-strength than the Farm sample

V. Uttar Pradesh

17. *Establishment of permanent cotton plots.* Mention was made in the last Report that samples of 216F cotton from different pickings raised at Raya in the 1959-60 season were received for tests. Similar samples were received for tests in the 1960-61 season.

It was observed from their test results that the 3rd picking sample was finer and had lower maturity coefficient than the other samples. It is noteworthy that, as in the case of last season, the 3rd picking sample gave the best spinning performance.

18. *Mill tests on improved varieties (Uttar Pradesh).*—(i) *Desi Varieties.* Mill and Laboratory tests carried out on 197-3 × 35/1 against the two controls, U. P. No.1 and 35/1 raised at Raya in the 1959-60 season were discussed in the last report. Similar samples raised in the 1960-61 season at Raya were also subjected to mill and Laboratory tests. Comparative results of tests obtained at the mill and at the Laboratory in both the seasons are summarised in Table 13.

TABLE 13
Lea strength (lb) for Desi Varieties.

Variety	1959-60		1960-61	
	Mill test	Laboratory test	Mill test	Laboratory test
	10*s*	10*s*	14*s*	
197-3×35/1	179.1	188.1	116.6	20s— 90.4
U.P.No.1	140.5	157.7	92.4	14s—116.9
35/1	150.5	155.2	83.1	14s— 95.6

It may be seen that 197-3 × 35/1 has given definitely better yarn-strength than U. P. No. 1 and 35/1 in both the seasons both by the mill test and by the Laboratory test. In fact, 197-3 × 35/1 was spun into 20s in the 1960-61 season instead of 14s as it was too superior for the latter count.

(ii) *American varieties.* Mill and Laboratory tests were carried out on M4/43 and M4/58 against the control 216 F raised at Raya in the 1960-61 season. Comparative results of tests obtained are given in Table 14.

TABLE 14
Lea strength (lb) for 30s yarns.

	Mill test	Laboratory test
M4/43	37.9	50.0
M4/58	48.5	50.9
216 F	39.5	45.9

M 4/58 yielded definitely better yarn-strength than 216F both by the mill test and by the Laboratory test.

VI. Madhya Pradesh.

19. *Trade and Departmental samples of A 51-9.* Trade and Departmental samples of A 51-9 from three centres, Barwaha, Pansomal and Khargone, in the 1960-61 season were supplied by the Cotton Multiplication Officer, Khargone for tests. It was observed from the test results that the trade and departmental samples at each centre had practically the same fibre-properties. But, the trade sample from Barwaha gave a definitely lower spinning value than the departmental sample. This was also the case at Khargone though to a lesser extent. At Pansomal, the two samples gave practically the same spinning performance.

20. *Selection 7727-2 at Indore.* This sample is a selection from 7727 originally evolved at Coimbatore in 1940-41. It is a multiple hybrid between (6094 × 5815) (Co3 × Co4) × (Rus. Ash) × (S.G. × Ash). The object of this test is to breed an extra-long staple cotton capable of spinning 50s and above to be grown under irrigated conditions. It was sown on 17-6-60 and was given only one irrigation. The pickings were made on 29-12-60 and 30-1-61. It gave an yield of 311 lbs. per acre with a ginning percentage of 32.5. It gave a test of 34 lbs. for 60s yarns when spun by micro-spinning technique while the standard test for 60s is 28 lbs.

VII. Punjab State.

21. *Sea Island Andrews raised at Rauni (Patiala).* Mention was made in the last report that a sample of Andrews cotton raised in the 1959-60 season at Rauni was received for full spinning tests. A similar sample was received for tests in the 1960-61 season also. A comparison of the results for these two seasons showed that this cotton had recorded good improvement in the 1960-61 season as compared with the previous one.

VIII. General.

22. *Tests on improved varieties from distributed seed at various stages of multiplication.* Sixteen improved varieties belonging to different stages each received from different centres, were tested in the 1960-61 season. They were Virnar, Deviraj and Daulat from Maharashtra State, Digvijay, Sanjay and Kalyan from Gujarat State, Laxmi, Jayadhar, M. A. 5 and Deviraj from Mysore State, M. C. U-1, M. C. U.-2 and K 6 (Pandyan) from Madras State, Laxmi and Westerns 1 from Andhra Pradesh and Badnawar 1 from Madhya Pradesh. The test results showed that there was no general decline in the quality as the stage of multiplication advanced, thus confirming the previous finding. There are, however, a few exceptions, viz., Digvijay at Kapadvanj, Sanjay at Botad, Laxmi at Muddebihal, Westerns 1 at Guntakal and Badnawar 1 at Badnawar. In these cases, the last stage sample gave a definitely lower spinning quality than the earlier stage samples.

23. *Results for extra long staple* (1.1/16" *and above*) *cottons of* 1960-61 *season tested from different States.* The test results of full scale spinning carried out on the extra long staple material developed in various States under different schemes of the Indian Central Cotton Committee are being published in the Annual Reports of the Laboratory in view of the necessity of developing such strains in the country. This would help the breeders to draw on the material for use in their breeding programme. Accordingly, the available results for such strains tested in the 1960-61 season at the Laboratory are given in Table 15.

B. STANDARD INDIAN COTTONS

As in the past, extensive fibre and spinning tests were carried out on the Standard Indian Cottons of the 1960-61 season which covered as much as 58 per cent of the total area under cotton cultivation in India. It was estimated that the growers of these improved varieties in place of the earlier varieties were benefited by an additional gross income of as much as 20.4 crores of rupees in the 1960-61 season alone. A technological bulletin (Series A. No. 108) embodying the results obtained for these varieties in 1960-61 season was published during the period.

Out of the 19 varieties tested in the 1960-61 season, eight had recorded an improvement, seven had maintained their performances, while only four varieties had registered a decline in spinning value. In Gujarat State, the four varieties, Vijalpa, Surat 1027 A.L.F., Digvijay and Kalyan, have maintained their performances while Vijay alone has recorded a decline in spinning value. In Maharashtra, Virnar has registered an improvement, Gaorani 12 has maintained its performance while Gaorani 6 had declined in spinning value. In Mysore State, Jayadhar and Westerns have improved in quality while Laxmi has registered a decline. In the Punjab, P.A. 320F has improved while P.A. L.S.S. has maintained its performance. In Madras State, M.C.U. 1 and Karunganni 5 have recorded an improvement, Karunganni 2 has maintained its performance while M.C.U. 2 has declined in spinning value. Both the varieties, Nandyal 14 and Parbhani-American 1 of Andhra Pradesh have registered an improvement in spinning value in the current season.

Some of the standard cottons of the 1961-62 season have been received for tests during the period and tests on them are in progress. Ways and means are under consideration for the reduction of the size of the bulletin on Standard cottons by eliminating not very necessary details and rearranging the tables in a more convenient and shorter form without sacrificing essential information needed in this publication in order to reduce the printing costs.

C. TRADE VARIETIES.

Samples of fair average quality of the principal trade varieties of Indian cottons of 1960-61 season were obtained with the assistance of the East India Cotton Association and the Madras Agricultural Department. Representative kapas samples of

TABLE 15

Results for extra long staple cottons (1-1/16″ and above) tested for full scale spinning in 1960-61.

S. No.	Name of Variety	Place	Mean fibre length (inch)	Mean fibre weight (10^{-6} oz) per inch	Maturity Coefficient	Pressley Strength index 1b/mg.	Highest Standard counts
1	2	3	4	5	6	7	8
	I. Gujarat State						
1.	170-Co2-S.I. 1 ..	Surat	1.07	0.143	0.75	7.1	35s
2.	68-18-3	,,	1.13	0.150	0.79	7.3	37s
3.	I.S.C. 67-4	,,	1.20	0.122	0.71	6.7	42s
4.	I.S.C. 67-5-0	,,	1.17	0.128	0.71	6.5	40s
5.	I.S.C. 67-5-5	,,	1.18	0.119	0.72	7.0	36s
6.	I.S.C. 67. B-23 ..	,,	1.21	0.122	0.66	7.3	37s
7.	I.S.C. 37-1	,,	1.18	0.140	0.77	6.7	37s
8.	I.S.C. 77-1	,,	1.13	0.123	0.70	6.9	31s
9.	Co-ano 11-2 ..	,,	1.18	0.129	0.69	7.5	39s
10.	68-G-4-11	,,	1.19	0.145	0.76	7.1	34s
11.	134-Co2M-21-4 ..	,,	1.16	0.129	0.70	7.6	41s
12.	134-Co2M-D-19 ..	,,	1.21	0.151	0.75	6.8	39s
13.	134-Co2M (Control)..	,,	1.24	0.130	0.74	6.5	35s
14.	134-Co2M	Thasra	1.11	0.134	0.75	6.7	35s
15.	134-Co2M-21 ..	,,	1.16	0.124	0.71	7.8	30s
16.	I.S.C. 67	,,	1.14	0.115	0.67	7.0	33s
17.	170-Co2	,,	1.10	0.154	0.76	7.6	34s
18.	SB 24-26-23	Junagadh	1.09	0.134	0.72	7.9	44s
19.	H.F. 25-20	,,	1.10	0.138	0.72	7.6	44s
20.	134-Co2M	,,	1.14	0.125	0.71	7.1	37s
21.	I.S.C. 67	,,	1.10	0.104	0.61	8.5	43s
22.	134-Co2M	Kheralu (Mehsana)	1.15	0.112	0.69	6.7	42s
23.	134-Co2M-21 ..	,,	1.12	0.096	0.61	7.4	41s
24.	I.S.C. 67	,,	1.08	0.098	0.61	7.7	39s
25.	134-Co2M	Kapadvanj	1.22	0.111	0.67	8.4	46s
26.	134-Co2M-21 ..	,,	1.22	0.129	0.72	8.6	43s
27.	I.S.C. 67	,,	1.22	0.109	0.67	8.2	40s
28.	,, ...	Idar	1.20	0.141	0.71	7.1	36s
29.	134-Co2M	,,	1.20	0.129	0.70	7.0	36s
30.	,,	Bardoli	1.20	0.123	0.74	6.8	36s
31.	134-Co2M21	,,	1.12	0.127	0.75	7.8	41s
32.	I.S.C. 67	,,	1.15	0.108	0.66	8.0	43s
33.	Deviraj	Kholwad	1.08	0.152	0.80	7.0	37s
34.	Devitej	,,	1.25	0.130	0.74	7.0	36s
35.	134-Co2M-21 ..	,,	1.23	0.137	0.73	7.7	40s
36.	134-Co2-D-19 ..	,,	1.22	0.145	0.76	6.6	37s
37.	I.S.C. 67	,,	1.18	0.120	0.69	7.4	39s

S. No.	Name of Variety	Place	Mean fibre length (inch)	Mean fibre weight (10^{-6} oz) per inch	Maturity Coefficient	Pressley Strength index lb/mg.	Highest Standard counts
1	2	3	4	5	6	7	8
38.	Devitej ..	.. Kim	1.12	0.148	0.77	7.0	32s
39.	134-Co2M-21	.. „	1.18	0.142	0.76	7.5	33s
40.	I.S.C. 67 ..	.. „	1.10	0.119	0.69	7.2	37s
41.	Deviraj ..	.. Dabhoi	1.10	0.138	0.75	7.4	44s
42.	Devitej ..	.. „	1.20	0.120	0.68	7.1	42s
43.	134-Co2M-21	.. „	1.18	0.130	0.73	8.8	46s
44.	I.S.C. 67 ..	.. „	1.15	0.112	0.74	7.6	49s
45.	Devitej ..	.. Halvad	1.20	0.148	0.78	7.3	37s
46.	134-Co2M-2 ..	.. „	1.16	0.150	0.80	8.4	40s
47.	I.S.C. 67 ..	.. „	1.18	0.137	0.73	7.7	42s
48.	Deviraj ..	.. Amreli	1.10	0.145	0.78	7.3	39s
49.	Devitej ..	.. „	1.22	0.137	0.77	7.9	43s
50.	134-Co2M-21	.. „	1.15	0.129	0.71	7.9	40s
51.	I.S.C. 67 ..	.. „	1.18	0.118	0.70	8.1	43s
52.	134-Co2M ..	.. Vijapur	1.08	0.108	0.66	7.7	37s
53.	„ ..	.. Talod	1.11	0.130	0.72	7.8	42s
54.	I.S.C. 67 ..	.. Upleta	1.16	0.123	0.70	8.1	41s
55.	„	Bodeli	1.18	0.123	0.70	7.7	37s
56.	134-Co2M ..	.. Dhari	1.16	0.141	0.73	8.1	40s
57.	134-Co2M-21	.. „	1.14	0.141	0.72	8.5	50s
58.	I.S.C. 67 ..	.. „	1.16	0.124	0.68	8.0	50s
59.	170-Co2 ..	.. „	1.14	0.114	0.67	7.4	41s
II.	**Maharashtra State**						
60.	170-Co2 ..	..Sreerampur	1.07	0.140	0.79	6.8	45s
61.	134-Co2M-21	.. „	1.18	0.133	0.75	8.0	41s
62.	I.S.C. 67 ..	.. „	1.08	0.113	0.67	7.9	45s
63.	170-Co2 ..	.. Malegaon	1.07	0.145	0.82	7.4	51s
64.	134-Co2M-21	..Pimpri (Dhulia)	1.22	0.135	0.77	8.0	56s
65.	I.S.C. 67 ..	.. „	1.22	0.132	0.77	7.8	70s
66.	170-Co2 ..	.. „	1.12	0.153	0.81	7.5	49s
67.	170-Co2 ..	.. Jeur (Shelgaon)	1.12	0.126	0.68	7.0	38s
68.	134-Co2 ..	.. „	1.12	0.116	0.67	7.4	37s
69.	134-Co2 ..	.. „	1.13	0.111	0.64	7.4	39s
70.	170-Co2 ..	.. Chalisgaon	1.10	0.138	0.78	7.4	46s
71.	245	.. Buldana	1.10	0.120	0.68	7.2	49s
72.	Deviraj ..	..Ahmednagar	1.08	0.135	0.74	7.5	36s
73.	134-Co2M-21	.. Puntamba	1.08	0.124	0.69	7.6	41s
74.	170-Co2 ..	.. „	1.11	0.121	0.67	7.7	36s
75.	I.S.C. 67 ..	.. „	1.11	0.109	0.62	7.7	40s
76.	245	.. Nagpur	1.10	0.109	0.63	8.2	53s
77.	I.S.C. 67 ..	..Somnathpur	1.14	0.115	0.66	7.7	50s

S. No.	Name of Variety	Place	Mean fibre length (inch)	Mean fibre weight (10^{-6} oz) per inch	Maturity Coefficient	Pressley Strength index lb/mg.	Highest Standard counts
1	2	3	4	5	6	7	8
78.	134-Co2M ..	.. Somnathpur	1.16	0.123	0.67	8.2	50s
70.	170-Co2 ..	.. Nanded	1.14	0.134	0.70	7.2	50s
80.	134-Co2 ..	.. ,,	1.21	0.127	0.68	7.5	49s
81.	I.S.C. 67 ..	.. ,,	1.14	0.116	0.66	7.2	50s
III. Madras State							
82.	E.L. 120E ..	.. Srivilliputhur	1.10	0.122	0.71	8.1	39s
83.	E.L. 123 ..	.. ,,	1.10	0.115	0.67	8.0	44s
84.	E.L. 173B ..	.. ,,	1.09	0.123	0.68	6.8	41s
85.	E.L. 174C ..	.. ,,	1.10	0.116	0.68	6.6	38s
86.	E.L. 113D ..	.. ,,	1.12	0.102	0.61	7.9	44s
87.	E.L. 192 ..	.. ,,	1.15	0.108	0.64	8.1	50s
88.	E.L. 405 ..	.. ,,	1.13	0.123	0.70	7.6	42s
89.	0892B	.. ,,	1.18	0.114	0.66	8.4	43s
90.	L03013 W ..	.. ,,	1.14	0.134	0.73	7.3	46s
91.	L1143 EE ..	.. ,,	1.10	0.106	0.64	7.1	38s
92.	M.C.U. 2 ..	.. ,,	1.10	0.132	0.75	7.8	43s
IV. Mysore State							
93.	14-2-10 ..	.. Mandya	1.08	0.114	0.66	7.3	41s
94.	Westberry ..	.. ,,	1.24	0.131	0.79	7.2	70s
95.	Andrews ..	.. Diff. Centres	1.24 to 1.32	0.126 to 0.149	0.68 to 0.76	7.0 to 7.9	73s to 80s
V. Madhya Pradesh							
96.	B 56-286 ..	.. Badnawar	1.08	0.153	0.77	8.5	60s
97.	B 57-965 ..	.. ,,	1.10	0.152	0.78	8.2	60s
98.	B 57-966 ..	.. ,,	1.07	0.171	0.78	8.1	60s
99.	B 58-1367 ..	.. ,,	1.14	0.153	0.77	9.0	60s
100.	B 58-1372 ..	.. ,,	1.10	0.154	0.78	8.7	60s
101.	C.T.I. 4-21 ..	.. Dhar	1.14	0.140	0.72	8.7	45s
102.	Badnawar 1 ..	.. Khargone	1.08	0.148	0.76	8.8	47s
VI. Punjab State							
103.	A.S. 101 ..	.. Abohar	1.07	0.097	0.59	7.9	36s
104.	A.S. 102 ..	.. ,,	1.20	0.096	0.58	8.4	41s
105.	A.S. 136 ..	.. ,,	1.07	0.095	0.60	9.3	44s
106.	Andrews ..	.. Rauni	1.38	0.134	0.71	8.7	88s
VII. Kerala State							
107.	Andrews ..	.. Trichur	1.33	0.127	0.70	7.6	82s
108.	,,	Kozhinjapara	1.32	0.145	0.76	8.4	80s
109.	Westberry ..	.. Trichur	1.28	0.120	0.69	7.6	77s

these varieties were also obtained from market Committees and other sources to determine the ginning percentage which were incorporated in these reports. The fibre and spinning test results, ginning percentage and other results obtained for each variety were, in the first instance, published in 2-3 page technological circulars as early in the season as possible to provide useful information to the cotton trade and the industry. These were later compiled and published as a Technological Bulletin (Series A, No. 107) entitled "Technological reports on trade varieties of Indian cottons, 1961" during the period.

Mention was made in the last report that the list of trade varieties was revised with a view to include samples from selected stations in each tract and this list contained 54 varieties. Furthermore, nine other varieties were chosen on which technological circulars are to be issued but their results need not be included in the bulletin. In the 1960-61 season, all but five of the varieties, viz., Buri 147-Pathorat Westerns-Raichur, Maljari, P.A. 216F and LL. 54 were received and their results are given in the bulletin. During the year, the Local Sub-Committee approved of the following changes in this list. Digvijay may be obtained from Palej and Cambay/Petlad in place of Vijay as the former has replaced the latter. Westerns-Raichur may be replaced by Westerns-Bellary, as Westerns is not grown in Raichur. It was also decided to add A 51-9 (Narmada) from Khandwa in the list of trade varieties since it is taking the place of Buri 0394 in the East Nimar tract.

Some of the trade varieties of the 1961-62 season have been received for tests during the period and technological circulars were being issued on them. In this connection, mention may be made that the writer suggested a new get-up for the circulars to be issued on trade varieties, so that all the results are presented in one page. Hence all the data could be examined at a glance and the cost of printing would also be reduced. Furthermore, since only one page has to be printed, the circulars may also be issued more expeditiously to the users thus reducing the time lag between the receipt of samples and the issue of circulars as recommended by the Third Visiting Committee. After consultations with the Bombay Millowners' Association and the East India Cotton Association, the Local Sub-Committee at its meeting held on the 28th March, 1962 approved of the adoption of the revised form. Accordingly, the circulars are being issued for 1961-62 season in the revised form.

II. 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 these figures that the total number of samples received during the year was 1690 as against 1882 of the last year. The decrease in the number of samples received for various textile tests may be partly due to the directive of the Indian Central Cotton Committee and the consequent

action taken by the Secretary, giving effect to its decision at its meeting held on 7-10-61 that a Circular letter should be sent to all the Millowners' Associations having research institutions under them to instruct their member mills to send their samples for tests to their respective research institutions and not to this Laboratory.

TABLE 16

Number of samples received.

	Average No. of Samples received.			1957-1958	1958-1959	1959-1960	1960-1961	1961-1962
	1943-1948	1948-1953	1953-1958					
Spinning tests ..	75	68	89	76	68	64	101	24
Fibre tests	144	110	161	240	98	254	310	38
Yarn tests	97	188	233	243	405	174	263	182
Cloth tests	95	115	390	373	354	188	195	166
Moisture tests ..	2	5	168	615	806	821	1004	1258
Miscellaneous tests	7	6	29	16	50	16	9	22
Total	420	492	1,070	1,563	1,781	1,517	1,882	1,690

It may be noted 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, Indian Standards Institution etc., etc.

Generally most of the samples received for testing were of routine nature but a few worthy of special mention are given below:-

(1) A sample of 20s grey yarn spun on a 32 spindle Domestic Spinning Unit was received from the Director of Handlooms, Madras, for ascertaining its suitability for handloom weavers. The yarn was tested and compared with I-S. specification and a report was issued accordingly.

(2) A complaint of short weight of shipment of art yarn was referred by the State Trading Corporation to the Laboratory. Samples were drawn by the Laboratory representative and tested for "Commercial Weight" as per BISFA rules and an authoritative report was issued.

(3) Four cuttings of dyed furnishing fabrics processed by different processes were submitted for ascertaining the causes of small "white spots" observed in them. The probable causes of the same were intimated to the party.

(4) Four samples of cloth treated with certain chemicals were submitted for determination of mildew resistance. Appropriate tests were carried out on them and report issued giving the rank of merit for mildew resistance.

(5) A sample of dyed fabric was received for ascertaining the cause of formation of bars. Seven types of cotton used in the manufacture of grey yarn of the fabric were also received. After detailed examination and testing of the cottons for dye-absorption, the probable cause was intimated.

(6) Three samples of cotton-seed were received for determination of "oil content" and "linter percentage". They were tested by the solvent extraction method for "oil content" and by the chemical method for "linter percentage" and the report was issued.

The fees received for carrying out the tests, during the year amounted to Rs. 24,007 as against Rs. 41 391 during the previous year and Rs. 25,910 in 1959-60.

III. FIBRE TESTS

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 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 four years and average for the period 1946-48 and the two 5-year periods 1948-53 and 1953-58 for purposes of comparison are given in Table 37, which shows that during the period under review, fibre tests were made on 1956 samples.

TABLE 17

Number of samples tested in the Fibre Testing Section.

	Average							
	1946-1948	1948-1953	1953-1958	1957-1958	1958-1959	1959-1960	1960-1961	1961-1962
Standard	20	17	22	30	22	18	26	17
Agricultural (Large)	446	475	701	759	820	929	841	829
Agri. (small) ..	116	190	447	736	1055	1170	969	693
Commercial	182	197	315	409	224	400	402	320*
Ginning	137	64	51	49	27	47	10	28
Technological ..	98	58	72	64	44	26	57	46
Miscellaneous ..	13	27	24	..	64	3	..	23
Total ..	1012	1028	1632	2047	2256	2593	2305	1956

*203 samples received from the East India Cotton Association.

It may be mentioned that technological samples belonging to agronomic experiments were previously being tested in the Fibre Testing Section. Recently, these tests have been transferred to be done by the Research section. The number of samples tested in this connection during the year was 432 (vide table 2).

IV. RESEARCH WORK IN PROGRESS

(Please see Appendix I for completed problems).

A. Ginning Problems.

1. *Pre-cleaning and Ginning tests on Indian cottons.* (Item G. 1 of the Programme of work). The pre-cleaning and ginning tests on 134-Co2-M cotton were completed during the last year and the observations made from these results were given in the previous report. During the period under review, the fibre test results and the Grader's valuation for this cotton were obtained, from which the following observations were made:—

(i) *Effect of Pre-cleaning*: The grader's valuation for the pre-cleaned samples was on the whole, higher by Rs. 5.00 than that of the uncleaned samples, when ginned in saw gin and double roller gin, while there was no difference in valuation between pre-cleaned and uncleaned samples ginned in single roller gin.

(ii) *Comparison of gins*:

(a) The samples ginned in saw and roller gins did not show any marked difference in the fibre properties.

(b) Grader's valuation for saw-ginned samples was higher by Rs. 15/- than for the roller-ginned samples.

(iii) *Effect of Feed-step in saw gin* :

(a) Samples ginned with different feed steps showed little difference in fibre properties.

(b) The Grader's valuation for the sample ginned with feed step No. 1 was higher than that with feed step Nos. 2, 3 and 4.

(iv) *Effect of overlap and speed in Double Roller gin* :

(a) The samples ginned with different speeds and overlaps did not show any marked difference in fibre properties.

(b) Samples ginned with higher speed of 1030 o. p. m. and higher overlap of 3/8″ received the highest valuation, while the samples ginned with higher speed and lower overlap received the lowest valuation.

(v) *Effect of overlap and speed in Single Roller gin* :

(a) Different overlaps and speeds did not show any marked effect on the fibre properties.

(b) Grader's valuation for the sample ginned with lower roller speed of 180 r.p.m. was higher than the corresponding samples ginned with higher roller speed of 210 r.p.m.

Besides, the pre-cleaning and ginning tests on Digvijay cotton are in progress and are nearing completion.

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

2. *Investigation on the formation of neps during ginning.* (Item G.2 of the Programme of work). A paper entitled "Formation of neps during ginning was published in the July 1961 issue of the Indian Cotton Growing Review."

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

3. *Economic & Technical Survey of the existing gins in India* (Item G.3 of the Programme of work). The State-wise statistical compilation of the data, which was already in progress, was finalised. The compilation of the data on an all-India basis is in progress and it is to be seen how far the results of this survey differ from the previous one. It will be remembered that in the earlier survey, the information was collected on a voluntary basis from various ginning factories. Although the sample chosen in that survey was not statistically representative, the replies received were fairly reliable as they were obtained with the voluntary co-operation of the factory owners. The present survey was undertaken with a view to obtaining more accurate and reliable information by collecting the necessary data from a representative sample of factories in each State. The information in this survey was obtained through the officers of the State Agricultural Departments by mailing to them copies of questionnaires and the names of ginning factories in their jurisdiction from which the replies were required.

While scrutinising the data, it was observed that in a number of cases, the replies were not as precise as desired, probably because the investigating officers did not have sufficient technical knowledge regarding the working of gins and because the proprietors and working personnel in the factories were either unwilling to give any information or were themselves ignorant of the various facts. Further, all the sample units were not covered in the same season due to various causes. Due to these reasons, it is doubtful whether any more useful information would be obtained in the present survey than in the earlier one.

In this connection, it may be pointed out here that, if reliable information is to be obtained, qualified and trained personnel will have to be deputed to visit selected factories when these are working and collect the required data from the factory owners. Besides this, survey work should, as far as possible be completed in the

same season for all the selected factories. Whether a survey is to be carried out on these lines is for consideration. In this context it may be recalled that surveys are in hand in some States e.g. the Punjab, Rajasthan and Andhra Pradesh.

This work was supervised by Shri V. Venkataraman.

4. *Fabrication of an Extractor.* (Item G. 4 of the Programme of work)

The main frame work of the above machine has been completed including the fabrication of all the rollers of different diameters to be used for different purposes in the machine. Mounting of saw bands on two cylinders, fixing of brushes and doffer plates on two of the remaining cylinders, and fixing of baffles on two feeder rollers have also been completed. The work of preparing spikes and fixing them on the beater cylinder is in progress. Besides, mounting and positioning of the rollers on the frame work have been finalised and many of them have been fixed on the frame. In addition to the above, revolutions and the direction of rotations of many of the rollers have been determined and the design of the driving pulleys of a few of these rollers have been completed and patterns made for preparing the castings. After the receipt of the castings, the work of turning, facing, grooving for Vee belt etc., will be taken up.

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

B. INVESTIGATION ON FIBRE PROPERTIES

5. *Work of pulling of fibres from seed in relation to fibre properties and percentage of seed-coat removal.* (Item F.1 of the Programme of work)

During the period under review, the data were further analysed and the writing of the paper was continued.

This work was done by Shri Jai Prakash.

6. *Study of variation between seeds of the same strain.* (Item F.2 of the Programme of work)

Bundle-strength : The results of the 16 samples of cotton were analysed and a paper was being written up.

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

Chalazal-fibre immaturity : The paper is being 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 properties of fibres collected from bolls of different ages.* (Item F.3 of the Programme of work)

(a) *Structural properties* : Changes in the structural properties during the cell wall thickening of cotton fibres were being investigated.

Strength and birefringence were determined on the samples of various ages of Vijalpa of 1958-59 and 1959-60 season and on 170-Co2 of 1959-60 season, thereby concluding all the tests on the samples of previous seasons.

Degree of thickening, convolution angle and fibre reversals were determined on the samples of the same two cottons of 1960-61 season. On completing the remaining tests on these samples, the problem will be concluded and the results will be analysed.

Last year, it was decided to undertake development studies on the long staple Indian cottons at PIRRCOM centres. Samples were received from Sirsa. However, they were not covering full range of fibre development and also the samples were inadequate for undertaking chemical analysis. Samples of M.C.U. 3 were expected from Coimbatore but were not received. For the last three years, development studies have been carried out on 170-Co.2 cotton, received from Surat. After analysing the data so far obtained, future work will be planned in collaboration with PIRRCOM Centre at Surat.

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 different ages. The work on Vijalpa (1959-60) from six stages, i.e. 24, 31, 39, 45, 52, and 59 days age and 170-Co2 (1960-61) for the same six stages was completed during this period. Estimation of the wax content of these samples was also carried out. The results obtained for D.P. values showed progressive increase in this value with the development of bolls at different stages. As may be expected, there is gradual decrease in the wax content of these samples, i.e. the higher percentage of wax is obtained in early stages of samples. Further work on Vijalpa (1960-61) cotton is in progress.

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

(c) *X-ray angle* : The X-ray angles for fibres collected from side and chalazal regions of the seed from 30 days old bolls of 170-Co2 cotton were determined. It was found that the X-ray angle for the fibres from the chalazal region was higher than that for the fibres from the side regions. Similar measurements on 48 days old bolls could not be made as the films were found attacked by fungus. Further work could not be carried out due to the breakdown of the equipment. It is proposed to continue this work.

This is being done by Dr. V. Sundaram.

8. *Study of fibres from different regions of the seed.* (Item F. 4 of the Programme of work)

(a) *Bundle strength.* It was reported in last Annual Report that a couple of more cottons would be included in this study to give equitable representation to all the species. During the period under review, one more seed cotton, Laxmi, was taken up for this study and the fibres collected from both side and chalazal regions

of a large number of seeds were tested. Further, it was considered desirable to repeat the bundle strength tests, after calibrating the Pressley tester, on all the 21 cottons for which X-ray photographs were reported to have been taken last year, and these repeat tests were also completed during the period under review.

This was done by Shri Jai Prakash.

(b) *X-ray angle.* X-ray angles of fibres collected from chalazal and side regions of seven cottons were measured. Total number of samples tested was raised to 22. Further work could not be done due to the breakdown of the photo-electric densitometer equipment used for measuring the intensity distribution on the X-ray diffraction photographs.

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

(c) *D. P. values.* Investigation on this problem was continued during this period and D. P. values for the side and chalazal fibres were determined for the following cottons, viz., I.S.C. 67, Jayadhar, M.C.U.2, L.S.S., Kalyan, local Turturi, Gaorani-12, 320F, 134-Co2 M, Virnar, Westerns I and Laxmi. It was observed that the D.P. value for the side fibres was higher than that for the chalazal fibres for all the cottons. Wax-estimation was also carried out on these samples and it was observed that wax content is higher in chalazal fibres compared to the side fibres of the same cotton.

In all, 22 cottons have been tested for the D.P. values; the results will be analysed and a paper will be written up.

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

(d) *Fibre-maturity.* The work was carried out on the same lines as stated earlier. During this period, eight cottons were tested for maturity of side-region as well as chalazal region fibres. The results of 18 cottons (including 10 of last year) showed that side-region fibres had higher maturity than chalazal-region fibres.

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

9. *X-ray studies on the relationship between structural features and the physical properties of cotton.* (Item F.5 (a) of the Programme of work) A number of films were measured for X-ray angle and out of these, some related to an investigation on the effect of D.P. on the strength and the others related to the effect of structural features of cotton on rigidity. The analysis of the results on 15 samples related to the first investigation showed that the correlation coefficient between strength and D. P. was + 0.504 which is on the border line of significance (5% level). The correlation coefficient of the X-ray angle and strength was—0.850 and that between X-ray angle and D.P. was—0.739, both highly significant (1% level). Further the multiple correlation coefficient of strength with X-ray angle and D.P. was + 0.870, highly significant. The analysis of the results of the investigation relating to the relationship between X-ray angle and rigidity was carried out. Further work had to be suspended as the photo-electric densitometer went out of order and the replacement parts could not be obtained locally.

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

10. *Inheritance of X-ray angle.* (Item F.5(b) of the Programme of work) After a detailed discussion with Dr. Santhanam, Head of PIRRCOM, Coimbatore and Dr. Srinivasachar, Head of PIRRCOM, New Delhi, a composite programme of work was chalked out to investigate the inheritance of X-ray angle and strength. For this purpose, samples of parent strains which have been used by Dr. Santhanam for crossing have been received. Work on this problem will be started shortly.

11. *Study of convolution angle, birefringence etc.* (Item F. 6(a) of the Programme of work)

(a) *Convolution angle and bundle strength.* Relationship between convolution angle and bundle strength, specieswise, was being investigated. In all 75 cottons have been tested so far, which include five American *hirsutum* cottons tested during the period under review. Six samples of Sea Island cottons have been received recently from the West Indies. On testing these cottons this problem will be concluded and the results will be analysed.

(b) and (c) *Birefringence & Reversals.* (Item F.6(b) and (c) of the Programme of work. Fibre reversals have been determined on 17 samples of cotton, of which three were tested during this year. A final draft of a paper entitled "Structural properties of cotton fibres: Part II—Birefringence, Fibre reversals and tensile strength" is being, prepared incorporating all the results so far obtained in this investigation, progress on which was reported in the past.

The items of work are being done by Dr. S. M. Betrabet.

(d) (i) *Chemically modified fibrous cotton cellulose:*

Under certain experimental conditions, sodium-metaperiodate preferentially attacks the OH groups in the 2 and 3 positions of glucose molecules of cotton cellulose, converting them to -CHO groups. Effect of introducting -COOH and-CH_2OH groups in place of -CHO groups by further treatments, is being investigated.

Oxycelluloses varying in copper number from 1.55 to 14.22 were prepared for this study. Single fibre strength, birefringence, fibre reversals, gross morphological changes etc., were determined on all these samples, inasmuch as changes brought about in strength and structural properties were followed in the subsequent samples where in-COOH and-CH_2OH groups were introduced.

The problem will be extended to oxycelluloses wherein -OH groups in the sixth position of glucose molecules are preferentially attacked.

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

(ii) *Cellulosic fibres other than cotton.*

Degumming process to prepare samples of bast fibres to determine birefringence was standardised and the tests were carried out on ramie, jute and malachra.

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

(iii) *Structural properties of some cellulosic fibres.*

Two bast fibres were treated with NaOH varying in concentration from 1% to 17.5%, for two hours and were subsequently washed free of alkali. Effect of these pre-treatments on the swelling behaviour in water was determined.

Swelling behaviour of the two bast fibres in NaOH at 5%, 10%, 15%, 20%, 25% and 35% concentrations and KOH at 10%, 20%, 25%, 30%, 35%, 40% and 50% concentrations was also studied. Incidentally, a formula has been derived to study whether the changes brought about due to swelling are statistically significant or not.

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

12. *Effect of neutron irradiation of cotton.*—(Item F.8 of the Programme of work)

This problem had been presenting difficulties due to the non-availability of suitable containers for sending cotton samples for irradiation. The matter was discussed with Dr. H.D.Sharma and Dr. Iya of the Radio-Chemistry Division of the Atomic Energy Establishment Trombay and they have agreed to help in getting the samples irradiated on payment of fees.

In this connection, a research project was submitted early last year to the Government for obtaining financial assistance from P.L. 480 funds. The original proposals have now been modified by the USDA authorities. Preliminary discussions on the revised proposals were held with Mr. S. B. Detwiler Jr. and Mr. E.F. St. Claire of the USDA. Detailed proposals on the basis of the above will be submitted shortly.

This investigation will be carried out by Dr. V. Sundaram and Shri Jai Prakash.

13. *The comparison of Stelometer value with* (a) *Pressley-strength index* (*O gauge length*), *and* (b) *instrinsic strength as measured on single-fibres* (1/8″ *gauge*). (Item F. 9 of the Programme of work)

The results obtained for this investigation on 20 cottons are being written up.

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

14. *Comparison of different methods of measuring fibre maturity.* (Item F. 10 of the Programme of work)

The Note on the determination of fibre maturity using the "Cotton Grader" will be published in an early issue of the Indian Cotton Growing Review.

This was done by Dr. V. Sundaram.

A statistical analysis of the data collected is being made. Further, the fibre weight by counting method on 80 samples comprising of Hirsutum and Herbaceum species was determined with a view to assessing the bias due to fibre weight in maturity values.

This work is being done by Shri K.N. Seshan under the guidance of Shri Harirao Navkal.

15. *Stress-strain studies of cotton using the Instron Tensile Tester.* (Item F.11 of the Programme of work)

(a) *Bundle strength at various gauge lengths to determine the strength gradient for different Indian cottons.* In view of the finding, under F. 11 (c) below, that the Instron Tensile Tester was not suitable for bundle strength at O gauge length at higher than 0.5 cm/mt rate of elongation, it was suspected that at 1 mm gauge length also the value of bundle strength at 1 cm/mt rate of elongation may be erroneous. Therefore, the bundle strength values for all the 22 cottons reported last year were again determined at 0.5 cm/mt rate of elongation and practically in all cases the new values were higher than the earlier ones. The values of bundle strength at other gauge lengths are also being checked up now.

In addition to the above, two more cottons were tested for single fibre strength, convolution angle and number of reversals per cm., thus bringing the total number tested so far to 27. Further, the point of break in single fibre strength test was also examined for another three cottons to see if the break occurred at or between reversals, thus raising the number of cottons so examined to 16.

(b) *Cotton roving strength in relation to fibre properties.* Some preliminary tests for strength determination of rovings on Instron revealed that a better understanding of the relationship of fibre properties with roving strength would be possible, if the strength determinations on rovings are carried out in relation to the twist present in the rovings. An indirect approach to this is by determining the tension necessary for breaking the roving at its minimum twist of cohesion for that tension. The determination of minimum twist of cohesion and the tension required at that twist to break the roving can be easily carried out with an ordinary twist tester with little alteration. The necessary changes in the twist tester machine are being incorporated for the purpose of this investigation.

(c) *Comparison of different methods of testing bundle strength and the effect of rate of loading on the strength.*—It was reported in the previous Annual report that attempts were being made to account for the different levels of bundle strength values obtained with different instruments. As the rate of loading is an important factor known to affect the bundle strength values, three cottons covering a wide range of strength, were tested for bundle strength at o gauge length on Instron Tester at five different rates of elongation, i.e. 0.02, 0.10, 0.50, 1.00 and 2.00 cm/mt. Contrary to expectations, the bundle strength values recorded with the instrument decreased

with the increase of rate of elongation beyond 0.5 cm/mt. The reason for this was found to be in the response time of the pen being larger than the time of break at higher rates of elongation, thus recording lower values for bundle strength at higher rates of elongation. Having thus come to the conclusion that Instron Tester was not suited for bundle strength tests at o gauge length at higher than 0.5 cm/mt rate of elongation, all the 22 cottons tested earlier on Instron at 1 cm/mt rate of elongation were re-tested at 0.5 cm/mt and the new values were higher than the previous ones and are very near to the level of values obtained with Stelometer. Further work is in progress.

These items of work are being done by Shri Jai Prakash.

16. *Effect of simplification of sample preparation on Micronaire Test Results.*—(Item F. 12 of the Programme of work). The paper was published in the March 1962 issue of the Indian Cotton Growing Review and was reissued as Technological Bulletin, Series B. No. 82.

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

17. *Effect of dewaxing cotton fibres on their Micronaire reading.*—(Not in the Programme of work). It had been reported in the Annual report for the year ending 31st May, 1959, that dewaxing and wax content estimations had been carried out on 18 cottons and 14 of these had been tested for their Miscronaire values. This problem had since been completed and in all 22 cottons had been tested. The results were statistically analysed and it was observed that the dewaxed samples registered a statistically significantly higher value than the raw samples. However, as the mean difference is only of the order of 2%, it is negligible for all practical purposes. A note embodying the results of this investigation is being written up.

This work was carried out by Shri Harirao Navkal and Dr. V. Sundaram.

18. *Investigation to see whether separate micronaire scales are necessary for different botanical species.*—(Item F. 13 of the Programme of work). In continuation of the last Annual Report, the data on Barbadense cottons was also graphically analysed. It was found that as compared to gravi-meteric method, micronaire over-estimates the fibre weight of this group of cottons, although the over-estimation was not found to be as high (i.e. 0.8 μ/in) as in case of American Egyptian cottons. The statistical analysis of the entire data on different species is under progress.

This is being done by Shri Jai Prakash.

19. *An evaluation of the performance of Port-Ar.*—(Not in the Programme of work). The data collected on the Port-Ar instrument sent to this Laboratory by the Indian Agricultural Research Institute, New Delhi for setting up and calibration were analysed rigorously and the following observations were made:

(1) The fineness values as determined by Port-Ar and Micronaire are highly correlated.

(2) The Port-Ar yields a higher value than the Micronaire, the average difference being about 0.2 micronaire units.

(3) The error attached to the Port-Ar value is of the same order as that attached to the Micronaire value.

(4) When the samples are opened by hand, Port-Ar gives a higher value as was observed in the case of Micronaire.

A paper is being written up embodying the above observations.

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

20. *Variation of fibre-bundle strength with relative humidity.*—(Item F. 14 of the Programme of work). The work on this problem was taken up during the period under review because of the facility offered by the newly acquired instrument, "Aerosol", for raising the relative humidity in a closed room to any desired level. Use was made of the dry winter months for the purpose of this investigation particularly at the lower humidity levels and 12 cottons representing different species and ranging in bundle strength over wide limits, were tested at seven levels of relative humidity i.e 25%, 35%, 45%, 55%, 65%, 75% and 83% both at 0 and 1/8″ gauge length with the help of Stelometer.

In case of each cotton at both the gauge lengths, the bundle strength showed an appreciable increase with rise in relative humidity, the humidity strength coefficient being roughly 0.5%. It was found on further analysis that while the regression coefficients of bundle strength upon relative humidity did not differ significantly from one cotton to another (except in the case of 3 cottons) at 0 gauge length, it showed a considerable change from cotton to cotton at 1/8″ gauge length, being higher for stronger cottons and lower for weaker cottons. Further analysis of data is in progress.

This work is being done by Shri Jai Prakash.

21. *Effect of swelling agents on structural and mechanical properties of cotton fibres.*—(Item F. 15 of the Programme of work). The fabrication of the attachment to fit Instron tensile tester for treating cotton samples with swelling agents at different stretches was completed, during the period. Further, 10 samples of cotton were mercerized slack with NaOH (25% concentration), stretched to their normal length on Instron with the help of above attachment and washed thoroughly with cold water under the stretched condition.

Further work is in progress and is being done by Shri Jai Prakash.

22. *Nickerson-Hunter Colorimeter tests.*—(Item F. 16 of the Programme of Work).

(*a*) *Effect of storage.*—The reflectance percentage and degree of yellowness of the samples stored in two lots, one in conditioned and another in unconditioned

room, were determined with the Nickerson Colorimeter both before and after monsoon in 1961. Besides, the mean fibre length and fibre length irregularity percentage of these samples were also measured. Further work is in progress.

(*b*) *Colour chart for Indian grade standard.*—An investigation was undertaken to determine the contribution of the different factors, such as colour, amount of foreign matter etc. to the grade of a cotton. For this purpose, a large number of samples belonging to different grades and representing a wide range of varieties and growths, were tested for reflectance percentage and degree of yellowness by the Nickerson Colorimeter. So far, tests have been made on about 550 samples. It is proposed to determine the trash content of some of these samples by Shirley Analyser. Further work is in progress.

The reflectance percentage and degree of yellowness of the trade varieties for the current year were determined with the Colorimeter.

These items of work were done by Shri N. Balasubramanian.

23. *Standardization of Digital Fibrograph.*—The standardisation of the testing procedure and the errors attached to various parameters of length and length non-uniformity were carried out during this period. It was found that at least two replicate determinations were necessary for getting 2.5 per cent span length with 5% accuracy. The error attached to the fibre length non-uniformity measures, such as floating fibre percentage of fibres, less than half inch was found to be too high, probably on account of the variations caused in the manual preparation of the sample.

After standardising the testing procedure, 115 cottons covering the mean fibre length from 0.65 inches to 1.38 inches were tested on Digital Fibrograph. A very highly significant correlation coefficient of + 0.98 was found between 2.5 per cent span length determined with Digital Fibrograph and the mean length obtained with Balls Sorter.

In addition to the above, percentage of short fibres, digital ratio and percentage of floating fibres, were also determined with the help of Digital Fibrograph on 80 samples and the length irregularity percentage and the percentage of fibres less than 9/16″ (both by weight and by number) were determined with the help of Balls Sorter. It has been found that the mean fibre length computed from 66.7% span length is much lower than the actual mean length obtained from Manual Fibrograph and that 12.5% span length is a better parameter for mean length. This fact was communicated to the Textile Research Journal in the form of a letter to the editor and it has been published in the March issue of the Journal. The other chief findings of this investigation were incorporated in a paper presented at the Third Technological Conference organised by the Bombay Textile Research Association, Bombay.

This work was done by Shri Jai Prakash.

24. *Standardisation of vibroscope.*—(Not in the Programme of work). This instrument was acquired by the Laboratory during the period under review. It is used for the determination of mass per unit length of single fibre or filament and is based on the principle of vibrating strings.

The instrument was checked and set up during this period and its calibration and standardisation is under way.

This is being done by Shri Jai Prakash.

C. INVESTIGATIONS ON FIBRE PROPERTIES AND YARN CHARACTERISTICS.

25. *Variation in weight of single fibre in relation to yarn irregularity.*—(Item Y-2 of the Programme of Work). The fibre fineness variation within each of three cottons was determined, by weighing 300 single fibres cut to a known length on the cantilever balance, thus bringing the total number of cottons for this study to six. The strength of the weighed fibres was determined by Balls Magazine hair tester. The correlation coefficients between strength and the weight was determined for each cotton. It is proposed to measure the irregularity of 20s yarn spun out of these cottons and to correlate it with the variation of fibre weight per unit length.

This work is being done by Shri N. Balasubramanian.

26. *Effect of fibre properties on yarn evenness.*—(Item Y-5 of the Programme of Work). Yarns prepared from three more cottons, by varying the draft at the ring frame from 2 to 10, were tested for irregularity with the Uster Evenness Tester bringing the total number of cottons studied for this work to six. The slope of variance draft line was determined by calculating the regression coefficient for each of the samples. Examination of the results revealed that cottons with high fibre length variation tended to have higher regression coefficient. The regression coefficient did not show any tendency to increase with coarseness of the cotton, which once again indicates that fibre fineness may not have much influence on the number of subslivers and therefore, the irregularity added during the drafting.

This work is being done by Shri N. Balasubramanian.

27. *Studies on lustre behaviour of cotton fibres and yarns.* (Item Y-6 of the Programme of Work). For the greater part of the period under review the instrument was not working properly as a tremendous amount of drift had developed during the monsoon period presumably due to high humidity. Ultimately, the instrument was set right and the determination of contrast ratio was started on raw cottons belonging to different species grown in different countries. In addition to this, lustre determination was also carried out both in the raw state and after mercerization on the ten cottons reported under F 15 above. A very interesting observation was made that while in the raw state there was not much variation in the lustre value from cotton to cotton (range of contrast ratio being from about 1.8 to 2.1), after mercerization these cottons showed a very differential response to lustre (from 5 to 10). Further work is in progress and is being done by Shri Jai Prakash with the assistance of Shri P. G. Oka.

28. *Relationship between fibre-properties and spinning value for extra-long staple cottons, 1.1/16" and above.* (Item Y.7 of the Programme of Work). A note

on this problem was published in the May 1962 issued of the Indian Cotton Growing Review. It was also issued as a Technological Leaflet (No. 71) of the Laboratory.

This work was carried out by Shri V. Venkataraman.

29. *Regression Coefficients between fibre-properties and spinning value on tract-wise basis.* (Item Y.8 of the Programme of Work). As mentioned in the last Annual Report, the data available for each tract were rather small for applying statistical analysis. More data were therefore collected and the data for the tracts, for which sufficient data were available, are being analysed.

This work is being done by Shri V. Venkataraman.

30. *Upgrading of cotton by double roving and high draft in relation to fibre-properties.* Results for 58 cottons were analysed and a paper on this problem was written up and sent for publication.

This work was done by Shri V. V. Gupte.

D. PROBLEMS ON SPINNING AND YARN CHARACTERISTICS.

31. *Standardisation of yarn evenness.* (Item S.1 of the Programme of Work). The work on the standardisation of the method for the evaluation of yarn appearance by comparison with photographic standards (prepared by the A.S.T.M.) was continued on the same lines as stated in the last report and four more samples were evaluated for appearance. Analysis of the results showed that the difference in the estimates between the observers was highly significant thus pointing out the necessity for carrying out this test by more than one observer. It was found that a reliable estimate of yarn appearance can be obtained if tests are made by two observers on five blackboards prepared from a sample. Based on this, a draft specification on the determination of yarn appearance using photographic standards was prepared for the Indian Standards Institution.

This work is being done by Shri N. Balasubramanian.

32. *Study of the evenness of material in different stages with different systems of processing.*—(Item S.2 of the Programme of Work). It was mentioned in the previous report that two samples of yarn spun by (1) the orthodox process and (2) by omitting roving frame and spinning from intermediate on a ring frame fitted with Casa A500 high-draft system were tested for short term irregularity. Tests for long-term variation were made on these samples. Besides, two more yarn samples were spun by the above mentioned two processes and the short and long-term variations of the yarns were determined. In addition to lea strength, single thread strength of all the yarns were also determined. Examination of the results showed that the short process produced more uniform yarns in respect of short-term regularity. However, when the results of long-term variations are considered, the effect is reversed, the orthodox process giving better results. The yarns from short process had slightly

lower lea strength and nearly the same single thread strength compared to those from orthodox process.

Further, 4 more samples were spun to 40s by (1) orthodox process and (2) using double roving and Casa A500 drafting at the ring frame thus bringing the total number of samples to 39. The yarns were tested for irregularity and lea strength. Analysis of the results showed that the difference in strength between the two types of yarns was significantly related to the difference in irregularity. Further, whereas the extent of improvement in uniformity by apron drafting increased with length variation of the cotton, the improvement in strength increassed both with mean fibre length and length variation.

This work was done by Shri N. Balasubramanian.

33. *Effect of distribution of draft at the speed frames on the evenness of the product.* (Item S.3 of the Programme of Work). The effect of draft distribution between slubber and intermediate frames on the evenness of the product was investigated at a total draft of 30.2 for this purpose, five intermediates were prepared by varying the draft at the slubber from 2.8 to 10.8 and that at intermediate from 10.8 to 2.8. The irregularity of each of the inters was determined with the Evenness Tester. Tests were made on four samples during this period. Analysis of the results showed that the effect of draft distribution on the regularity of the product was on the border line of significance at this total draft.

This work was done by Shri N. Balasubramanian.

34. *Relationship between yarn mass irregularity and yarn strength irregularity.* (Item S.4 of the Programme of Work). The investigation was continued on two more samples during this period. The results are to be analysed for determining the relationship between the two measures of yarn variability and the influence of fibre properties on the same.

This work was done by Shri N. Balasubramanian.

35. *Variance—length curve studies.* (Item S.5 of the Programme of work). Based on the results of this work a paper entitled 'Contribution to the study of B-L curve of cotton yarns' was presented at the Third Technological Conference arranged by the Bombay Textile Research Association.

This work was done by Shri N. Balasubramanian.

36. *Combing of good quality Indian cottons.* (Item S.6 of the Programme of Work). Tests were made on 134-Co. 2-M cotton by extracting two different comber wastes. Similar tests on the same lines were also carried out on I.S.C. 67, LL.54 and A.R.B.P. 52. A note on the results will be written up for publication after analysing the data.

This was done by Shri V. V. Gupte.

37. *Miniature spinning plant for spinning micro-samples.* (Item S.9 of the Programme of Work). Much progress could not be made in this work as the Spinning Master retired from service in November 1961 and new appointment is not yet made.

38. *Study of the variation in yarn-strength at different portions of the bobbin.* (Item S10 of the Programme of Work). A paper on the above subject was written up for publication.

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

39. *Comparison of strength and extension values of single thread by three types of instruments with ballistic worth of rupture.* (Item S12 of the Programme of Work). It has been reported in the last Annual report that so far 20 samples of yarn of 20s count and 17 samples of 30s count have been tested for single thread strength at a test length of 50 cm. or 20″ using a Constant-rate-of-traverse machine (Goodbrand), a Constant-rate-of-loading machine (Scott) and a Constant-rate-of-extension machine (Instron). The ballistic work of rupture of single threads of these samples has also been determined. The results are being analysed statistically.

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

40. *Effects of different processing treatments on the spinning value of M.A.*5. (Item S13 of the Programme of Work). The paper on the above subject was finalised and sent for publication.

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

41. *Skein strength of the yarn in the metric system.* (Item S14 of the Programme of Work). Further tests were made on 38 cottons for finer counts. All the results were analysed. A comprehensive paper including the results for all counts of yarn was written up and the paper entitled "A proposed strength standard for cotton yarns under the universal count system" was sent to the Indian Standards Institution Convention held at Kanpur in December, 1961.

In addition to the above paper, another, entitled, "The adoption of universal count system in textiles" was written up and sent to the above Convention.

A further paper on the subject was read and discussed before the Third Conference on Textile problems arranged by the Bombay Textile Research Association held at Bombay in January 1962.

42. *Relationship between the single thread strength measured at* 500 *m.m. test length and* 12 *inches test length on a constant rate of traverse machine.* (Not in the Programme of Work). At present, the single thread strength test is usually carried out on a test length of 12″. With the introduction of the metric system, the Indian Standards Institution has recommended the use of 500 m.m. test length for this test. Hence a study has been undertaken to compare the strength values of single threads

of different counts at these two test lengths. So far, about 17 samples of 20s counts, 16 of 30s and 14 of 40s have been tested. Further work is in progress and is being done by Dr. V. Sundaram.

43. *Variation of yarn strength with relative humidity.* (Not in the Programme of Work). To work out correction factors for variation of Yarn Strength with relative humidity, preliminary work was carried out. Six samples ranging in counts from 20s to 40s were conditioned and tested for their lea strengths, at five different humidities ranging from 45% r.h. to 85% r.h. These results have shown that there is a definite tendency for the Yarn Strength to increase with increasing humidity. Further work is planned and is being done by Dr. V. Sundaram.

E. CHEMICAL PROBLEMS.

44. *Evaluation of D. P. Values of Indian cottons by different methods.* (Item C.1 of the Programme of Work). D. P. estimation by different methods was continued during this period. As reported previously, the Cannon Fenske Viscometer tube series 100 was not found suitable for this work; therefore, Viscometer tube of series 300 was employed for determination of D.P. using cupriethylene diamine as solvent. D.P. test was made at 0.5 per cent concentration of eight cotton samples and study of viscosity at various concentrations for these samples is in progress.

D.P. tests by cuprammonium method, using X-type tube was also continued and five cotton samples were tested during this year. Work on this problem is in progress. So far, a total number of 11 cottons have been tested by this method.

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

45. *Investigation on the Mercerisability of Indian cottons.* (Item No. C.2 of the Programme of Work). Mercerisation was carried out on five cottons, i.e. four Indian cottons, viz., Virnar, Jayadhar, M.C.U.1 and Sea Island 'Andrews' and one Egyptian 'Karnak' cotton. The yarns used for this investigation were of low counts of 20s, which were doubled and bleached under uniform conditions. The mercerisation of these samples was carried on a small hand mercerising machine fabricated at the Laboratory and the yarns were mercerised under tension using 57° TW NaOH at 18-20° C.

Mercerised yarns were used for the determination of Barium Activity Number and Lustre Number. Egyptian and Sea Island 'Andrews' yarns were found to be equally lustrous after mercerisation and MCU-1 was next in order of lustre. A paper on this subject was read at the Technological Conference arranged by the Bombay Textile Research Association at Bombay. The paper has been submitted for publication.

Further work on this problem will be taken up to study the effect of various treatments during mercerisation.

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

46. *Estimation of Pectin and Wax content and their relation to fibre strength and moisture absorption.* (Item C.3 of the Programme of Work). Investigation on this problem was continued during this period. In all, 10 cotton samples were tested for wax-content. Besides, dewaxed as well as raw cottons were taken for the study of moisture absorption at various humidity levels. So far, seven samples of dewaxed as well as raw cottons were tested for moisture absorption at various humidity levels. Further work is in progress.

Pecting estimation could not be done because of non-availability of the spectrophotometer, which is under repairs.

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

47. *Studies in the chemical modification of cotton.*—(Item No. C. 4 of the Programme of Work). At a meeting of the Research Council, it was decided that work should be taken up on the de-crystallisation of cotton by treatment with a mines in slack condition. It was also decided that slack mercerisation should be carried out for comparative purposes. Essential chemicals needed for this work are being procured. Preliminary work on the standardisation of methods is in progress.

48. *Study of the Ash and Mineral contents of Indian cottons.*—(Item No. C.5 of the Programme of Work). Ten cotton samples were taken up for detailed studies of mineral contents during this period. Determinations of ash, silica, calcium, magnesium, potash, phosphorus and sesquioxide content were completed on these samples. So far, 20 cotton samples have been tested on this problem. Further Work is in progress.

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

49. *Determination of the oil-content of different varieties of cotton seeds.*—(Item No. C. 6 of the Programme of Work). Three hundred and sixty cotton-seed samples were tested for oil-content during this year and the reports were sent to the respective breeding stations. Further work is in progress.

This is being done by Kum. I.G. Bhatt and Shri S. N. Pandey.

F. MISCELLANEOUS PROBLEMS.

50. *Reduction of neps in neppy Indian cotton.*—(Item No. M. 2 of the programme of work). Single plant produce (1960-61 season) of about 100 plants each of 134-Co. 2-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 1961-62 season.

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

51. *Study of effects of different agronomic treatments on fibre properties.*—(Item No. M. 3. of the Programme of Work).

(*a*) *Effect of different frequencies of irrigation and manurial trials.*—The results of two seasons were reported earlier. The statistical analyses of the third year samples (1959-60 season) revealed that the effects on seed-weight, lint-weight, ginning percentage and mean fibre-length were non-significant. But mean fibre-weight decreased with increasing doses of nitrogen and higher doses of nitrogen, N_2 (80 lb. N/acre) and N_3 (120 lb./acre) affected it significantly as compared with control. This property was depressed by increasing amounts of irrigation and decreased significantly at I_3 (7 frequencies) level.

Second year samples were re-tested for micronaire fineness and maturity-index.

The data for three seasons were combined and are being statistically analysed.

(*b*) *Effect of differential irrigation* (*different frequencies of irrigation and intensities of irrigation*) *and levels of nitrogen.*—The results of two seasons were already reported. In addition to other properties reported, bundle-strength was found to be-non-significant for the third season. Further, mean fibre-weight decreased with increasing doses of nitrogen. The higher dose of nitrogen depressed this property significantly as compared with control, while mean fibre-length was unaffected by any one of treatments.

(*c*) *Effect of alpha-naphthalene acetic acid.*—As mentioned in the last report, 56 samples of third year were tested for micronaire fineness and maturity index.

The results of two seasons were given earlier. The statistical analysis of the data of third season (1959-60) showed that length-irregularity percentage and other fibre characters excluding micronaire value were unaffected by the treatments.

First year samples were re-tested for micronaire fineness. This work will be continued for the fourth year.

(*d*) *The fertilizer experiments of Dharwar.—NP—Experiment*: During this period, 64 samples for bundle-strength at Zero gauge-length and 34 samples for micronaire fineness and maturity index were tested.

NPK Experiment: During this period, 108 samples for bundle strength at Zero-gauge length and 80 samples for micronaire fineness and maturity index were tested.

The statistical analysis of data showed that ginning percentage and bundle-strength were affected by N-treatment and not by P and K treatments. The ginning percentage increased with increasing nitrogen level from N_0 (0 lb.) to N_1 (20 lbs.), but showed no further rise with increase in nitrogen to N_2 level (40 lbs.), Bundle strength was adversely affected by increase in nitrogen dose and its mean-value decreased from 37.5 gms/ tex at N_0 level to 35.9 gms/tex at N_2 level.

(*e*) *Agronomic experiment at Sirsa.*—The agronomic experiment was carried out on LL. 54 cotton, grown at Sirsa, PIRRCOM Centre, combining two frequencies of irrigation and three levels each of N, P and K.

The mean fibre-length by Fibrograph and bundle-strength at zero gauge-length by Stelometer was completed on 108 samples of 1960-61 season.

(*f*) *I.A.R.I. investigation on phosphorus fertilization of cotton by Radio-tracer-technique.*—Seventy two samples of 1960-61 season were received from Agronomy Division of Indian Agricultural Research Institute, New Delhi. The main treatments were three doses of Phosphorus, three single-band-placements and three double-band-placements.

Ginning percentage and upper-half-mean length by Fibrograph were determined on these samples.

These items of work are done by Shri V. G. Munshi.

52. *Effect of change in conditions of growth on strength and structure of cotton fibres.*—(Item No. M. 4 of the Programme of Work). (*i*) A paper was written up and communicated for publication based on results in a study of three varieties of cotton (P. 216F, P.23F, H.14) grown at three localities (Coimbatore, Aduthurai and Palur) in Madras State during three seasons. It was concluded from this study that the locality of growth affects to a large extent the strength and structure (fibrillar orientation as measured by 40% X-ray angle) of cotton fibres without affecting the inter-relationship between these two characters. In general, whenever, the locality effect was to lower the strength, there was a corresponding increase in the X-ray angle. All the varieties recorded lower strength and higher X-ray angle when grown at Coimbatore than when grown at Aduthurai or Palur.

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

(*ii*) *Place effect study on* 170-*Co.* 2 *cotton.*—At the Conference of Cotton Breeders, Agronomists, Technologists, etc., held at the Laboratory on 23rd February, 1961, it was decided that 170-Co. 2 cotton should be grown at five different places using the seeds supplied by the Cotton Specialist, Gujarat State, and the spinning performance and the fibre characteristics including structural aspects of these sample studied. The five places selected were Niphad, Kopergaon and Khasapur in Maharashtra State, Arbhavi in Mysore State and Sagdividi Farm at Junagadh in Gujarat State. So far, samples have been received only from Khasapur, Kopergaon & Arbhavi. It may be mentioned here that the sample received from Khasapur weighed only eight lbs. as against the requirement of 12 lbs. for carrying out full scale spinning tests. The testing of the samples will be undertaken as soon as all the samples are received.

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

53. *Comparative performance of three interspecific varieties of cotton.*—(Not in the Programme of Work). The blackarm and Jassid resistant interspecific strain I.S.C. 67 is being tried for the replacement of the existing strains, 170-Co. 2 and 134-Co. 2-M selections, which are being grown extensively in Gujarat State. To study the relative performance of I.S.C. 67 with respect to 170-Co. 2 and 134-Co.

2-M selections, the test results on samples (*i*) of these cottons grown in 8 localities in Gujarat and three in Maharashtra during 1959-60, and (*ii*) of 170-Co. 2 and I.S.C. 67 grown in five localities during three seasons have been analysed and the following chief inferences were drawn.

(*i*) I.S.C.67 and 134-Co. 2-M have nearly the same fibre properties but I.S.C. 67 is superior on account of its higher yield and ginning percentage and lower processing loss. Hence, I.S.C.67 can profitably replace 134-Co. 2-M.

(*ii*) The superiority of I.S.C. 67 over 170-Co. 2 in respect of fibre length and fibre fineness is not reflected in its spinning performance probably due to its higher percentage of short fibres and immaturity as shown by processing loss. Further, 170-Co. 2 has a higher ginning percentage. In addition to this, the samples grown in different localities exhibited a greater variation in fibre properties and spinning performance in the case of I.S.C.67 than in the case of 170-Co. 2.

A paper embodying these conclusions was presented for discussion at the Tenth Conference on Cotton Growing Problems in India, held at Bombay in December 1961 under the auspices of the Indian Central Cotton Committee.

This was done by Dr. V. Sundaram.

54. *Determination of rate of drying of cotton and other textile fibres.*—(Not in the Programme of Work). The determination of moisture content of most of the textile fibres is carried out between 100° C and 110° C for accurate scientific purposes and the time required for drying the samples may vary with the initial condition of moisture content of the samples, the ambient conditions of the drying oven (e.g. temperature of drying and draft of air etc.) and the nature and form of the material. In industry for quality control work where the interest may lie mainly in the comparative values of moisture content of different samples, stress may be more on the time required for drying even at the loss of a little accuracy. It is with this idea that this investigation was taken up and the rate of drying and the final value of moisture content for cotton in various forms (e.g. lint, yarn, fabric and seed cotton etc.) as well as some other textile fibres is being determined at three different drying temperatures, 102° C, 110° C and 120° C. The initial conditions of moisture content of the samples and the draft of air in the oven are being kept constant throughout the tests. The work is in progress and is being done by Shri Jai Prakash.

A summary of research work carried out by Senior Assistants (Technological) attached to the various Cotton Breeding Stations, is given in Appendix II.

V. GINNING SECTION.

Most of the work done in this Section, during the year under report has been described under the head 'Research Work in Progress'. An outline of the chief items is, however, given below :—

Pre-cleaning and ginning tests on 134-Co2-M cotton were completed and the fibre tests on this cotton have been done, while the spinning tests could not be taken up due to pressure of other work in the Spinning Section. The results obtained so far are being analysed. Further, pre-cleaning and ginning tests on Digvijay cotton are in progress and are nearing completion.

About 30 trade varieties of 1960-61 season and 28 varieties of 1961-62 season were ginned and their ginning percentages determined.

About 600 small samples obtained from agronomic experiments and other agricultural centres were ginned in the Laboratory gin and their ginning percentages determined.

For satisfactory ginning of Sea Island cotton grown in Mysore and Kerala States and to improve the grade of ginned cotton, the Engineering Assistant (Ginning) visited selected ginning factories for giving necessary instructions and guidance for ginning, to the gin mechanics and suggesting suitable adjustments to be made in the gins. He also supervised the ginning of this cotton for some days.

The Engineering Assistant (Ginning) also attended to the ginning of Hybrid cotton grown in Gujarat State where single roller gins were converted to single action for the purpose and a few bales were ginned under his personal supervision and guidance.

The Engineering Assistant (Ginning) attended the meetings of the Committees for the survey of facilities for ginning and pressing of cottons in the States of Rajasthan and the Punjab. He visited many of the ginning and pressing factories in the State of Rajasthan as one of the members of the Committee for the above subject formed by the Government of Rajasthan.

The fabrication of an extractor was continued and as appreciable progress has been made in this work, as indicated under Research Work in Progress.

The replies received in the proforma for the Economic and Technical Survey of the Existing gins in India conducted by the Laboratory were scrutinised and it was observed that the replies on the technical aspects were not quite satisfactory.

In accordance with the decision of the Indian Central Cotton Committee, the fabrication of the Laboratory gin has been entrusted to a local firm, to whom necessary guidance was given by the Engineering Assistant (Ginning) to ensure smooth and efficient working of the gins. The firm has so far supplied eight Laboratory gins, out of which six gins have been despatched to different cotton breeding and marketing centres.

VI. PUBLICATIONS.

A list of publications issued by this Laboratory during the year together with the summaries of the Bulletins published is contained in Appendix III.

VII. TECHNICAL SUMMARY.

This Report gives an account of the work carried out at the Laboratory during the year 1961-62. Good progress has been recorded in the various activities of the laboratory, as will be seen from the report, a summary of which is given below:—

Tests made at the Laboratory :—The total number of samples received for all types of tests during the year was 5667, which is somewhat less than 6229 received last year but higher than 5357 and 5476 received in the previous years. It would appear that the number of samples would stabilise round about 5500 which is the average for the last five years. The number of samples tested during the year was 5689 against 5393 last year recording an increase of 5 per cent.

(i) *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 3163 as against 3890 last year. Here again, this figure compared favourably with 3348 and 3230 received in the previous two years. It is possible that better screening of the samples might have been done by the Breeders before sending these for tests at this Laboratory. The reports on the test results evaluating the quality of new strains proved to be of great utility to the Breeders in selection work. Some of them belonged to the improved varieties under various stages of multiplication. A few items of special interest are very briefly summarised below :

1. Tests carried out on six *desi* varieties raised in six different centres in the 1960-61 season in the Vidarbha area had shown that 331 gave significantly longer and finer staple with significantly better spinning value than Virnar as in the case of the previous season.

2. Samples of Gaorani 22, Daulat, Vijalpa, Digvijay, Kalyan and 216F which were raised under the scheme for the establishment of permanent cotton plots were tested and reported in the 1960-61 season.

3. Mill tests were arranged to be carried out on 23 improved varieties including their controls which were distributed in most of the States and reports were issued to the respective Officers. The mill had reported that the hybrid cotton in Gujarat was suitable for 100s/120s combed yarns, but the cotton was very wasty and the yarns were neppy.

4. Samples belonging to several agronomic experiments such as manurial, spacing, sowing date, irrigations, rotation etc., received from several States were tested and the results reported to the respective Breeding Stations.

5. Results of tests on all samples of extra-long staple varieties, 1.1/16″ and above, raised in the 1960-61 season in all States are given in this report for the benefit of the Breeders in drawing material for use in their Breeding Programme.

(ii) *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 ex-

perimental stations were published for general information. Technological Circulars on each trade variety were issued as soon as tests were completed. These publications proved very useful to the cotton trade and the indutry.

The Testing House of the Laboratory received 1690 samples for various types of tests during the year, which were less than 1882 received in the previous year. This decrease may be partly due to the directive of the Indian Central Cotton Committee asking the Millowners' Associations to instruct their member mills to send their samples for tests to their respective research institutions and not to this Laboratory. Tests on some of them which were of a special nature, are described in the main report.

(iii) *Research Work.*—Substantial progress was recorded in most of the items of research work. Progress in each item is very briefly dealt with below.

A. INVESTIGATIONS ON GINNING.

1. The fibre test results and grader's valuation for the pre-cleaned and ginned samples of 134-Co2M were obtained during the period. Besides, the pre-cleaning and ginning tests on Digvijay cotton were nearly completed.

2. A paper entitled "Formation of neps during ginning" was published.

3. Analysis of the data obtained for the economic and technical survey of the existing gins in India on random sample basis indicated that the data on technical items were not as precise as could be desired and hence, the conclusions drawn therefrom may not be as sound as was derived from the previous survey.

4. The main frame-work for the fabrication of an extractor has been completed including the fitting of rollers, and the determinations of their speeds and the direction of rotations. Further work is in progress.

B. INVESTIGATIONS ON FIBRE-PROPERTIES.

5. The data obtained for the work of pulling of fibres from seed in relation to fibre-properties and percentage of seed-coat removal were further analysed and the writing up of the paper was continued.

6. A paper was being written up on the study of variation in bundle strength between seeds of the same strain.

7. A paper on the study of the variation of fibre maturity from single seeds in relation to seed and embryo weights was being published.

8. Changes in the structural properties during the cell wall thickening of cotton fibres were investigated by determining strength, birefringence, degree of thickening, convolution angle and fibre-reversals on samples of various ages of Vijalpa and 170-Co2. Studies were made for their D. P. values, wax content and X-ray angles.

9. Study of bundle strength, X-ray angle, D. P. value, fibre-maturity etc., of fibres from different regions of the seed was continued.

10. Studies on the relationship of X-ray angle with the D. P. and the strength showed that the correlations of X-ray angle and strength was — 0.850 and between X-ray and D. P. was — 0.739, which were highly significant. Further work had to be suspended as the densitometer went out of order.

11. A composite programme of work was chalked out to investigate the inheritance of X-ray angle and strength. Samples of parent strains used for crossing have been received and tests will be made shortly.

12. Relationship between convolution angle and bundle-strength, species-wise was being investigated and on testing a few Sea Island cottons from West Indies, the results will be analysed.

13. A paper on the "Structural properties of cotton fibres : Part II — Birefringence, Fibre reversals and tensile strength" was being prepared incorporating all the results so far obtained.

14. Study of the structural properties of chemically modified fibrous cotton cellulose and cellulosic fibres other than cotton such as ramie, jute and malachra, was continued during the period. Degumming process to prepare samples of bast fibres to determine birefringence was standardised. A formula has been derived to study whether the changes brought about due to swelling are statistically significant or not.

15. A paper on the investigation carried out on the comparison of stelometer value with (a) Pressley strength index (o gauge length) and (b) intrinsic strength as measured on single fibres (1/8″ gauge) was being written up.

16. The Note on the determination of fibre-maturity using the Cotton Grader is being published in an early issue of the Indian Cotton Growing Review. Statistical analysis of the data collected for comparison of different methods of measuring fibre-maturity was being made.

17. The study on bundle strength at various gauge lengths to determine the strength gradient for different Indian cottons was continued. Preliminary tests for strength of rovings on Instron revealed that a better understanding of the relationship of fibre-properties with roving strength was possible if the strength of rovings was carried out in relation to twist in rovings. Attempts were made to account for different levels of bundle strength values obtained with different methods of break.

18. A paper on the effect of simplification of sample preparation on micronaire test results was published in March 1962 issue of the Indian Cotton Growing Review. It was re-issued as Technological Bulletin Series B, No. 82 of the Laboratory.

19. A note embodying the results obtained for the investigation on the effect of de-waxing cotton fibres on their micronaire reading was being written up.

20. Statistical analysis of the entire data on different species for the investigation to see whether separate micronaire scales are necessary for different botanical species was in progress.

21. Tests were made for the determination of variation of fibre bundle strength with variation in relative humidity from 25 % to 83% both at o and 1/8″ gauge lengths with the help of Stelometer.

22. The fabrication of the attachment to fit Instron Tensile tester for treating cotton samples with swelling agents at different stretches was completed during the period.

23. The reflectance percentage and degree of yellowness of the samples stored in two lots, one in conditioned and the other in unconditioned room, were determined with the Colorimeter both before and after monsoon in 1961.

24. An investigation to prepare a colour chart for Indian grade standards was made to determine the contribution of factors like colour, amount of foreign matter etc., to the grade of a cotton in co-operation with the East India Cotton Association. The reflectance percentage and the degree of yellowness of all trade varieties for the current year were also determined with the Colorimeter.

25. The standardisation of the testing procedure in the Digital Fibrograph was carried out and the errors attached to various parameters of lengths and length-non-uniformity were determined during the period. A letter to the Editor, Textile Research Journal on the estimation of floating fibre percentage using the Digital Fibrograph was published in the March 1962 issue. Other findings in this investigation were incorporated in a paper presented to the Third Technological Conference organised by BTRA in January, 1962 in Bombay.

26. Vibroscope acquired by the Laboratory during the period for the determination of mass per unit length of individual fibres or filaments based on the principle of vibrating strings was checked and set up. It is being calibrated and standardised.

27. A paper on an evaluation of the performance of Port-Ar was being written up.

C. INVESTIGATIONS ON FIBRE-PROPERTIES AND YARN-CHARACTERISTICS.

28. The problem of the variation in weight of single fibre in relation to yarn-irregularity was being studied with the help of the cantilever balance fabricated at the Laboratory.

29. The study of the effect of fibre-properties on yarn-evenness as measured by the Uster Evenness Tester was continued during the period.

30. Studies on lustre behaviour of cotton fibres and yarns measured on the Lustremeter fabricated at this Laboratory were made. It was found that while there was not much variation in the lustre value in the raw state from cotton to cotton, the variation showed a differential response from cotton to cotton in lustre after mercerisation.

31. A note on the relationship between fibre-properties and spinning value of extra-long staple cottons, 1.1/16″ and above was published during the period (May 1962 issue of the Indian Cotton Growing Review). It was also issued as a Technological Leaflet (No. 71) of the Laboratory.

32. A paper on the upgrading of good quality Indian cottons by the use of double roving on double apron drafting system and its relation to their fibre-properties was prepared after statistical analysis of the test results and sent for publication.

D. *PROBLEMS ON SPINNING AND YARN-CHARACTERISTICS.*

33. The work on the standardisation of the method for the evaluation of yarn-appearance by comparison with photographic standards (A. S. T. M.) was continued on the same lines as stated in the last report. Based on the results, a draft specification on the determination of yarn appearance using photographic standards was prepared for the Indian Standards Institution.

34. Study of the evenness of material in different stages with different systems of processing was continued as during the last year. The problem of the effect of distribution of draft at the speed frames on the evenness of the product was also studied. The relationship of yarn mass irregularity with yarn strength irregularity was also investigated.

35. Based on the results of work carried out on the variance-length curve studies, a paper on the "Contribution to the study of B-L curve of cotton yarns" was presented at the Third Technological Conference arranged by BTRA in Bombay in January, 1962.

36. Tests were made on 134-Co2 M, I. S. C. 67, L. L. 54 and A. R. B. P. 52 for the problem of the combing of good quality Indian cottons. A note on the results obtained will be written up for publication after analysing the data.

37. A paper on the study of the variation in yarn-strength at different portions of the bobbin was written up during the period for publication.

38. Work on the problem of comparison of strength and extension values of single thread by three types of instruments with ballistic work of rupture was continued.

39. A paper on the effects of different processing treatments on the spinning value of M. A. 5 cotton was finalised and sent for publication.

40. A comprehensive paper including the results for all counts of yarn on the problem of the skein strength of the yarn in the metric system was written up and presented at the Indian Standards Institution Convention held at Kanpur in December, 1961. A further paper on the subject was read and discussed at the Third Technological Conference arranged by BTRA in Bombay in January, 1962.

41. For the change-over to the metric system, the relationship between the single thread strength measured at 500 mm test length and 12″ test length on a constant rate of traverse machine was being investigated.

E. *CHEMICAL PROBLEMS.*

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

43. A paper on the investigation of the mercerisability of Indian cottons was prepared after carrying out tests on a small hank mercerising machine fabricated at the Laboratory which was read at the third technological conference arranged by BTRA in January 1962 at Bombay. It is being sent for publication.

44. Investigation on the estimation of pectin and wax content and their relation to fibre-strength and moisture absorption was continued during the period.

45. Preliminary work on the standardisation of methods for studies in the chemical modification of cotton was in progress.

46. A study of the ash and mineral contents of Indian cottons was being made.

47. 360 cotton-seed samples were tested for oil-content during the year and their reports were sent to the respective breeding stations.

F. *MISCELLANEOUS PROBLEMS.*

48. In order to bring about reduction of neps in neppy cottons, tests were made on single plant produce of 100 plants of each of 134-Co2 M, I.S.C. 67 and M.C. U. 2 and seeds selected on the basis of neppiness were sent for further propagation.

49. The study of the effects of different agronomic treatments such as different frequencies of irrigation, different intensities of irrigation, manurial treatments, and hormone treatments etc. on seed and lint weights, ginning percentage and fibre-properties was continued during the period.

50. A paper on the effect of change in conditions of growth on the strength and structure of cotton fibres based on a study of three varieties in three localities was written up and sent for publication.

51. A paper embodying the results obtained after a study of the comparative performance of three interspecific varieties, 170-Co2, 134-Co2 and I. S. C. 67, was presented for discussion at the Tenth Conference on Cotton Growing Problems in India held at Bombay in December, 1961.

(iv) *Other activities.*—Seven meetings of the Staff Research Council were held during the period. The Laboratory displayed exhibits at the Indian Industries Fair through the Directorate of Advertising and Visual Publicity, Ministry of Information and Broadcasting, Exhibition Division. The Laboratory also took part in the National Agricultural Fair held at Madras from January to March, 1962.

The Laboratory was recognised as a Post-graduate Institution by the University of Bombay for a further period of three years from the 2nd July, 1961 for guiding students for the M.Sc., and Ph.D. degrees in Physics (Textiles) by research.

In the January-February 1962 issue of the Indian Standards Institution Bulletin the very valuable contribution made by this Laboratory for the specification (IS : 1671-1960) on the method for determination of skein breaking load (strength), tenacity and yarn strength index of the cotton yarn (by constant rate of traverse machine) has been reported.

VIII. MISCELLANEOUS.

(i) As usual, a large number of distinguished persons and students from Technological Institutions and Colleges visited the Laboratory during the period under review and among them mention may be made of the following :—

	1.	Mr. P. C. Sherman	U. S. Department of Agriculture, Washington, D.C.
Members of the University Commission	2.	Shri G. D. Parikh	Rector, University of Bombay, Bombay-1.
	3.	Dr. G. M. Nabar	Director, Department of Chemical Technology, Bombay-19.
	4.	Shri R. Ghosh	Secretary, Agricultural and Food Production Department of West Bengal.
	5.	Mr. D. W. Brooks	General Manager, Cotton Production Association, Atlanta, U.S.A.
Members of the Visiting Committee	6.	Shri Narain V. Ullal	Manager, Khatau Mills, Bombay-27.
	7.	Dr. T. S. Subramanian	Director, Ahmedabad Textile Industry's Research Association, Ahmedabad.
	8.	Dr. C. Nanjundayya	Joint Director, Bombay Textile Research Association, Bombay.

9.	Mr. Walter M. Scott	Assistant Director, Foreign Research and Technical Programme Division, U.S. Department of Agriculture Washington, D.C.
10.	Shri K. C. Naik	American Embassy (FERRO) (ARS), U. S. Department of Agriculture, Washington, D.C.
11.	Mr. Jasusuke Simomura	Japan Cotton Traders Association, Osaka, Japan.
12.	Mr. G. W. Walls	C. S. I. R. O., Geelong, Australia.
13.	Shri A. C. Bose	Financial Adviser with the Ministry of Food and Agriculture, New Delhi.
14.	Dr. H. K. Nandi	Director of Agriculture, Government of West Bengal, Calcutta-1.
15.	Shri V. Ramanatha Iyer.	Retired Cotton Specialist, Coimbatore.
16.	Mr. S. B. Detwiler Jr.	Special Assistant to the Administration of Agricultural Research, U.S. Department of Agriculture, Washington, D.C.
17.	Mr. E. F. St. Clair	Administrative Officer of the U.S. Department of Agriculture, Agricultural Research Service, Far Eastern Regional Research Office, American Embassy, New Delhi.

(a) *Officers* : Dr. R. L. N. Iyengar — Director, proceeded on leave from the 30th April, 1962 to the 8th June, 1962.

Shri V. V. Gupte, Spinning Master, retired from the service with effect from the 17th November, 1961.

Dr. V. Sundaram, Senior Research Officer, reported at this Laboratory for duty on the 17th June, 1961, after successfully completing the advanced training in textile technology at the Manchester College of Science and Technology and at Leeds under the Colombo Plan.

Dr. V. Sundaram, Senior Research Officer was granted earned leave for 34 days from the 18th December to 20th January, 1962.

Shri Jai Prakash, Senior Research Officer was granted earned leave for 48 days from the 15th January 1962 to the 3rd March, 1962.

Dr. S. M. Betrabet, Officiating Senior Research Officer proceeded on leave from the 16th April 1962 to the 19th May 1962.

Shri N. Balasubramanian, Junior Research Officer proceeded on leave from the 26th June, 1961 to the 18th July, 1961 and again from the 14th May, 1962 to the 30th June, 1962.

Shri V. Venkataraman, Junior Research Officer (Statistics) proceeded on leave from the 5th March 1962 to the 4th May, 1962.

Shri S. N. Pandey, Junior Research Officer proceeded on leave from the 2nd May, 1962 to the 28th May, 1962.

(b) *Establishment* :—Shri K. G. Deo, Superintendent, Testing House, was granted leave on average pay for three months and 12 days from the 10th April, 1961.

Shri H. R. Nayak, Head Assistant (Testing) was appointed as Officiating Superintendent, Testing House, with effect from the 10th April to the 21st July, 1961, *vice* Shri K. G. Deo, proceeded on leave.

Shri K. S. Marar, Senior Assistant (Technological), Trichur, was appointed as Officiating Head Assistant (Testing), with effect from the 10th April, 1961, *vice* Shri H. R. Nayak promoted as Officiating Superintendent, Testing House, and subsequently continued on his post, *vice* Shri V. N. Modak retired from the 22nd July, 1961.

Shri P. S. Sambamurthy, Senior Assistant (Testing) was appointed to the selection grade with effect from the 14th June, 1961.

Shri K. Chandran, Senior Clerk in the office of the Secretary, Indian Central Cotton Committee, Bombay was appointed as Officiating Junior Assistant (Statistical) with effect from the 27th June, 1961 *Vice* Shri S. Srinivasan resigned.

Shri E. S. Abraham, Junior Assistant (Testing) was transferred to Dharwar as Junior Assistant (Technological) with effect from the 10th July, 1961 and in his place Shri T. G. Shankarnarayanan was appointed as Junior Assistant (Testing).

Kumari K. G. Tavkar, temporary Junior Assistant (Testing), was retained in service with effect from the 1st July, 1961 *vice* Shri V. N. Kamath resigned.

Kumari S. Janaki was appointed as Officiating Junior Assistant (Testing) with effect from the 1st September, 1961 *Vice* Shri M. G. Rege resigned.

Shri K. S. Joykutty was appointed as Officiating Junior Clerk with effect from the 6th October, 1961 *Vice* Shri V. D. Ponkshe appointed as Senior Clerk in the office of the Secretary, Indian Central Cotton Committee, Bombay.

Shri H. Vittala was appointed as Junior Assistant (Testing) with effect from the 13th November, 1961, *Vice* Shri M. N. Upponi resigned.

Shri A. Nagarajan, Assistant in the office of the Secretary, Indian Central Cotton Committee, Bombay, was appointed as Superintendent with effect from the 1st December, 1961.

Shri A. T. Raphael, Assistant was transferred to the office of the Secretary, Indian Central Cotton Committee, Bombay, with effect from the 1st December, 1961.

Sarvashri N. A. Kazi, S. K. Redkar, R. K. Dam and M. R. Mudras were appointed to the upgraded posts of Assistants with effect from the 1st December, 1961.

Sarvashri S. K. Gupta, V. P. Shende and M. P. Juwale, Senior Clerks and Store-keeper respectively were appointed as Assistants in the office of the Secretary, Indian Central Cotton Committee, Bombay, with effect from the 1st December, 1961.

Sarvashri R. D. Patwardhan and M. S. Pande, Upper Division Clerks in the office of the Secretary, Indian Central Cotton Committee, Bombay, were appointed as Store-keepers at this Laboratory with effect from the 1st December, 1961.

Shri L. R. Surti, Upper Division Clerk in the office of the Secretary, Indian Cotton Committee, Bombay, was appointed as Cashier at this Laboratory with effect from the 1st December, 1961.

Shri C. M. Krishnan, Stenographer (Grade I) in the Secretary's office was transferred to this Laboratory with effect from the 1st December, 1961. In his place Shri P. V. Thomas, Stenographer (Grade II) at this Laboratory was transferred to the Secretary's office.

Shri P. K. Jayaram was appointed as Officiating Junior Assistant (Testing) with effect from the 9th March, 1962 *Vice* Shri P. M. Thomas resigned.

Shri Nagvekar Sadanand N. was appointed as Officiating Junior Assistant (Testing) with effect from the 13th March, 1962, *Vice* Shri A. N. Balasubramanian resigned.

Two posts of Operatives were created at the Laboratory to cope up with the increased workload.

(iii) *Training* :—(1) As in the past, the following students were selected for training in the elements of Spinning and methods of testing fibres, yarn and cloth

and application of statistical methods to textiles for a period of six months commencing from the 31st July, 1961.

(1) Shri V. K. Srinivasan (The Textool Co. Ltd., Coimbatore).

(2) Shri A. L. Hiremath (The Hubli Agricultural Produce Market Committee, Hubli).

(2) Shri W. T. Butany, Geneticist (Cotton), Indian Agricultural Research Institute, New Delhi, was deputed to the Laboratory for a few days for getting himself acquainted with the various techniques in Laboratory testing of cotton and for personally carrying out certain tests on a few samples of cotton brought by him.

(3) Shri K. N. Seshan, Junior Assistant (Testing) was detailed for training on the "Safety aspects in the industrial application of radiation sources" at Atomic Energy Establishment, Trombay, from the 8th January, 1962 to the 2nd February, 1962.

(4) Shri M. U. Parmar, Senior Assistant (Technological) at Surat was deputed for a week to this Laboratory for undergoing training in the use and maintenance of the Digital Fibrograph.

(iv) *Laboratory Equipment:*—Additions to the Laboratory equipments during the period under review are given below :—

1. Aerosol Apparatus.
2. Immersion Equipment, Tension load-cell.
3. Electrical Supermetall Calculating Machine.
4. Brown Amplifier.
5. Schwarz Modified Hand Microtome.
6. Soxhlet Extraction Apparatus and Waterbath.
7. ATIRA Fibre Fineness Tester.
8. Raymax Rotating Anode Crystalographic tube conversion parts.
9. O3B Oil Diffusion Pump and Biased Cathod Assembly.
10. Brabender Semi-Automatic Moisture Tester.
11. Electric Centrifuge.
12. Gansons Shaker.

(v) *Staff Research Council.*—Seven meetings of the Staff Research Council were held during the period under review. Programme of Work of the Laboratory and progress made on research problems were discussed in some of these meetings. One of these meetings was held to meet Shri V. Ramanatha Iyer, Retired Cotton Specialist, Coimbatore. Three subjects, viz., (i) Measurement of Fineness and Maturity of cotton fibres based on air-flow principles, (ii) Studies in the chemical modification of cotton and (iii) Determination of extent of immaturity that could be tolerated in

long staple cottons in reference to their final spinning performance and nep-potentiality were discussed in the other meetings.

(vi) *Conferences and Convention.*—The tenth conference on cotton growing problems in India was held in Bombay in December, 1961. A paper on the comparative performance of three interspecific varieties of cotton was contributed by the Laboratory for discussion.

The Laboratory participated in the Sixth Indian Standards Convention held at Kanpur in December, 1961 by contributing two papers, *viz.*, (i) A proposed strength standard for cotton yarn under the universal count system and (ii) Adoption of the universal count system in textiles.

The Third Technological Conference arranged by the Bombay Textile Research Association was held at Bombay in January, 1962. Four papers were contributed by the Laboratory for discussion at this Conference.

(vii) *Exhibitions*:—Two lbs. of each of L.L. 54, H. 14, 170-Co2, 134-Co2, 134-Co2-M, Digvijay, Vijalpa, Virnar, Buri 147, Gaorani-22, Maljari, A.51-9, M.C.U-2, 9030-G, K.6 (Pandyan), Laxmi, Jayadhar, Coconadas 2, N. 14, Sea Island (Andrews) varieties of cotton and halo-length cards of each variety prepared by the Laboratory were displayed at the Indian Industries Fair through the Directorate of Advertising and Visual Publicity, Ministry of Information and Broadcasting, Exhibition Division, New Delhi-2.

The A. N. Stapling apparatus, Ginning percentage balance, Stelometer, instrument for measuring the toughness of leaf veins, Baer Sorter patterns and halocards prepared by the Laboratory were displayed at the Cotton show arranged by the Indian Central Cotton Committee in connection with their meetings held in October, 1961 and February, 1962.

The Ginning percentage balance, and various exhibits pertaining to pre-cleaning, ginning, spinning process, development and structure of cotton, cross section of collapsed cotton fibres, mercerized cotton fibres etc. were exhibited at the National Agricultural Fair held in Madras from the 14th January to 11th March, 1962. An Assistant from the Laboratory was deputed in this connection.

(viii) *Post-graduate Institution — Recognition of*:—The Syndicate of the University of Bombay have been pleased to continue the recognition granted to this Laboratory as a post-graduate institution for guiding students for the M.Sc. and Ph.D. degree in Physics (Textiles) by research for a further period of three years with effect from the 2nd July 1961. At present, six members of the research staff of the Laboratory have registered their names as students of the Bombay University. Out of these one is being guided for Ph.D. and remaining five for M.Sc. by Dr. R. L. N. Iyengar, Director and Shri Harirao Navkal, retired Senior Research Officer of this Laboratory, who have been given recognition by the University of Bombay as University teachers for guiding students for their Ph.D. and M.Sc. degrees in Physics

(Textiles) registered as students at this Laboratory. The Indian Central Cotton Committee has been pleased to attach Shri Harirao Navkal to this Laboratory after his retirement in an honorary capacity to guide the students in their post-graduate research.

(ix) *Visiting Committee*:—The achievement audit on the actual achievements of practical utility of the Laboratory for the triennium period, 1st June, 1958 to 31st May, 1961 was carried out by the Committee on the 9th and 10th August, 1961 and the Committee submitted its report to the Indian Central Cotton Committee.

This report was considered by the Indian Central Cotton Committee at its meeting held on the 7th October, 1961 and it was decided that the various recommendations made therein may be implemented. Some of the important recommendations are given below :—

1. The ginning section of the Laboratory might be equipped with the latest types of machinery. It is possible that this may be accomplished without much cost as the machinery manufacturing industry is likely to make a gift of the machinery to the Laboratory.

2. To enable the laboratory to undertake more intensified research on the fine structure and performance, the procurement of the following apparatus and equipment has been recommended : (i) SKF Spin-tester, (ii) A modern X-ray diffraction unit and auxiliary equipment like scanner, (iii) Nepotometer and (iv) Uster Spectrograph.

3. The necessity or otherwise of continuing some of the publications of the Laboratory might be examined after conducting a survey on their utility from the users' point of view.

The action taken on the above and the other recommendations of the Visiting Committee was reported to the Committee which was considered at its meeting held on the 28th February, 1962 and it was recommended for adoption.

(x) *P. L. 480 Programme.*—In 1960, two Research Projects had been submitted from the Laboratory for being financed out of P. L. 480 funds. The first project dealt with the investigation of microbial decomposition of cotton. The proposals submitted were modified by the U. S. Department of Agriculture authorities and sent back to the Laboratory for consideration. Further Dr. Walter M. Scott and Dr. K. C. Naik of the U. S. Department of Agriculture visited the Laboratory on the 29th September, 1961, and held discussions on the above project. Detailed proposals based on the above discussions were submitted as a research 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", Dr. S. M. Betrabet being the investigator of this Project.

This Project has now been approved by the Government of India and by the American authorities. The financial aspects of the Project were discussed and finalised by Mr. S. B. Detwiler Jr. and Mr. E. F. St. Clair of the U. S. Department of Agriculture on the 15th May, 1962, when they visited the Laboratory. Final sanction from the Government of India is expected to be received shortly.

The other project, which related to the investigation of the effect of high energy radiations on textile materials, has also been received back from the U. S. Department of Agriculture authorities with modifications. Preliminary discussions on these modified proposals were held with Mr. S. B. Detwiler, Jr. and E. F. St. Clair of the U. S. Department of Agriculture during their visit to the Laboratory on the 15th May, 1962 mentioned earlier. Detailed proposals, based on these discussons, are being prepared and will be submitted shortly to the Government of India in the form of a Project entitled, "Investigation of the preparation of radio resistant and radio sensitive celluloses to obtain basic information on the chemistry of cotton cellulose". Dr. V. Sundaram and Shri Jai Prakash, Senior Research Officers at the Laboratory, will be the investigators of this Project.

Further, at the above meeting on the 15th May, 1962, preliminary proposals proposals relating to another scheme entitled, "The effects of high energy radiation on the induction and half-life of excited, free and/or ionized radicals in cotton cellulose", prepared by U. S. Department of Agriculture were offered for investigation at this Laboratory. As some of the equipment needed for this work is not available at this Laboratory but available only at the Tata Institute of Fundamental Research, the matter is being looked into.

(xi) *Fabrication.*—Several instruments were fabricated locally, tested and supplied to various organisations. Of these, mention may be made of the following :—

	Nos.
1. Laboratory Model Gin	6
2. Halo Length discs.	62

(xii) *Appreciation.*—The eleventh meeting of the Textile Division Council of the Indian Standards Institution was held in Bombay on the 11th August, 1961. In the January-February 1962 issue of the Indian Standards Institution Bulletin mention was made while reporting the proceedings of this meeting that Shri Maharaj Kishen, Secretary of the Council reported that among published Indian Standards, special mention should be made of the specification on Method for determination of the skein breaking load (strength), tenacity and yarn strength index of cotton yarn (by constant rate of traverse machine) (I.S: 1671-1960), for which a very valuable contribution was made by the Technological Laboratory of the Indian Central Cotton Committee.

(xiii) *Lecture.*—Shri V. Ramnatha Ayyar, Retired Cotton Specialist, Government of Madras, gave a lecture on "A few thoughts on cotton" in May, 1962 at this Laboratory.

(xiv) *Library.*—The number of books in the Library at the beginning of the year was 1622. 101 books were added during the year bringing the total to 1723. The number of bound volumes at the end of the year was 1564. The Laboratory is getting as many as 68 important scientific journals dealing with the textile and allied subjects. Of these, 48 are subscribed while the other 20 are on exchange or free basis.

ACKNOWLEDGEMENTS

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 very 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, besides providing accommodation for the installatation of the Colorimeter at the Cotton Exchange Building, in connection with the preparation of Colour-grade charts for Indian Cottons.

My thanks are also due to the authorities of the various mills for their valuable help in carrying out mill tests on a large number of improved varieties of cotton which has proved useful to the Committee for assessing the performance of the new varieties under mill conditions. I am also thankful to the authorities of the ATIRA for arranging mill tests on some of the samples in their member mills.

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

Director,

Technological Laboratory.

APPENDIX I

Research Problems completed during the year

It may be recalled that this Appendix is being included in the Annual report since 1952-53. It should, however, be mentioned that an investigation may be deemed to have been completed only when the analysis of the results and the final writing up of the bulletin for publication have been done. Some problems which were entered in this Appendix as completed previously might, therefore, be included in this report as well, because further experimental work or statistical analysis was considered necessary before their publication. This also includes Papers which have been published during the year or presented at a Conference, Convention, Seminar etc.

The following investigations were completed during the year with the above proviso. Some of them were written up and sent for publication. Some have been published while others are under publication.

1. Studies in the mixings of Indian cottons with special reference to their fibre-properties (Series A, No. 106).

2. Formation of neps in ginning (Series B, No. 79).

3. A note on the determination of bulk torsional rigidity of cotton fibres (Series B, No. 80).

4. Oil and Linter contents of Indian cotton seeds (Series B, No. 81).

5. Method of sample preparation and its effect on micronaire fineness and maturity (Series B, No. 82).

6. A note on the relationship between fibre and spinning value of cottons of staple, 1.1/16″ and above (I. C. G. R. May 1962 and Technological Leaflet No. 71).

7. A study of the variation of fibre-maturity from single seeds in relation to seed and embryo weights (Sent for publication in the I. C. G. R.).

8. Effect of conditions of growth on the strength and structure of cotton fibres : Part I. Preliminary results on the effect of locality of growth (Sent for publication in the I. C. G. R.).

9. A comparative study of the visual assessment of yarn irregularity with the Uster Evenness Tester (sent for publication in the I. C. G. R.).

10. Upgrading of good quality Indian cottons by the use of double roving on double apron drafting system and its relation to their fibre-properties (Sent for publication in the I. C. G. R.).

11. Effect of different processing treatments on the spinning quality of M. A. 5 cotton (Sent for publication).

12. Contribution to the study of B-L curve of cotton yarns (Sent for publication).

13. A note on the determination of cotton fibre-maturity using the Cotton Grader (Sent for publication in the I. C. G. R.).

14. Variation in the yarn quality at different portions of the bobbin.

15. Non-lint content measurement by the One-Pass Shirley Analyser procedure (Letter to the Editor, Textile Research Journal, October, 1961).

16. Estimation of floating fibre percentage using the Digital Fibrograph (Letter to the Editor, Textile Research Journal, March 1962).

17. Comparative performance of three interspecific varieties of cotton (Sent for publication in the I. C. G. R.).

18. Evaluation of the length parameter with Digital Fibrograph with reference to fibre-length uniformity (Read at the BTRA Conference in Bombay, January 1962 and being published as a bulletin).

APPENDIX II

Brief account of the Technological work done at the cotton breeding stations in India during the year ended 31st March, 1962.

Details regarding the staff, the number of samples tested during the year and the nature of the tests carried out are given below. It may be mentioned in this connection that the check cottons covering a wide range of variation in all the important fibre properties were sent to all the Technological Assistants to enable them to calibrate and maintain their instruments in proper working order. The results on these check cottons indicated that the agreement between the Laboratory values and those of the Technological Assistants was better this year as compared to previous year.

Cotton breeding station at	Staff		No. of samples tested for			
	Senior Assistant (Tech.)	Junior Assistant (Tech.)	Fibre length	Fibre weight	Fibre maturity	Strength Index
Abohar	Shri Om Prakash Bansa[2]	Shri P. P. Chopra[1]	802[1]	801[2]	185	273
Achalpur	Shri L.R.Jambunathan	..	344	250	324[3]	405[3]
Bulandshahr	Shri M.Radhakrishnan	..	540[4]	332	20	169
Coimbatore	Shri K.V.N.Nayar	Shri S.K. Iyer	877[5]	842	828	812
Dharwar	Shri M.S.Sitaram	Shri Y.R. Yardi Shri E.S.Abraham[6]	703	703	493[7]	1776[7]
Indore	Shri N.C. Chiplunkar	Shri N.B. Joshi	525[8]	327	434	246
Nanded	Shri W.R.Sharma	..	321	255	197	275[9]
Nandyal	Shri R.Dwarkanath	..	305	311	86	..
Rajasthan	Shri P.N.Elayathu	..	253	235	122	31
Surat	Shri M.U. Parmar	Shri R.C.Sankalia Shri K.R.Desai Shri S.M. Gandhi Shri P.M. Patel[10]	1608[11]	1299	778	778

[1] Shri P. P. Chopra joined as Junior Assistant (Technological) on 20th September, 1961 and resigned from that posts on 5th March, 1962.

[2] Out of the samples tested for mean fibre length and fibre weight per unit length with the help of A.N. Stapling apparatus, only one tuft was tested in case of 402 samples. Further, determination of ginning outturn, lint index and seed index was carried out on 100 samples.

[3] In case of 200 samples, the determination of maturity and Pressley strength was done by taking only one slide for maturity and only two breaks for bundle strength. In addition, embryo weight and seed weight were determined on 200 samples and yield and ginning percentage on 20 samples.

[4] 229 samples were tested on A. N. Stapling apparatus, 290 Samples on Balls Sorter and 21 samples on Baer Sorter. Out of the samples tested on A.N. Stapling apparatus, only two tufts were tested in case of 196 samples. Further, determination of ginning percentage and net proneness was carried out on 24 samples.

[5] Fibre length irregularity percentage calculation was also carried out on 744 samples.

The Senior Assistants (Technological) are mainly engaged in the testing of fibre properties of various strains evolved in connection with the breeding work of the experimental stations. A summary of the work done by them during the year is given below:

1. Abohar:

A few selected strains from the extra long staple scheme had a mean fibre length about 1.15 inch, but from their very low fibre weight per inch they appear to be rather immature. Selections 49/61 and 76/61 from pure lines and A 194 and A 179 from micro trials I and II gave a good combination of fibre properties. The bundle strength for these selected strains seems to be rather high, probably, because of some defect in the testing machine which should be checked up.

Desi varieties from Gurdaspur and their crosses were very short in staple length and they were also very coarse. In trial 2 from Jullundur strains AS 132 and AS 136 gave better mean length (1.01 and 1.08 inch respectively) compared to about 0.90 of the controls, while in other properties they were either on par with the controls or somewhat better.

The problem on the genetic selection for high Pressley strength index was completed and the data were under analysis.

The investigation concerning the correlations between seed and lint characters was also completed after collecting the data for three years. The analysis of the pooled data is to be carried out now.

Regarding the relationship of lint index and ginning outturn with fibre properties, the various correlations showed variation from year to year but on the whole it was found that lint index was better associated with fibre properties than the ginning outturn.

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[6] Shri E.S. Abraham who was working as Junior Assistant (Testing) at the Technological Laboratory, Matunga, was transferred back to Dharwar on 10th May, 1961 and Shri T. G. Shankaranarayanan was transferred to the Technological Laboratory, Matunga, in his place.

[7] Only one slide consisting of 120-180 fibres was tested in case of maturity tests. In case of samples tested for bundle strength on Pressley machine, 6 breaks were taken for 1283 samples and 5 breaks on the remaining. Further, fibre length irregularity% was also calculated for 351 samples.

[8] Calculation of fibre length irregularity percentage was done in case of 401 samples.

[9] In case of 229 samples, the determination of bundle strength was carried out by testing 5 tufts only.

[10] Shri P. M. Patel, B.Sc. (Agri.) was appointed as Agricultural Supervisor and he has been working as Junior Assistant (Technological) from 9th March, 1962 under the Arboreum Cotton Improvement Scheme, Amreli.

[11] Out of the 1,608 samples tested for length, 359 were tested with the help of Digital Fibrograph. Further, the determination of fibre length irregularity percentage was also carried out on 113 samples.

The investigation regarding the effect of different dates of flowering was started on the cotton, 320F, in 1958-59 but from 1960 onwards, three strains 320F, LL.54 and L.S.S. are being studied under this problem. It was reported from the trend of results that the number of days required by the flowers to mature into bolls and the number of hairs per seed, in general, increased with decrease of the average of maximum and minimum temperature.

2. Achalpur:

A number of strains from replicated progeny row trials of American cotton breeding scheme showed a good combination of fibre properties. Selections 180-1 and 277-3 from replicated progeny row II are worth mentioning, as they had pressley strength about 8.7 lbs/mg, coupled with mean length above 1.1 inch, fineness about 0.11×10^{-6} oz/in. and maturity about 70%. A sample of *desi* hybrid gave an extra-ordinary mean length of 1.13 inch with 68% maturity and Pressley strength of 8.06 lbs/mg. Selections A4, H-2 and H-22 from Desi strain tests at Akola proved superior to the two controls AK. 277 and 197-3. A few selections from miscellaneous crosses of AK and CJ series gave a good combination of fibre properties with mean fibre length about one inch. Strain 3469 from F2 crosses was the most outstanding with 3467, 3465 and 3457 following it in respect of fibre properties. Selections 197-65 and 81-313 from Buri strain trial at Buldana proved very promising and are worthy of future exploitation with advantage.

The investigation regarding the influence of different inter-pick intervals (from 1 to 5 weeks varying at an interval of one week) on the quality, ginning percentage and yield of strain 0394, showed that in conformity with last year, none of these was affected significantly except in case of ginning percentage which was significantly higher this year for the 1-weekly picking interval. This was assigned by the Senior Assistant (Technological) to be an accidental result as no such trend was observed last year.

The results for the fourth year on the investigation concerning the relationship between embryo weight on the one hand and the pressley strength index, maturity and seed weight on the other were in general agreement with those of previous years. The compiled results for the four years indicated a weak negative correlation between embryo weight and Presssley strength index, whereas between embryo weight and maturity a very highly significant positive correlation was found. As expected, the very close relation between embryo weight and seed weight was also evident from pooled data for four years. In the course of above investigation, the maturation period (i. e. the number of days that elapsed between the flower opening and the boll opening) was also determined for 5 arboreum and 5 hirsutum strains. This period was found to be in the range of 51-55 days for arboreum strains as against 59-62 days for hirsutum strains, thus showing that hirsutums required about a week longer than arboreums for maturation.

3. Bulandshahr:

Among the desi cottons, two hybrid selections 197-3 × 35/1(1) and (197-3 × C 520) × 197-3 × C 520(8) spinning to 24s and 28s counts as compared to 19s of Raniben, have completed two years of comparative mill tests and have shown a definite superiority. The two crosses 36/5b × 197-3/28-8 and (197-3 × C 520) × C 520/5-6 from main strain trial proved superior in yield and spinning quality to the controls 35/1 and Raniben.

Among the American cottons at Raya, the two selections M4/43 and M4/58 have also completed two years mill tests. The last five years data given in the report of the Technological Assistant showed that M4/43 and M4/58 were better yielders that the control 216F ; the latter was also superior in mean length and fineness and hence spinning better. However, the mean fibre length for both the strains was lower in the current year as compared to previous years. In the earlier generations, the multiple crosses of Madras, Punjab and Uttar Pradesh strains gave some valuable segregates. Strain 216F/13 × CTI-25-4 needs special mention as it was the longest, finest and strongest compared to other samples from this trial.

At Hempur, in the tarai region, Punjab American A.C.88, gave twice as much yield as 320F, while maintaining high mean fibre length. The C.T.I. types ranging in mean fibre length from 1.04 to 1.22 inch gave yields at par with that of 320F, control.

The problem on the effect of rainfall on the yield and quality of 35/1 cotton was given up as suggested by me in my comments on last year's Annual report. Regarding the other investigations, not much progress was made except in the case of the problem on the design of a new instrument for fibre fineness determination. In connection with the design of this new instrument, optimum weight of lint for test, removal of air bubble, control of viscosity of lissapol solution, and effect of temperature were investigated.

4. Coimbatore:

A number of strains from main strain trial at Srivilliputtur were longer than control, although compared to last year, the performance was poor during the current year. From Progeny row trials, a number of selections were 1.20 inch or above in mean length and 0.100×10^{-6} oz/in. or below in fibre weight as compared to Control M.C.U.2 which had the mean length 1.14 inch and weight 0.117×10^{-6} oz/in. Further, a marked feature of some of these strains was their considerably higher uniformity of fibre-length. From the arboreum strains, although a number of selections were longer in mean fibre length than the Controls K2 and K6, practically none was much superior in strength and fineness to K6. From the progeny row trials as many as eight strains gave a mean length round about 1.10 inch as against 1.04 inch for the control, K6, but most of them were either coarser than control or on par with it. Strain 0754 was found to be the only selecton with an alround combination of good properties.

With regard to the problem on the possibility of breeding for uniformity of length in hirsutum types, the work of crossing for uniformity is reported to have been started and the samples would be tested after they are received.

The problem on the study of fibre properties of wild cottons, grown at Coimbatore, has been continued for three years and the data collected shows that some outstanding types of crosses are available.

The study on the breeder's problem regarding the causes of bad boll opening of M.C.U.2 cotton at Rajapalayam and at Srivilliputtur was continued for the third year on the same lines as in the previous years, except for a new additional treatment of applying trace elements. From the analysis of data, it was found that the effect due to treatments was not significant at both the places except on mean fibre weight at Srivilliputtur where it was highly significant. Last year, the treatment effect was found to be significant for fibre length irregularity percentage at Rajapalayam centre.

District trials were conducted at 15 places under Karunganni scheme on four varieties including K.6, as the standard. The analysis of results indicated, that the Tirunelveli locality was better than Coimbatore, as the cottons grown there were longer in staple length, had higher maturity coefficient and also gave higher bundle strength. As regards the varieties concerned, strains 9833-4 and 9705C were found to be, in general, better performer even though the maturity value for 9833-4 was somewhat low.

5. Dharwar

A few DH-10 selections recorded higher ginning percentage and finer fibres as compared to Control, Jayadhar. Special mention may be made of DH-10-6-9, 1-997-13 and 2-5(B)-12 which gave 4 to 7 per cent higher ginning percentage, 2 to 11 per cent higher mean length, 10 to 27 per cent better fineness, maturity on par and fibre length irregularity percentage lower than the control. A few selections of crosses of M.A. 5 and Misdel, M.A. 5 × D.P. gave improved fibre strength as compared to previous year. Russian cottons tried in that farm were all highly immature with fibre length varying from 0.86″ to 1.04″.

Some Indo-American strains from Gadag which had recorded higher ginning percentage and mean fibre length last year showed deterioration this year. A few selections were, however, better than Laxmi. Some samples from Arbhavi gave higher Pressley strength value combined with good mean fibre length and maturity. Further selections on basis of fibre strength may give good results.

A few selections from 32 Russian cottons grown in Siruguppa Research station recorded higher mean fibre length, and Pressley strength index.

From the insecticidal experiments, it was noted that this year there was no improvement in the mean fibre length of the treated samples, although in concurrence with previous year's results, they recorded higher pressley strength index.

Regarding the investigation on the effect of Gibberallic acid treatment on fibre properties of Laxmi cotton, the Senior Assistant (Technological) carried out some pot-culture experiments. It was found that the treated flowers indicated higher mean fibre length than the control. The Senior Assistant (Technological) desires to undertake large scale experiments to confirm the same.

6. Indore

A few selections (B59-1564, B57-827, B59-1578, B58-1320 and B59-1591) from Badnawar gave a mean length above 1.10 inch and maturity above 80% and Pressley strength 9 lbs/mg or above. Three selections were reported to possess Pressley strength even above 10 lbs/mg. As this figure appeared to be rather too high for American cottons grown in India, the Senior Assistant (Technological) has been advised to check and calibrate the Pressley instrument as well as his operation technique. From Khargone, the mean length of both desi and American cottons showed a decline compared to last year. Some of the outstanding desi and American cottons gave a mean length of about 0.90″ and 1.00″ respectively compared to corresponding figures of 0.95″ and 1.10″ of last year. As compared to a figure of 7.50 lbs/mg of last year, the Pressley strength index as high as 9.47 lbs/mg was reported this year for American cottons, most probably due to defective working of the instrument.

From a scheme of acclimatization and development of Harsh cottons at Bilaspur, eight samples recorded a range of 0.50 to 0.66 inch for mean fibre length and from 0.255 to 0.334 $\times$ 10-^{6} oz/in. for mean fibre weight.

Regarding the problem, "effect of environmental conditions on fibre properties of desi cotton", the rainfall data collected from 1947 to 1956 was analysed on weekly basis and certain constants were calculated to get the rainfall distribution pattern. The Senior Assistant (Technological) proposes to calculate relationship between the quality data for two cottons (names not given) with the rainfall distribution pattern.

In continuation of earlier work on the effect of organic manures on mean length and mean fibre weight, the study was extended to see the effect of these manures on fibre maturity. From the three years' data collected, it was reported that the maturity coefficient was highest in the year 1955-56 but no explanation was offered. Further, the interactions, kinds of N $\times$ levels of N and kinds of N $\times$ levels of N $\times$ levels of P were reported to be significant.

Regarding the investigation connected with fibre length estimation by Balls Sorter with three different methods of sampling, since this problem had already been examined thoroughly at the Technological Laboratory, Matunga and since an Indian Standards Institution standard had already been issued for doing the sampling in a particular manner, he should not waste his time on this work. He should stop this work immediately. In future, he should not undertake any such work without prior approval of the Director, Technological Laboratory.

The Senior Assistant (Technological) presented a paper on the study of fibre properties of interspecific hybrids from Badnawar at the Tenth Conference on Cotton Growing Problems in India held at Bombay in December, 1961.

7. Nanded

Some single plant selections of Indo-American varieties, 170-Co. 2, 134-Co2 and ISC-67 at Nanded, gave a mean length as high as 1.30 inch and in a few cases the pressley strength was also 8 lbs/mg or above, but the maturity was in general very poor. Strains 474-97-97, 474-101-28 and 823-10-155 selected from 170-Co. 2 were reported to have given good material combining good maturity with high pressley strength. From various arboreum trials at Parbhani, a number of strains having mean length round about 0.95 inch and fineness about 0.150×10^{-6} oz/in. or slightly more with a good strength (8.5 lbs/mg.) were evolved. Two of these selections, viz., 7701 and 7750 from replicated progeny row trials I and II gave an estimated count of 45 as against 38 for Gaorani 22. From Badnapur, both the Buri varieties, 147 and 0394, gave a very poor performance this year.

From the statistical analysis of results, separately for each year on the four years' data regarding the problem 'effect of green manure on the quality and agronomic characters of cotton', it was found that, but for the yield, none of the fibre characters was affected by the treatments. From the analysis on the pooled data for four years, Sannhemp and Dhainchaya were reported to have given significantly higher yield than the control. Sannhemp proved the best amongst all. Analysis of four years' data on the investigation on the effect of rotation on the quality of Gaorani 6 Cotton revealed that none of the various combinations of rotations produced any effect on fibre properties. However, ginning percentage was found to be affected by the rotational treatment.

8. Nandyal

32 samples of Sea Island (Andrews) received from different centres in Andhra Pradesh exhibited a wide range of variation in the various fibre properties. Amongst the arboreum selections at Mudhol, quite a few were above 1.00 inch in mean fibre length. Strains 5025, 5044 and 4913 were reported to be superior as they possessed a good combination of mean fibre length and fineness. From the American selections at Mudhol, some of the strains were above 1.00 inch in mean length and varied in fineness from 0.098×10^{-6} oz/in to 0.133×10^{-6} oz/in. The maturity determination on these American strains should have also been carried out. From the results of 1st lot received from Adoni, it was reported that red soil experiment gave better mean fibre length as compared to black soil, although the fineness was affected in the adverse direction. The statistical analysis of the data was not given in the report.

In a scheme for the pest control of N14 cotton, several pesticides, like Endrin, Parathion, Gusathion and Sevin etc., were tried in different concentrations. It was

mentioned in the report that control and sevin treated plots gave lower mean fibre length than the other treatments. Also sevin treatment was reported to have induced coarseness in the fibres.

The Senior Assistant (Technological) has not taken up any research problem so far. The presentation of the report is very poor and the Assistant should take pains to learn the art of reporting. He will be given the necessary instructions during the refresher course by the end of this year.

9. Rajasthan

The quantity of work turned out from the station, which was established slightly more than a year ago, is much lower than what could be expected for this period and the presentation of report also leaves very much to be desired. The Assistant should take pains to learn in this regard. He will be given the necessary instructions during the refresher course by the end of this year.

A number of samples from Kota Bundi were reported to be ranging in mean fibre length from 1.00 to 1.15 inch and they had also good maturity but all of them were low yielders. The properties of the selected strains and the controls were, however, not given in the report. In the case of samples from Udaipur, fibre length, maturity and yield for most of the selections was reported to be quite satisfactory except for LL 54 from Punjab which was a rather low yielder and susceptible to jassid attack.

It has been stated that no progress was made regarding the investigation on the study of maturity of cotton grown in different tracts of Rajasthan because of non-availability of a microscope.

10. Surat

From the herbaceum cotton breeding scheme, some of the remaining samples from different crosses of last year gave a mean length above 1.00 inch compared to 0.86 for the control, 2087. They were also finer and somewhat stronger than the control although the maturity was slightly on the lower side. Some of the last year's promising strains of Indo-American cottons, BC-68, 134-Co2-M, Co-ano, A.P. types, Co-toms and BC-22 etc., gave an excellent material with fibre length over 1.20 inch with a maturity over 60% and very good strength (above 3.75 gm/grex) and fineness. The current season's samples were, however, very poor in quality.

Some of the samples from Talod had a satisfactory combination of mean length, fineness and strength but their maturity was in general, low. Selections I.S.C. 67-586-1-3-2 and H. 33-1-4-2 from progeny row trials gave a very good combination of fibre properties. From district trials of 2087, Digvijay, Vijay and Culture 92 at 15 different places at Broach, the last one was found to be longer than Digvijay at 14 places out of 15.

Some selections like 767-B, 1/23, 8/1, 11/4 and 957-B-2 etc. from Viramgam proved superior to the Control, Kalyan, in mean fibre length and fineness, Quite a few selections from the crosses and back crosses of Kalyan with 2087, 2334 and 115 approached 1″ in mean length as compared to 0.87 inch for the control and they also combined very good fineness.

From Amreli, the quality of the produce was, in general, inferior compared to the last year.

Regarding the investigation of fibre properties in relation to soil and climatic conditions, 6 different types 115, 198, 235, 2087, Suyog and Digvijay were reported to be under trial at nine different places in South Gujarat but no further details regarding the performance were given in the report. 74 samples were reported to be tested regarding the district trials on Indo-American cottons, 170-Co2,134-Co2-M, 134-Co2-M-21 and I.S.C. -67 etc., but no details regarding the fibre properties were given.

156 samples of 170-Co2 and 2087 treated with different dozes of various in sectiCides like Sevin, Endrin etc., were reported to have been tested for various fibre properties but nothing was mentioned in the report regarding the beneficial or harmful effects of these treatments.

APPENDIX III

The following publications were issued from the Laboratory during the period under review:—

I. Technological Bulletin Series 'A'.

(i) Technological Bulletin Series A, No. 106, 'Studies on the mixings of Indian Cottons with special reference to their fibre properties', by V.V. Gupte and R.L.N. Iyengar.

(ii) Technological Bulletin Series A, No. 107, 'Technological Reports on Trade Varieties of Indian cottons 1961', by R.L.N. Iyengar.

(iii) Technological Bulletin Series A, No. 108, 'Technological Reports on Standard Indian Cottons, 1961', by R.L.N. Iyengar.

II. Technological Bulletin Series 'B'

(i) Technological Bulletin Series B, No. 79, 'Formation of neps during ginning' by R.L.N. Iyengar and S. M. Betrabet.

(ii) Technological Bulletin Series B, No. 80. 'A note on the determination of bulk torsional rigidity of Cotton Fibre' by N. Balasubramanian and R.L.N. Iyengar.

(iii) Technological Bulletin Series B, No. 81, 'Oil and Linter Contents of Indian Cotton-seeds' by Indira G. Bhatt, K.S. Bhujang and R.L.N. Iyengar.

(iv) Technological Bulletin Series B, No. 82, 'Method of sample preparation and its effects on Micronaire fineness and Maturity' by Jai Prakash, V. Sundaram and R.L.N. Iyengar.

III. Technological Leaflets.

(i) Technological Leaflet No. 71 'A note on the relationship between fibre and, spinning value of cottons of staple 1-/16″ and above', by V. Venkataraman and R.L.N. Iyengar.

(ii) Technological Leaflet No, 72, 'Ramie Fibre: An enquiry into its production in India,' by R.L.N. Iyengar and K.S. Bhujang.

IV. Articles and Papers.

The following articles were published in the Indian Cotton Growing Review:—

(i) 'Formation of neps during ginning,' by R.L.N. Iyengar and S.M. Betrabet, Indian Cotton Growing Review, July 1961 (B. No. 79).

(ii) 'Effect of manuring on quality of cotton,' by H.R. Nayak, Indian Cotton Growing Review, September, 1961.

(iii) 'Studies of the mixings of Indian Cottons with special reference to their fibre properties,' by V.V. Gupte and R.L.N. Iyengar, Indian Cotton Growing Review, September, 1961 (A. No. 106).

(iv) 'A note on the determination of bulk torsional rigidity of cotton fibres,' by N. Balasubramanian and R.L.N. Iyengar, Indian Cotton Growing Review, November 1961, (B. No. 80).

(v) 'Oil and Linter Contents of Indian Cotton-seeds', by Indira G. Bhatt, K.S. Bhujang and R.L.N. Iyengar, Indian Cotton Growing Review, November, 1961 (B. No. 81).

(vi) 'Method of sample preparation and its effect on micronaire fineness and maturity', by Jai Prakash, V. Sundaram and R.L.N. Iyengar, Indian Cotton Growing Review, March, 1962, (B. No. 82).

(vii) 'A Note on the relationship between fibre properties and spinning values of cottons of staple 1-1/16″ and above', by V. Venkataraman and R.L.N. Iyengar (Leaflet No. 71).

(viii) 'Ramie Fibre: An enquiry into its production in India,' by R.L.N. Iyengar and K.S. Bhujang (Leaflet No. 72).

The following papers were sent for publication in the Indian Cotton Growing Review.

(1) 'Effect of conditions of growth on the strength and structures of cotton fibres, Part I. Preliminary results on the effect of locality of growth', by V. Sundaram, Jai Prakash and R.L.N. Iyengar.

(2) '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.

(3) 'A comparative study of the visual assessment of yarn irregularity with the Uster Evenness Test results,' by N. Balasubramanian, V.V. Gupte and R.L.N. Iyengar.

(4) 'Upgrading of good quality Indian Cottons by the use of double roving on double aprona drafting system and its relation to their fibre properties,' by V. V. Gupte and R.L.N. Iyengar.

The following papers were written up and sent to the Indian Central Cotton Committee for approval of the Editorial Sub-Committee for publication.

(1) 'Effect of different processing treatments on the spinning quality of M.A.-5', by Harirao Navkal, V. V. Gupte and R.L.N. Iyengar.

(2) 'Contribution to the study of B.L. curve of cotton yarns', by N. Balasubramanian.

The following articles were published in various journals as given below:—

(1) 'Non-Lint Content Measurement by the one-pass shirley Analyser procedure', by R.L.N. Iyengar, Letter to the Editor, Textile Research Journal, October 1961.

(2) 'Heard of Ramie Fibre?' by R.L.N. Iyengar and K.S. Bhujang, Indian Farming, November, 1961.

(3) 'Estimation of floating fibre percentage using the Digital Fibrograph', by Jai Prakash, letter to the Editor, Textile Research Journal, March 1962.

The following paper was contributed to the symposium on instrumentation in Textile Industry, Bombay, September 1961.

Instruments for cotton Testing by R.L.N. Iyengar. This paper subsequently appeared as an article in the November, 1961 issue of the Journal IMDA.

The following papers were contributed at the 6th Indian Standards Convention, Kanpur, held in December, 1961.

(1) 'A proposed strength standard for cotton yarn under the Universal Count System', by R.L.N. Iyengar and V.V. Gupte.

(2) 'Adoption of Universal Count System in Textiles', by V.V. Gupte.

The following paper was contributed to the 10th Conference on Cotton Growing Problems in India held in Bombay during December, 1961.

"Comparative performance of three interspecific Varieties of cotton," by V. Sundaram and R.L.N. Iyengar. This will be published in the Indian Cotton Growing Review.

The following papers were contributed to the Third Technological Conference held in Bombay in January 1962, under the joint auspices of Bombay Textile Research Association, Ahmedabad Textile Industry's Research Association and South India Textile Research Association.

(1) 'Yarn strength index under the metric system,' by R.L.N. Iyengar.

(2) 'Evaluation of the length parameter with digital fibrograph with reference to Fibre-length non-uniformity', by Jai Prakash.

(3) 'A contribution to the study of the B.L. curve of cotton yarn,' by N. Balasubramanian.

(4) 'A preliminary study on the mercerisation of some of the Indian cottons', by S.N. Pandey and R. Braganza.

V. Technological Circular Nos. 1201 to 1265 as per list given below:—

Technological Circular No.	*Title*	*Date of Publication*
1201	Fibre and Spinning Test Report (No. 6252) on sample of Malvi Cotton 1960-61.	May, 1961
1202	Fibre and spinning Test Report (No. 6278) on sample of Bengal Deshi (Punjab) Cotton, 1960-61.	May, 1961
1203	Fibre and spinning Test Report (No. 6279) on sample of Bengal Deshi (Rajasthan) Cotton, 1960-61.	May, 1961
1204	Fibre and spinning Test Report (No. 6280) on sample of Virnar (East Khandesh) Cotton, 1960-61.	May, 1961
1205	Fibre and spinning Test Report (No. 6290) on sample of Virnar (W. Khandesh) cotton, 1960-61.	June, 1961
1206	Fibre and spinning Test Report (No. 6291) on sample of Virnar (Berar) cotton 1960-61.	June, 1961
1207	Fibre and spinning Test Report (No. 6292) on sample of Gaorani (Bhainsa) cotton, 1960-61.	June, 1961
1208	Fibre and spinning Test Report (No. 6293) on sample of Gaorani 6 (Umri) cotton 1960-61.	June, 1961
1209	Fibre and spinning Test Report (No. 6294) on sample of Gaorani 12 cotton, 1960-61.	June, 1961
1210	Fibre and spinning Test Report (No. 6295) on sample of Punjab American H. 14.	June, 1961
1211	Fibre and spinning Test Report (No. 6296) on sample of 320F Punjab American cotton, 1960-61.	June, 1961
1212	Fibre and spinning Test Report (No. 6297) on sample of Buri 0394 (Achalpur) cotton 1960-61.	June, 1961
1213	Fibre and spinning Test Report (No. 6298) on sample of M.A.5, cotton, 1960-61.	June, 1961
1214	Fibre and spinning Test Report (No. 6299) on sample of Buri 0394 (East Nimar) cotton, 1960-61.	June, 1961
1215	Fibre and spinning Test Report (No. 6300) on sample of Laxmi (Gadag) cotton, 1960-61.	June, 1961

Technological Circular No.	*Title*	*Date of Publication*
1216	Fibre and spinning Test Report (No. 6301) on sample of 170-Co2 (Nagar) cotton, 1960-61.	June, 1961
1217	Fibre and spinning Test Report (No. 6383) on sample of Virnar (Aurangabad) cotton, 1960-61.	Sept., 1961
1218	Fibre and spinning Test Report (No. 6384) on sample of Kalyan (Viramgam) cotton, 1960-61.	Sept., 1961
1219	Fibre and spinning Test Report (No. 6385) on sample of Kalyan (Bavla) cotton, 1960-61.	Sept., 1961
1220	Fibre and spinning Test Report (No. 6386) on sample of Vijalpa (Surat) cotton, 1960-61.	Sept., 1961
1221	Fibre and spinning Test Report (No. 6387) on sample of Vijalpa (Navsari) cotton, 1960-61.	Sept., 1961
1222	Fibre and spinning Test Report (No. 6388) on sample of Vijalpa (Rajpipla) cotton 1960-61.	Sept., 1961
1223	Fibre and spinning Test Report (No. 6389) on sample of Digvijay (Dabhoi) cotton 1960-61.	Sept., 1961
1224	Fibre and spinning Test Report (No. 6390) on sample of Vijay (Palej) cotton 1960-61.	Sept., 1961
1225	Fibre and spinning Test Report (No. 6391) on sample of Laxmi (Adoni) cotton 1960-61.	Sept., 1961
1226	Fibre and spinning Test Report (No. 6392) on sample of Jayadhar (Hubli) cotton 1960-61.	Sept., 1961
1227	Fibre and spinning Test Report (No. 6393) on sample of 170-Co2 (Porbunder) cotton, 1960-61.	Sept., 1961
1228	Fibre and spinning Test Report (No. 6423) on sample of K. 6 (Pandyan) cotton, 1960-61.	Oct., 1961
1229	Fibre and spinning Test Report (No. 6424) on sample of Jarila (Barsinagar) cotton, 1960-61.	Oct., 1961
1230	Fibre and spinning Test Report (No. 6425) on sample of Wagad (Saurashtra) cotton 1960-61.	Oct., 1961
1231	Fibre and spinning Test Report (No. 6426) on sample of Buri 147 (Achalpur) cotton, 1960-61.	Oct., 1961

Technological Circular No.	*Title*	*Date of Publication*
1232	Fibre and spinning Test Report (No. 6427) on sample of A.R.B.P. 52 cotton, 1961.	Oct., 1961
1233	Fibre and spinning Test Report (No. 6428) on sample of A. R. Busoga cotton, 1961.	Oct., 1961
1234	Fibre and spinning Test Report (No. 6442) on sample of A. R. Jinja cotton, 1961.	Oct., 1961
1235	Fibre and spinning Test Report (No. 6443) on sample of Mwanza cotton 1961.	Oct., 1961
1236	Fibre and spinning Test Report (No. 6447) on sample of Karunganni 2 (Sattur) cotton 1960-61.	Oct., 1961
1237	Fibre and spinning Test Report (No. 6461) on sample of Nandyal 14 cotton; 1960-61.	Oct., 1961
1238	Fibre and spinning Test Report (No. 6477) on sample of Westerns (Adoni) cotton, 1960-61.	Oct., 1961
1239	Fibre and spinning Test Report (No. 6478) on sample of Daulat (Hingoli) cotton, 1960-61.	Oct., 1961
1240	Fibre and spinning Test Report (No. 6479) on sample of Kalyan (Saurashtra) cotton, 1960-61.	Oct., 1961
1241	Fibre and spinning Test Report (No. 6480) on sample of Vijay (Cambay) cotton, 1960-61.	Oct., 1961
1242	Fibre and spinning Test Report (No. 6481) on sample of Digvijay (Kapadvanj) cotton 1960-61.	Oct., 1961
1243	Fibre and spinning Test Report (No. 6484) on sample of Jayadhar (Bagalkot) cotton 1960-61.	Nov., 1961
1244	Fibre and spinning Test Report (No. 6485) on sample of 134-Co2-M (Idar) cotton, 1960-61.	Nov., 1961
1245	Fibre and spinning Test Report (No. 6504) on sample of Karunganni 5 (Coimbatore) cotton, 1960-61.	Dec., 1961
1246	Fibre and spinning Test Report (No. 6505) on sample of Tinnevelly cotton, 1960-61.	Dec., 1961
1247	Fibre and spinning Test Report (No. 6515) on sample of 9030-G, cotton, 1960-61.	Dec., 1961
1248	Fibre and spinning Test Report (No. 6516) on sample of Cambodia Co2 (Tiruppur) cotton, 1960-61.	Dec., 1961

Technological Circular No.	*Title*	*Date of Publication*
1249	Fibre and spinning Test Report (No. 6520) on sample of M.C.U.1 (Coimbatore) cotton 1960-61.	Dec., 1961
1250	Fibre and spinning Test Report (No. 6528) on sample of L.S.S. cotton 1960-61.	Feb., 1962
1251	Fibre and spinning Test Report (No. 6534) on sample of Parbhani-American 1 cotton 1960-61.	Mar., 1962
1252	Fibre and spinning Test Report (No. 6535) on sample of Cocanadas-2 cotton, 1960-61.	Mar., 1962
1253	Fibre and spinning Test Report (No. 6546) on sample of M. C. U. 1, (Madurai) cotton 1960-61.	Mar., 1962
1254	Fibre and spinning Test Report (No. 6550) on sample of M.C.U. 2 (Summer) Cotton, 1961.	Mar., 1962
1255	Fibre and spinning Test Report (No. 6709) on sample of Bengal Deshi (Punjab) cotton 1961-62.	April, 1962
1256	Fibre and spinning Test Report (No. 6710) on sample of Bengal Deshi (Rajasthan) cotton 1961-62.	April, 1962
1257	Fibre and spinning Test Report (No. 6711) on sample of Virnar (East Khandesh) cotton, 1961-62.	April, 1962
1258	Fibre and spinning Test Report (No. 6712) on sample of Virnar (West Khandesh) cotton. 1961-62.	April, 1962
1259	Fibre and spinning Test Report (No. 6713) on sample of Virnar (Aurangabad) cotton, 1961-62.	April, 1962
1260	Fibre and spinning Test Report (No. 6714) on sample of Jarila (Barsinagar) cotton, 1961-62.	April, 1962
1261	Fibre and spinning Test Report (No. 6715) on sample of Gaorani 12 cottons 1961-62.	April, 1962
1262	Fibre and spinning Test Report (No. 6716) on sample of Buri 0394 (East Nimar) cotton 1961-62.	April, 1962
1263	Fibre and spinning Test Report (No. 6717) on sample of Daulat cotton 1961-62.	April, 1962
1264	Fibre and spinning Test Report (No. 6729) on sample of Maljari cotton 1961-62.	May, 1962
1265	Fibre and spinning Test Report (No. 6730) on sample of A 51-9 cotton, 1961-62.	May, 1962

Summaries of Technological Bulletins Series A, No. 106 and Series B, Nos. 79 to 82 are given below.

1. Technological Bulletin Series A, No. 106.

STUDIES ON THE MIXINGS OF INDIAN COTTONS WITH SPECIAL REFERENCE TO THEIR FIBRE PROPERTIES

Fifteen different Indian cottons were taken up for this experiment. They were individually tested for different fibre properties as well as spinning value, their market price was also obtained. On the strength of the fibre test results and spinning value, these cottons were divided into two groups: (i) superior cottons; and (ii) inferior cottons. Forty-three suitable mixings of two varieties each in proportion of seven of superior variety and three of inferior variety were made and spun into three different counts by two different processing methods. All the yarns thus obtained were tested for various physical properties. Mixing abilities of different cottons were thus found out. It was revealed that: (a) there is wide scope for selection of cottons from the cost point of view; (b) scientific selection of cottons in a mixture will pay good dividends; and (c) short-cut processing in spinning may save some cost but is likely to result in deterioration in quality.

2. Technological Bulletin Series B, No. 79.

FORMATION OF NEPS DURING GINNING

(i) Effect of pre-cleaning and ginning by three openers and gins with different speeds and settings, on the formation of neps has been investigated. (ii) Attempt is made to find out which treatment is most suited to get quality lint with least neps and maximum ginning output. (iii) Saw ginning gives significantly more neps than single or double roller ginning. (iv) Effects of gins are not uniform in all cottons and the interaction reflects differential response of cottons subjected to each gin. (v) Neps in the lint stage show no relationship with the neps at the yarn stage. (vi) Openers or speeds and settings in gins have very little effect on the formation of neps. Hence, optimum treatment to get maximum output without sacrificing fibre quality can be given to a cotton.

3. Technological Bulletin Series B, No. 80.

A NOTE ON THE DETERMINATION OF BULK TORSIONAL RIGIDITY OF COTTON FIBRES.

The resistance of a fibre to twisting is determined by its torsional rigidity. This fibre character is of importance in the case of spun yarns, as it influences the ease with which the component fibres are bound together in the yarn. Earlier work on

cotton fibres had shown that the variation in torsional rigidity among fibres of a particular sample are very great and therefore tests have to be made on a large number of fibres in order to obtain a fairly reliable estimate of torsional rigidity. An investigation was therefore undertaken to evolve a suitable method for determining rigidity by testing bundles of fibres, which will incidentally reduce the time required for testing.

As it is not possible to prepare accurately, bundles of constant weight, a preliminary study was made to determine the relationship between rigidity and bundle weight. It was found that the product, bundle weight × period of oscillation is linearly related to the bundle weight. This relationship can therefore be used for correcting the period of oscillation to a chosen constant weight of bundle and in this way bundle rigidity was determined for 18 cottons. An estimate of single fibre rigidity can be obtained by dividing the bundle rigidity value by the number of fibres in the bundle. It has been found that the estimated values thus obtained are closely correlated with results obtained from actual tests on single fibres and it is therefore concluded that comparative estimates of rigidity of cotton can be obtained from tests on bundles of fibres.

4. Technological Bulletin Series B. No. 81.

OIL AND LINTER CONTENTS OF INDIAN COTTON SEEDS

The present investigation has revealed certain interesting features about the oil and linter contents of Indian cotton seeds. Though certain varieties belonging to the arboreum species gave a high oil content, the desi varieties comprising both the arboreum and herbaceum species, in general, gave a lower value than the hirsutum varieties. Since these desi varieties still form a bulk of the production of cottonseed in the country there appears to be a good scope for improving the oil content of these varieties. Also, breeding for cottonseeds with thin seed coats and high kernel weight would appear to improve the oil yield.

If all the available cottonseeds were crushed for oil extraction the estimated production would be 250,000 tons per year approximately.

The linter content is high among the hirsutum varieties and low among the arboreum and herbaceum. About 8 to 9 per cent of linters could be obtained in the former case giving an estimated production of 40,000 tons of linters per year in our country, if all the available seeds of the American varieties are delinted.

As in the case of the properties of cotton fibre, the oil content also appears to be affected by environmental changes though this needs further investigation.

5. Technological Bulletin Series B. No. 82.

METHOD OF SAMPLE PREPARATION AND ITS EFFECTS ON MICRONAIRE FINENESS AND MATURITY.

Following are the conclusions of this investigation.

(1) The Micronaire value of a sample is higher when opened by hand than when opened by bow by about 0.17, on an average.

(2) The correlation coefficient of + 0.98 between the Micronaire values of the samples opened by the two methods is highly significant.

(3) The mean variance in the case of hand opened samples is about 1.5 times of that in the case of bow opened samples.

(4) The difference (A) between the Micronaire values measured with and without spacer for hand opened samples is higher than that (B) for the corresponding bow opened samples, most probably on account of curvilinear scale employed in the Micronaire instrument.

(5) The correlation coefficients + 0.8058 of A with Mc, the maturity coefficient determined by the caustic soda method, and + 0.7655 of B with Mc are highly significant; but these two do not differ significantly between themselves.

(6) The mean variance of A is not significantly different from that of B.

(7) The prediction formula for Mc from A and B are almost similar and equally sensitive.

(8) As the error of estimate of Mc from both A and B are of the same order, both the regression equations are almost equally efficient in predicting maturity.

It would thus appear that, although the mean variance associated with Micronaire value for hand opened samples is significantly higher than that associated with bow opened samples, hand opening method could be employed in place of the bow opening method wherever a little accuracy could be sacrificed in favour of speed of testing.

A word of caution, however, may be added here that in the case of very trashy cottons, it would be safer to employ bow opening method only to be more certain about its proper cleaning before testing for Micronaire values.

APPENDIX IV

Scientific and Technical staff in the Technological Laboratory as on the 31st May, 1962

	Designation	*Name*
1.	Director	Dr. R. L. N. Iyengar, D.Sc. F.T.I.
2.	Senior Research Officer	,, V. Sundaram, M.Sc., Ph.D., A.R.I.C.
3.	—do—	Shri Jai Prakash, M.Sc.
4.	—do—	Dr. S. M. Betrabet, M.Sc., Ph.D.
5.	Spinning Master	Vacant since 17-11-61.
6.	Junior Research Officer	Shri V. Venkataraman, M.A.
7.	—do—	,, N. Balasubramanian. B.Sc., BSc. (Tech.), A.T.I.
8.	—do—	,, V. G. Munshi, M.Sc.
9.	—do—	,, S. N. Pandey, M.Sc.
10.	Superintendent, Testing House	,, K. G. Deo
11.	Head Assistant (Testing)	,, H. R. Nayak
12.	Head Assistant (Testing)	,, K. S. Marar, B.A., LL.B.
13.	Senior Assistant (Testing)	,, P. S. Sambamurthy.
14.	—do—	,, R. G. Panvalkar, B.Sc.
15.	—do—	,, P. V. Nachane, B.Sc.
16.	—do—	,, S. B. Mogre, M.Sc.
17.	—do—	,, S. Samson, B.Sc., LL.B.
18.	—do—	,, P. D. Vakil
19.	—do—	,, N. Geo Paul, B.Sc.
20.	—do—	,, C. A. S. Iyer, B.Sc.
21.	—do—	,, S. Ramanathan
22.	Chemical Assistant	Kum. Indira G. Bhatt, M.Sc.
23.	Junior Assistant (Testing)	Shri. R. Braganza, B.Sc.
24.	—do—	,, K. N. Seshan, B.Sc.
25.	—do—	,, P. G. Oka, B.Sc.
26.	—do—	Smt. S. B. Pai, B.Sc. (Hons.)

	Designation	*Name*
27.	Junior Assistant (Testing)	Shri G. G. Phadnis, B.Sc.
28.	—do—	,, M. S. Sawant, B.Sc.
29.	—do—	Smt. K.L. Datar, B.Sc.
30.	—do—	Shri S. R. Ganatra, B.Sc.
31.	—do—	,, A. W. Shringarpure, B.Sc.
32.	—do—	,, A. V. Ravindranathan, B.Sc.
33.	—do—	,, C. V. Raman, B.A.
34.	—do—	,, Seshadri Srinivasan, B.Sc.
35.	—do—	,, T. G. Shankarnarayanan, B.Sc.
36.	—do—	,, A. Rajagopalan, B.Sc.
37.	—do—	,, A. V. Ukidve, B.Sc.
38.	—do—	,, K. S. Shama Rao, B.Sc.
39.	—do—	,, N. Venkataramu, B.Sc.
40.	—do—	Kum. K. M. Advani, B.Sc.
41.	—do—	Shri B. M. Petkar, B.Sc.
42.	—do—	,, K. R. Kamath, B.Sc.
43.	—do—	Kum. K. G. Tawkar, B.Sc. (Hons.)
44.	—do—	Shri A. K. Anthony, B.Sc.
45.	—do—	Kum. S. Janaki, B.Sc.
46.	—do—	Shri H. Vittala, B.Sc.
47.	—do—	,, P, K. Jayaram. B.Sc.
48.	—do—	,, N. Sadanand, B.Sc.
49.	Senior Asstt. (Stat.)	,, K. Venkateswaran, B.A.
50.	—do—	,, S. S. Malik, M.A.(Maths) M.A.(Stat.)
51.	Junior Asstt.	,, S. G. Nayar, B.Sc., LL.B.
52.	—do—	,, K. Chandran, B.A.
53.	Eng. Asstt. (Ginning)	,, D. G. Shete, L.M.E.
54.	Eng. Asstt. (Electrical)	,, H. V. Tamhankar, L.M.E., L.E.E.
55.	1st. Spg. Asstt. (Offg.)	,, S. A. Shankarnarayan, B. Sc. (Text.)
56.	2nd Spg. Asstt.	,, K. S. Bhyrappa
57.	Draughtsman	,, Y. N. Tendulkar.
58.	Turner	,, M. Mastan Shaikh,
59.	Mechanic	,, P. V. Shridhankar.

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