INDIAN CENTRAL COTTON COMMITTEE

ANNUAL REPORT

OF THE

DIRECTOR

TECHNOLOGICAL LABORATORY

FOR THE

YEAR ENDING 31st MAY 1947

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Annual Report of the Director, Technological Laboratory, for the Year Ending 31st May 1947.

THE present report contains an account of the work done at the Laboratory from 1st June 1946 to 31st May 1947 It will be seen from the report that, the work in all sections has progressed satisfactorily During this period some technological investigations have been completed and good progress has been made in others As in the past, valuable assistance has been rendered to the cotton breeders, cotton trade and industry not only by carrying out routine tests on a large number of samples sent by them, but also by giving them advice on technical matters, whenever necessary. This is evidenced from the fact, that tests on samples received from the cotton mills were not of a routine character, but they involved scientific investigations on the causes of certain defects in the processing and on suitable remedies for removing them. Further, the ginning section was fully occupied with a series of experiments on the pre-cleaning of Indian seed-cottons on different machines and suitable speeds and settings in the saw and roller gins for ginning different varieties of Indian cottons satisfactorily These tests were completed during the period under review. Furthermore, comparative ginning tests on two varieties of cotton both at up-country ginning factories and at the Laboratory were carried out.

It will thus be seen that there has been, on the one hand, a large increase in the number of technological problems tackled beside the routine and other samples received for tests from year to year and on the other, the equipment and the staff of the Laboratory have remained steady This has resulted in considerable strain on the existing re-ources of the Laboratory besides contributing to the slight delay in the issue of test reports on some agricultural samples It would, therefore, be necessary to provide both for additional equipment and increase in the staff in order to cope up with the progressive increase in the work of the Laboratory. The work done during the year under review will now be described under the following heads:—

I. General.
II. Spinning Laboratory.
III. Testing House.
IV. Fibre Testing Section.
V. Technological Research.
VI. Ginning Section.
VII. Publications.
VIII. Miscellaneous.

I. GENERAL.

The samples received at the Laboratory are of various kinds and fall under different categories Table I given below shows the different classifications of the samples together with the corresponding figures of last year for comparison

TABLE I.

	1- 6-45 to 31- 5-46	1- 6-46 to 31- 5-47
Agricultural Departments' Experimental strains ..	289	366
Standard cottons	24	16
Trade varieties cottons	48	31
Technological samples	158	214
Trade tests	69	63
Fibre tests (T T)	167	136
Fibre tests (Agri) . . .	194	96
Yarn tests	72	42
Cloth tests	59	21
Samples for valuation . ..	154	219
Moisture tests	6	—
Miscellaneous	9	—
Total	1,249	1,204

It will be seen that there is a small reduction in the total number of samples received which is primarily due to the fall in the receipt of yarn and cloth samples.

II. SPINNING LABORATORY.

The following statement A gives details of samples spun during the period which were received from the Agricultural Departments of Provinces and States together with the names of officers who supplied these samples for tests. This statement does not give the details in respect of standard and trade varieties of Indian cottons or in respect of small samples received for fibre tests, which will be found on pages 11-15 of this report.

STATEMENT A.

BOMBAY.

(1) *The Cotton Breeder, S.G., Surat.*—22 samples of 1027 A.L F., Suyog, Type 7-2, Type 1-4 and other selections.

(2) *The Cotton Breeder, Broach.*—10 samples of multiplication, maintenance and replication strains.

(3) *The Cotton Supervisor, Broach.*—5 samples of Vijay cotton.

(4) *The Cotton Breeder, Viramgam.*—17 samples of K72-2, Wagad and other strains.

(5) *The Cotton Supervisor, Viramgam* —20 samples of K72-2, B1, Wagotar, W 87 and Local Wagad grown in 4 localities.

(6) *The Cotton Breeder, S M C Dharwar* —16 samples of improved strains

(7) *The Cotton Breeder, Jalgaon, East Khandesh* —27 samples of Jarila cotton and other strains

(8) *The Agricultural Officer-in-charge, Padegaon* —2 samples of Jarila dry and irrigated types.

(9) *The Agricultural Officer, Gadag* —2 samples of 9-3 and 9-10.

(10) *The Agricultural Officer, Dakor* —2 samples of Vijay cotton.

(11) *The Field Kamgar, Jambusar* —One sample of Vijay cotton.

(12) *The Agricultural Officer, Amod* —One sample of Vijay cotton.

(13) *The Agr Asstt Cotton Breeding Sub-Station, Bavla.*—12 samples of various selections

SIND

(1) *The Botanist, Agricultural Research Station, Sakrand:*—4 samples of crosses, M 116 and No 60

(2) *The Cotton Botanist, Mirpurkhas* —31 samples of Sind Sudhar, and other strains and crosses

MADRAS

(1) *The Cotton Specialist, Coimbatore* —21 samples of improved strains.

(2) *The Assistant Cotton Specialist, Siruguppa* —2 samples of H. A. 11 cotton

(3) *The Assistant Cotton Specialist, Adoni* —2 samples of 881F and local cotton

(4) *The Dry Farming Development Officer, Bellary* —2 samples of Hagari and 1833

(5) *The Farm Manager, Agri Res Station, Koilpatti.*—6 samples of K.1 and other selections

(6) *The Assistant Cotton Specialist, Narasaraopet* —3 samples of No. 129, No 805 and No 1395

(7) *The Cotton Assistant, Gurzala* —2 samples of G1 and Local.

PUNJAB.

(1) *The Cotton Botanist, Lyallpur.*—32 samples of Lyallpur strains, other crosses and Lasani strains.

CENTRAL PROVINCES.

(1) *The Research Officer, Berar Cotton Breeding Scheme, Akola.*—4 samples of Buri and other cottons.

(2) *The Superintendent, Government Experimental Farm, Akola* —4 samples of Buri and Jarila cottons

(3) *The Economic Botanist, C. P and Berar, Nagpur.*—3 samples of M5A, 0382 and No 111

Hyderabad.

(1) *The Cotton Research Botanist, Nanded.*—5 samples of Gaorani selections.

(2) *The Cotton Breeder, Parbhani* —7 samples of Gaorani and other selections.

(3) *The Asstt Cotton Research Botanist, Latur* —5 samples of Gaorani, Jarila and other selections

(4) *The Plant Breeding Assistant, Madhol* —5 samples of Gaorani and other selections

(5) *The Superintendent, Government Main Farm, Raichur* —5 samples of local and Raichur Kumpta strains

(6) *The Superintendent, Government Farm, Warangal.*—5 samples of local and Gaorani strains in *chalka* soil

Baroda.

(1) *The Superintendent, Dabhoi Farm, Dabhoi.*—5 samples of B D. 8 Vijay, 1027A L F and segregates
(2) *The Cotton Dev Supervisor, Dabhoi* —2 samples of Vijay cotton
(3) *The Assistant Cotton Breeder, Jagudan* —7 samples of K72-2, Wagotar and other strains
(4) *The Farm Superintendent, Agr Experimental Station, Jagudan* —Two samples of Wagotar cotton
(5) *The Assistant Cotton Breeder, Amreli* —15 samples of S31, S24-2 and Matheo cottons grown in five localities
(6) *The Cotton Farm, Vesma* —2 samples of Suyog and 1027 A L F
(7) *The Cotton Development Supervisor, Baroda* —2 samples of Vijay cotton
(8) *The Suprintendent, A E Station, Baroda* —2 samples of B 9 and Vijay cottons
(9) *The Cotton Dev Supervisor, B 9 Scheme, Savli* —4 samples of Vijay and B 9 cottons
(10) *The Cotton Dev Supervisor, Karjan* —2 samples of Vijay cotton.
(11) *The Cotton Officer, Navsari* —6 samples of Suyog cotton
(12) *Mr. Nanubhai, Mangrol* —3 samples of Suyog cotton
(13) *The Cotton Dev Supervisor, Kosamba* —3 samples of Suyog cotton
(14) *The Asstt Cotton Inspector, Chalthan* —3 samples of Suyog cotton.
(15) *The Cotton Dev Supervisor, Baben* —3 samples of Suyog cotton
(16) *The Asstt Agri Officer, Kodinar* —2 samples of M4 and Kadayo.

Indore.

(1) *The Director, Institute of Plant Industry, Indore.*—15 samples of varietal trial samples, Jarila and Dhar 43
(2) *The Touring Inspector, Agri Department, Kapasin.*—3 samples of Desi, Upland and C. Indore 1.

The following tables II and III give the distribution of samples and counts spun at the Laboratory during the period together with the corresponding figures for the last 20 years.

TABLE II.—*Distribution of Samples spun*, 1926-47.

Province	From 1st Sept to 31st Aug										From 1st June to 31st May.										
	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1938-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46.	1946-47
Bombay	22	22	28	66	89	69	143	111	97	59	67	44	78	42	69	102	70	116	90	63	137
Sind										28	47		21	8	10	8	9	4	5	10	35
Punjab			42	30	10	44	55	42	23	71	9	45	57	61	50	27	25	12	26	66	32
U P	6	11	9	7	16	7	12	6	7	11		2	36	66	14	80	70	4	35	68	
Madras	50	23	30	51	66	15	28	101	30	51	31	31	42	30	33	34	17	22	11	17	38
C P	3	2	2	5	3	3	5	9	9	10	15	9	9	5	7	10	4	6	8	10	11
Hyderabad										36	20	32	50	26	43	25	62	56	54	51	32
Indore										26	8	38	6	37	51	41	13	14	27	7	18
Baroda											8	7	37	19	31	39	21	70	64	25	63
Miscellaneous		6	6	27	28	33	75	97	85	38	49	20	11	15	25	34	35	11		3	..
Total	81	64	117	186	212	171	318	366	251	330	254	228	347	309	333	400	326	315	320	320	366
Standard Cotton Tests	49	64	33	34	27	18	18	16	18	23	15	21	21	19	21	22	12	20	27	22	23
Trade and Special Tests				37	89	134	125	166	131	143	162	185	172	122	169	177	241	266	235	214	254
Grand Total	130	128	150	257	328	323	461	548	400	496	431	434	540	450	523	599	579	601	582	556	643

TABLE III.—*Distribution of Yarns spun*, 1926-47

Province	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45.	1945-46.	1946-47
Bombay	132	132	159	322	253	203	430	332	292	190	217	134	249	127	195	325	205	348	276	269	409
Sind										84	143		68	26	32	24	27	12	15	30	106
Punjab			254	113	31	136	165	127	72	220	28	144	168	195	149	54	75	36	78	193	97
U P	36	66	54	42	40	22	32	18	21	35		6	94	197	43	249	207	12	105	216	
Madras	278	138	180	255	199	53	85	303	90	151	89	91	123	92	93	86	51	66	33	46	101
C P	18	12	12	30	12	9	15	27	29	30	45	28	26	15	21	29	12	19	24	49	33
States and Miscellaneous		36	27	99	100	93	227	293	250	295	261	292	299	281	433	359	389	430	421	339	340
Total	464	384	686	861	635	516	954	1,100	754	1,005	783	695	1,027	933	966	1,126	966	923	952	1,142	1,086
Standard Cotton Tests	423	447	290	223	309	136	200	180	204	162	115	156	152	144	152	162	82	138	190	156	162
Trade and Special Tests				80	343	502	256	499	810	609	649	665	498	423	410	560	677	851	675	596	606
Grand Total	887	831	976	1,164	1 87	1,154	1,410	1,779	1,768	1,776	1,547	1,516	1,677	1,500	1,528	1,848	1,725	1,912	1,817	1,894	1,854

The total number of samples spun during the year shows an increase of about 16% as compared with last year. The noticeable increase is found under Bombay Province and Baroda State The number of counts spun is practically the same as in last year

The results of the various tests done at the Laboratory are described in different types of reports and the following Table IV gives a summary of the number of reports of different types issued from the Laboratory during the period under review. The figures for the corresponding period for the last 20 years are also given

TABLE IV —*Test Reports Issued*, 1926-47.

Reports	From 1st Sept to 31st Aug										From 1st June to 31st May										
	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47
Spinning Test	19	22	21	63	92	60	87	121	112	135	129	109	127	114	135	144	133	145	136	136	164
Fibre Test	5	1	7	4	7	19	30	18	19	44	52	32	35	42	52	59	29	43	49	69	58
Yarn Test		1	4	4	2	3	5	3	7	13	10	14	20	36	234	180	24	124	40	36	17
Cloth Test			.										25	69	624	821	42	67	101	46	16
Statistical Analysis													3			2	4		3		
Miscellaneous	.												1		1	2	2		1	2	
Total Reports	24	24	32	71	101	82	122	142	138	192	191	158	211	261	1046	1208	234	379	330	289	255

The total number of reports of various types issued shows a decrease over the last year's figure which is chiefly due to a fall in the number of samples received for yarn and cloth tests owing to the termination of the war

The following Table V gives the strength of the technical staff of the Laboratory as on 1st June, 1947 together with the figures from 1927 onwards. It may be mentioned here that though the sanctioned strength of the staff remained stationary, many working days were lost due to resignations in the staff. Details relating to members of the staff are given on pages 39 and 40 of this report.

TABLE V.—*Permanent Staff*, 1927-47

	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947.
Technical and Office staff .	24	27	27	32	32	32	33	34	34	35	36	36	36	38	39	39	39	40	40	40	40
Research Students .	4	3	2	1	1					2	2	2	1				..	.			..
Fumigation Chemists . .	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Total	32	32	31	35	35	34	35	36	36	39	40	40	39	40	41	41	41	42	41	41	41

Tests on most of the samples detailed in statement A were more or less of a routine nature, but some of these samples deserve special mention. They are described below.

A. AGRICULTURAL SAMPLES.

(1) *Vijay cotton in middle Gujarat* —Certified samples of Vijay cotton grown under departmental control at nine cotton producing centres, Haldar, Kisnad, Samlod, Vilayat, Samani, Dakor, Jambusar, Kapadvanj and Amod, in middle Gujarat were tested as in the last season to find out the variations in quality The mean fibre-length varied within the small range of 0.86" for the Kisnad sample and 0 82" for the Samlod and Amod samples. The Kapadvanj and Amod samples had the lowest mean fibre-weight per inch. The highest standard warp counts varied from 38s for the Kisnad, Dakor and Kapadvanj samples to 33s for the Jambusar sample. The Amod sample alone was poor in this season being suitable only for 28s standard warp counts

(2) *Certified Vijay cotton in Baroda State* —Vijay cotton, certified and non-certified, received from four localities Dabhoi, Baroda, Savli and Karjan, in Baroda State were tested during the period The samples were collected from bulk from all the ginning centres in each zone. Practically no significant difference was observed in any of the properties between the certified and the non-certified samples

(3) *Cottons grown in Kathiawar* —Three cottons, S 31, S. 24-2 and Matheo, were raised at five different localities, Amreli, Damnagar, Ingorala, Junagadh and Palitana in Kathiawar as in previous seasons Analysis of variance was applied to the results of tests for mean fibre-length, mean fibre-weight per inch and highest standard warp counts It showed that, as was the case last year, S 31 is significantly superior to S 24-2 in mean fibre-length and highest standard warp counts As regards locality, cottons raised in Junagadh were significantly coarser than those raised in other localities

(4) *Comparative tests on hybrids to replace Jarila* —Three hybrids, 197-3, 403-5 and 670-4, along with control Jarila were raised at six localities Dondaicha, Dhulia, Amalner, Jalgaon, Mamurabad and Mohadi Test results showed that hybrids 197-3 and 670-4 were significantly longer in staple than Jarila while hybrid 403-5 was significantly shorter All three hybrids were significantly coarser in staple than Jarila These tests are being continued in the current season (1946-47)

(5) *Jarila grown in different localities* —Jarila cotton raised in 9 different localities, 5 of them in East Khandesh, namely, Jalgaon, Bhusaval, Parola, Chopda and Chalisgaon, 3 of them in West Khandesh, namely, Mohadi, Dhulia and Taloda and one of them in Nasik district at Malegaon The highest standard warp counts varied from 30s standard warp counts for the Taloda sample to 20s standard warp counts for the Chalisgaon sample.

(6) *Jarila grown in 3 localities with 3 seed sources* —Tests were carried out on samples of Jarila raised in all three localities, Akola, Jalgaon and Indore, from seeds obtained from these three localities during the three seasons, 1943-46 The object of this experiment is to compare the place effect on different sources of seed The Indore seed samples gave better test than the Jalgaon and Akola seed samples in both the 1943-44 and 1944-45 seasons. But, this was found to be true only at Indore in the 1945-46 season.

(7) *Jarila raised from seeds of rain-fed and irrigated crops.*—There seems to be a general impression among the cultivators in Deccan that seeds from irrigated crop do not give as good yield as those from the dry crop, though the former has generally a larger percentage of viable seeds Tests were made to see whether it made any difference in quality on samples grown at the Padegaon Farm in three alternate seasons, 1941-42, 1943-44 and 1945-46 It was found that there was a small tendency in all three seasons for the sample from the irrigated crop seeds to be slightly finer in staple than the respective sample from the rain-fed crop seeds. The former sample gave more even and some-what stronger yarns than the latter in the 1945-46 season. But no such difference was observed in the 1943-44 season and the reverse was the case in the 1941-42 season

(8) *District trials on Suyog and* 1027 *A.L F* —Comparative tests on Suyog and 1027 A.L.F. cottons grown in four localities, Gangapur, Pangaran, Chinchpada 3 and Chinchpada 4, in Navapur Taluka of West Khandesh were made during the period. It was found that 1027 A.L F. gave uniformly better spinning performance than Suyog in all four localities.

(9) *Suyog cotton in Baroda State* —The A grade, B grade and commercial samples of Suyog cotton raised in 6 different centres, Navsari, Baben, Chalthan, Kosamba, Mangrol and Kholvad, were tested during the period under review. The A grade sample is supposed to be 99.9% pure and raised from the farm nucleus seed. The second year crop from the A grade is termed as B grade which is supposed to be 97% pure while the crop from the B grade seed is termed commercial which is considered as 95% pure Thus, the difference in three grades is in quality from seed of one year to another. Pedigree farm seed is the first crop. A grade crop from the pedigree seed is the second year crop while B grade and commercial are the third and the fourth year crops respectively. Analysis of variance was applied to the test results which showed that no significant difference was exhibited in mean fibre-length, mean fibre-weight per inch or highest standard warp counts among the three grades of Suyog cotton The differences in mean fibre-length and in highest standard warp counts between the means for the different localities were also non-significant.

(10) *H. A. II in Siruguppa* —Hyderabad-American II was raised in the stiff black cotton soil at Siruguppa in bulk both as Mungari crop and as Hingari crop. The former season is from June to December while the latter extends from August to March The yield per acre was nearly the same in both cases. The Hingari crop sample was somewhat longer but coarser in staple than the Mungari crop sample. But, the latter sample, in spite of its somewhat shorter staple, was found suitable for 39s standard warp counts as against 33s standard warp counts for the Hingari crop sample.

(11) *Lasani strains in the Punjab.*—Four hybrids, Lasani 1, Lasani 2, Lasani 4 and Lasani 5 raised at Risalevala and four other samples, Lasani 6, Lasani 7, Lasani 8 and Lasani 9 grown in Multan were tested during the period under review. The mean fibre-length for the former group varied from 0.96″ for Lasani 5 to 1.04″ for Lasani 4. The fibre-length irregularity percentage

was rather high. Their performances were poor ranging from 27s to 37s standard warp counts, in contrast to what might be expected from their mean fibre-length and mean fibre-weight per inch. Similarly for the Multan group, the mean fibre-length varied from 1 06″ to 1 09″ and the highest standard warp counts ranged from 36s to 44s standard warp counts. The yarns obtained from most of these Lasani samples were very neppy It would be useful if mill tests are carried out on these samples to verify the performances obtained at the Laboratory

(12) *Long staple hybrids in Sind* —Three new hybrids, 45/1, 45/2 and 41/4 were evolved at Mirpurkhas under the scheme for the production of long staple cottons in Sind April sown and May sown samples of these hybrids along with 124F, 199F, and M4 were tested during the period, all of which were saw-ginned A comparison of the performances of April-sown and May-sown samples showed that sowing in April was conducive to better test for all samples except in the case of hybrid 45/1 The performances of the hybrids were found to be poor in comparison with those of either the Punjab strains 124F and 199F or the Sind-American strain M4 in spite of their good staple length Further additional fibre tests were therefore carried out to investigate the causes for the same Hybrids 45/1 and 45/2 possessed higher fibre-length irregularity percentage, higher coefficient of fibre-length variation, lower percentage of mature fibres and were also intrinsically weaker than 124F, 199F or M4 The same was, to a less extent, true with hybrid 41/4. It was, however, suggested that mill tests may be carried out on these hybrids to confirm the Laboratory findings

B. Standard Cottons.

Standard Indian cottons of the 1945-46 season were subjected to detailed fibre and spinning tests and a technological bulletin containing the results of these tests was published during the period under review. As most of the standard cottons are grown on a very large scale and they covered nearly 45% of the total area under cotton cultivation and are being used in great quantities by the cotton industry, technological circulars were issued prior to the publication of the bulletin on those cottons which were received fairly early in the season so that the mills might utilise the results of these cottons as early as possible A list of such circulars will be found under the head 'Publications.'

It may be mentioned that in this season, 1945-46, Cambodia Co. 3, has been included among standard Indian cottons while Wagad 8 has been deleted from it as it was reported that this type was not now in cultivation in the British territory and its cultivation in the Baroda State was also on the decline as it is being replaced by Wagotar. Since it was reported that Victory cotton has also entirely taken the place of 289F/K25, tests on the former would be made from 1946-47 onwards in place of the latter.

Three cottons, Sind-American M4, Punjab-American L. S. S. and Verum 434, showed an improvement in 1945-46 over the previous season, which was appreciable for Sind-American M4. 12 cottons gave practically the same test as last year. The three cottons, which recorded a falling off in spinning performance as compared with the last season, were Nandyal 14, Hagari 1

and Gadag 1, the decline being more pronounced for the two Madras cottons. On the whole, it may be said that a great majority of the cottons of the 1945-46 season had maintained their performances of the previous season.

The names of the standard cottons of the 1946-47 season which have been received for tests during the period under review are given below :—

Jayawant	P. A. 4F
Gadag 1	P. A. L. S. S.
Jarila	Victory.
Sind-Sudhar R. G.	Mollisoni.
Sind-Sudhar S. G.	V. 434 (Akola).
Sind-American M4 R. G.	Gaorani 6.
Sind-American M4 S. G.	Nandyal 14.
Sind N. R.	

Four-page technological circulars have been issued on those cottons on which tests had been completed while the tests on the others are in progress.

C. Trade Varieties.

Samples of fair average quality of the principal trade varieties of India belonging to the 1945-46 season were received in accordance with the arrangements made with the East India Cotton Association, the Karachi Cotton Association and the appropriate Millowners' Associations and tested during the period under review. In cases where difficulty was experienced to get samples from these sources, they were obtained direct from the mills which use such cottons in large quantities The results of tests on each cotton were published as soon as possible in 2-3 page circulars for the information of the trade and the industry. They were later compiled into a bulletin, entitled "Technological Reports on Trade Varieties of Indian Cottons, 1946" which was published during the period Out of 42 cottons included under Trade Varieties, results for 1945-46 season of 38 cottons were reported in the bulletin. Four cottons, namely, Verum, Bawla, Jayawant (Bagalkhote) and Jayawant (Miraj) were not received for tests A sample of A R. Jinja could also not be tested in this season as there had been no export of this quality from Africa to India this year.

Samples of the following trade varieties of 1946-47 season have been received at the Laboratory during the period under review.

1. C. P. No. 1	9. Vijay
2. Verum	10. P. A. 4F (Montgomery).
3. Berar Jarila	11. P. A. 4F (Bahawalpur).
4. Gaorani 6	12. P. A. 289F/K25 (Khanewal).
5. Broach B. D. 8	13. Westerns H. 1 (Anantapur)
6. Jarila-West Khandesh	14. Jayawant-Bhagalkhote.
7. Jarila-East Khandesh	15. Malvi.
8. Suyog (Seg. 8-1).	

Thus, only 15 as against 42 samples in the list of trade varieties have been received so far. Attempts are being made to obtain the others as early

as possible. The list of technological circulars issued on those varieties on which tests have been completed will be found under the head "Publications."

III. TESTING HOUSE.

The Testing House has been rendering valuable service to the cotton trade and textile industry by carrying out a large number of tests on their samples of cotton, yarn and cloth on payment of fees laid down by the Committee. Table VI gives the number of samples tested during the period under review together with the corresponding figures for the previous ten years.

It will be seen from Table VI that the total number of samples tested in this section showed a slight decrease over last year. The samples tested were received almost entirely from the cotton mills and firms and it will be noticed that during the period under review spinning tests were carried out on no less than 77 samples It will also be observed that 139 samples were tested for fibre properties. The East India Cotton Association alone sent 94 samples for such fibre tests The total number of samples tested during the past 11 years, in this section is 5,177 which gives an average of 470 samples per year. The fees realised during the period under review were Rs. 4,787 as against Rs. 7,140 received in the previous year.

IV. FIBRE TESTING SECTION

Fibre tests are carried out at the Laboratory on most of the agricultural samples received for spinning tests as well as on a certain number of small size samples sent by the Agricultural Officers for fibre tests only. In addition, they are carried out on the Standard Indian cottons in a more comprehensive manner, on commercial samples received from mills and firms, on samples arising from the ginning and other investigations of the Laboratory etc. During the period under review, fibre tests were made on 986 samples, and the following Table VII shows the number of samples tested under different heads :—

TABLE VII.

	Number tested
Standard	22
Agricultural (spun)	420
do. (for F. T. only)	124
Commercial	139
Commercial (for spinning and F T.)	16
Ginning	176
Storage	69
Miscellaneous	20
Total ..	986

Most of these tests on small size samples were of a routine character, but some of them possessed certain interesting features and these will now be briefly described.

TABLE VI.

TESTS.	1-6-36 to 31-5-37	1-6-37 to 31-5-38	1-6-38 to 31-5-39	1-6-39 to 31-5-40	1-6-40 to 31-5-41	1-6-41 to 31-5-42	1-6-42 to 31-5-43	1-6-43 to 31-5-44	1-6-44 to 31-5-45	1-6-45 to 31-5-46	1-6-46 to 31-5-47
Spinning Tests .	6	12	11	20	45	62	50	109	68	62	77
Fibre tests	24	26	36	67	51	68	34	52	172	166	139
Yarn tests . .	23	37	49	80	323	325	64	209	133	72	42
Cloth tests .		23	39	117	696	988	89	167	149	59	21
Moisture tests ..	41	20	8	19						6	
Shirley Analyser tests	1			1				6			
Blow-room tests ..	1										
Dye absorption tests			2			1					
Miscellaneous tests		.			1	1	3		1	3	..
Total .	96	118	145	304	1,116	1,445	240	543	523	368	279

(1) *Orissa cottons.*—Four samples, two of them superior and two others inferior, were received for fibre tests from the Dy. Director of Agriculture, Cuttack (Orissa). The inferior sample, C 122 could be used only to spin weak 6s yarns suitable for the manufacture of carpets while C 118 was not suitable, as an economic proposition, for machine spinning. They could, however, conveniently be used for mixing with wool for the production of cheaper blankets

(2) *Assam cotton.*—A sample of cotton boll was received for tests from the Assistant Agricultural Officer, North East Frontier Agency, Shillong (Assam) It had a mean fibre-length of 1.32″ and a mean fibre-weight per inch of 0.121×10^{-6} oz But, it was extremely immature, containing only 14 per cent mature fibres From its black naked seeds and fibre properties, it was surmised that its origin is from *G barbadense.*

In addition to the above fibre tests, the following number of moisture tests was also carried out as detailed below

Storage experiments	108
Comparative ginning experiments ..	124
Pre-cleaning experiments	96
Sized yarns	48
	376

V. TECHNOLOGICAL RESEARCH

(1) *Pre-cleaning and Ginning tests on Indian cottons* —Mention was made in my last Annual Report that with a view to confirming the earlier findings on the samples of 1940-41 season, pre-cleaning tests by single passage in the openers and ginning tests on the kapas samples of the six long staple cottons of the 1943-44 season, namely, Sind-American M4, P. A 289F/K25, Gaorani 6, Jayawant, Cambodia and 1027 A L F had been carried out and analysed statistically. Spinning, fibre and yarn tests on the ginned lint samples of the first four cottons were completed and leaflets (Nos. 21, 27, 28 and 29) on each of these cottons were issued during the period under review Spinning and fibre tests could not be carried out on Cambodia and 1027 A L.F due to heavy pressure of work in these sections on agricultural samples As the samples were already stored for considerable length of time they were discarded and no leaflets could, therefore, be issued on them.

It may be recalled that experiments were made on kapas samples of seven cottons belonging to the 1941-42 season, namely Surat 1027 A L F., P. A. 4F, P A. 289F/K25, Verum, P A 289F 43, N T. 289F (Tando Jan Mohammad) and Sind Sudhar with a view to ascertaining the relative efficiency of the pre-cleaning machines by opening the samples *twice* either by double passage in the same machine or in combination of two of the three pre-cleaning machines. Nine combinations in two with the three machines are possible and all of them were tried in these tests. The effect of using different rates of feed in the saw gin and different roller speeds in the roller gins were also investigated. Five different feed-steps were tried in the saw gin while the effect of employ-

ing three roller seeds was investigated in the roller gins. A full report of this investigation was considered by the Committee at their meeting held in January 1944 and it was decided that leaflets should be published on each cotton separately. Accordingly, leaflets (Nos. 22, 23, 24, 25 and 26) on 5 cottons, Surat 1027 A.L.F., P.A.4F, P. A. 289F/K25, Verum and P. A. 289F/43 were published during the period under review. As it was not possible to carry out spinning and fibre tests on N. T. 289F and Sind-Sudhar, leaflets could not be issued on them

Thus, it may be mentioned that, on the whole, these tests were carried out on 25 cotton samples covering 4 seasons and leaflets were published on 21 of them. Statistical analysis was applied to the results as a whole and a summary of the main conclusions was published during the period by Mr V Venkataraman in the *Indian Cotton Growing Review* They are given below.

(*i*) The output of clean kapas per hour in the Hardwicke-Etter Opener is in most cases more than double that obtained in the Platts Opener or the F.E.C. among which the difference in output is not significant. The exceptions were Sind Sudhar for which the F. E C. gave distinctly higher output than Platts Opener while the reverse held good for Mollisoni and Sind N.R.

(*ii*) The F. E. C. and the H. E. openers removed very nearly the same percentage of trash consuming practically the same electric power. The Platts opener removed less trash with double the power consumption of the other openers. Pre-cleaning prior to ginning would be definitely advantageous to Sind Sudhar, Wagad, and Sind N. R. since the trash percentage was more than 3 per cent in them. The F. E. C. opener removed the hulls more efficiently. The Platts opener opened out each seed separately.

(*iii*) The double roller gin yielded the highest ginning percentage, the single roller gin came next in order while the saw gin took the last place in this respect.

(*iv*) The saw gin and the single roller gin yielded lint which has a significantly higher mean fibre length than the double roller ginned lint.

(*v*) The saw ginned and the single roller ginned lint samples sustained significantly less waste loss in the blow-room than the double roller ginned samples.

(*vi*) The saw ginned and the single roller ginned samples yielded significantly stronger yarns than the double roller ginned samples.

(*vii*) Samples opened in Platts opener gave significantly lower output per hour in the saw gin than when opened in the other two openers.

(*viii*) Lint obtained after pre-cleaning in any of the openers and ginning in double roller gin was significantly more regular in staple than the lint obtained in the same gin without pre-cleaning. Blow-room waste loss for the opened samples was also significantly less than that for the unopened sample.

(*ix*) The opened samples gave significantly higher output per hour in single roller gin than the unopened sample.

In accordance with the decision of the Committee at their meeting held in January 1944, a complete scientific report comprising the results of all cottons for 4 seasons is now being written up.

(2) *Investigation of the causes of difference, if any, between the spinning performance of saw ginned and roller ginned samples of the same cotton.*—In connection with the ginning experiments on Jayawant, Gaorani and M.4 cottons, the temperature of the lint just when it emerged from the rollers was measured by employing a copper-constantan thermo-couple. The temperature measured in this manner has been designated as the lint temperature for the purpose of this report Spinning tests were carried out on all these samples and the mean fibre-length as well as the fibre-length irregularity percentage had been determined for each of these samples. From an analysis of the results obtained, the following conclusions have been drawn:—

Jayawant.—The mean lint temperature is 93°F, 117°F and 112°F in the case of the saw ginned, the double roller ginned and single roller ginned sample respectively. Except for the fact that the saw ginned lint is somewhat longer than that from the double roller gin, the quality of the fibre, as indicated by the mean fibre-length and the fibre-length irregularity percentage, is not appreciably affected by the gin that is used; but, the saw ginned samples have yielded stronger yarns than the roller ginned ones. It has also been noticed that the spinning values of both the roller ginned samples are the same in spite of the fact that the lint temperature is higher for the double roller gin than for the single roller gin.

Gaorani 6 —The mean lint temperature is 83°F for the saw ginned and about 110°F for the roller ginned samples. The lint obtained from the single roller gin is some-what longer than that from the saw gin, the fibre-length irregularity percentage remaining, however, the same, there is no difference between their spinning values. The saw ginned sample has yielded stronger yarns than the double roller ginned sample even though the quality of the fibre is the same. These conclusions have been drawn from the means of 6 or 7 ginning experiments. If the individual results are examined it is seen that some of the roller ginned samples have yielded yarns as strong as those spun from the saw ginned samples.

M. 4.—The mean lint temperature is 90°F for the saw gin, 104°F for the double roller gin and 112°F for the single roller gin. The saw ginned lint is more regular in fibre-length than the double roller ginned sample. Otherwise, the quality of the lint from all the three gins is the same. The saw ginned lint has yielded yarns stronger than the roller ginned sample. The samples obtained from the double roller gin have a lower spinning value than those from the single roller gin even though the lint temperature is greater in the case of single roller gin.

It may be noted that the highest standard warp count is taken as the best measure of the spinning value in the foregoing analysis. If instead of the H. S. W. C., the lea strength results for 20s, 30s, 34s or 40s yarn are taken for the analysis, practically the same conclusions are reached, provided the count selected for this purpose is near the H. S. W. C. for that cotton.

From all these results it is concluded that the lint temperature by itself is not a dominating factor in deciding the spinning value of a cotton.

It is proposed to carry out fibre-strength and clinging power tests on some selected samples to see whether they will give a clue to find out the cause of difference between saw ginned and roller ginned samples.

This work is being done by Mr. Harirao Navkal.

(3) *Comparison of the ginning tests at the ginning factory and at the Laboratory.*—In 1945-46 season, comparative ginning tests were made on M.4 cotton with the co-operation of Messrs. Volkart Brothers at their factory at Mirpurkhas and at the Laboratory and a report on the findings was submitted to the last July meeting of the Committee. During 1946-47 season, two such experiments were carried out. One was in co-operation with B C G A. on 124F cotton with the saw-gin and single roller gin at their factory at Khanewal and at the Laboratory. The other, again in co-operation with Messrs. Volkart Brothers, was made on Jarila cotton with the saw gin, single roller gin and double roller gin at their Berar factories at Khamgaon (saw gin) and Amraoti (roller gins) and at the Laboratory. The ginning tests were first carried out at the factories and using the same respective settings as were employed at the factories the tests were repeated at the Laboratory. Due to difficulties in obtaining railway and other permits there was some delay in making tests at the Laboratory. However, ginning tests have been completed but due to pressure of work in the spinning department it has not yet been found possible to carry out spinning tests on these samples. The results will be analysed and reported after the spinning and fibre tests data are available.

This work is being done by Mr G G Oka and Dr. R L. N. Iyengar

(4) *Standardisation of the ginning technique for small samples.*—In order to standardise the ginning technique for small samples, the work was continued on the lines as indicated in the previous report. The effect of three factors, namely, (1) the size of the sample, (2) the method of sample selection and (3) the gin used for ginning, on the ginning percentage has been studied. In connection with the first factor, different weights of kapas *viz.*, 10, 25, 50, 100 and 400 grams were ginned in Platts hand gin but the results did not show any significant effect of the weight of the sample on the ginning percentage. On the other hand the method of taking the sample (second factor) was found to produce significant change in the ginning percentage. That is, a sample of 10 gms. made up of small lumps of kapas or of full locks gave a significantly higher ginning percentage (34.91) than a sample made up of 100 separated single seeds (34.35). The cause of this difference is, probably, the removal of some adhering dirt and loosely held fibres from the seed while single seeds are taken out in the latter case.

In connection with the third factor, tests were made on (1) locally made wooden roller gin from Parbhani (2) Bardoli wooden roller gin, (3) table model hand driven roller (5″) gin, (4) Platts hand driven roller (13″) gin and (5) Platts power driven roller (40″) gin of the commercial type. 12 varieties of cottons were tested during the period under report. The results showed that the

values of the ginning percentage obtained with Platts power gin (32.42), Platts hand gin (33.04) and table model gin (33.48), though statistically different from one another, do not differ by an appreciable amount. On the other hand all these three values are very much lower than those obtained by the Bardoli (38.10) and Parbhani (37.07) gins. It was noted, however, that the higher values obtained by the last two gins are due to some seeds being crushed and passed along with the lint. A device is being made in the Laboratory to prevent this seed crushing.

The average time taken for ginning 100 gm. of kapas is 9 minutes 57 seconds in Parbhani gin, 7 minutes 43 seconds in Bardoli gin, 2 minutes 7 seconds in table model gin, 1 minute 15 seconds in Platts hand gin, while it is only 7 seconds in Platts power gin.

The fibre length values of the lint obtained from different gins, like those of the ginning percentage, do not differ among the three gins, Platts power gin (0.835″), Platts hand gin (0.833″) and table model gin (0.823″). But all these values are significantly less than those obtained in the case of Bardoli (0.853″) and Parbhani (0.857″) gins. On the other hand the fibre length irregularity percentage of the lint in the case of the latter two gins (15.2 in each case) is significantly less than that in the case of the former three (17.2, 17.3 and 20.1 respectively). Incidentally it is seen that the value (20.1) for the table model gin is significantly higher than that for the other two gins (17.2 and 17.3) and the cause for this is being investigated. The general feature noted above, namely, lower mean fibre length and higher irregularity in the case of the three gins of the Macarthy type indicates that some fibres are probably broken in these gins.

From the above findings it can be concluded that, on account of seed crushing and higher time factor, Parbhani and Bardoli gins are not suitable for standard ginning practice. Of the other two gins, Platts power gin (40″ roller) being left out as it is unsuited for small size samples, Platts hand gin (13″ roller) should be considered more efficient as it takes less time. Its efficiency could be further improved by using electric motive power. This gin could be used not only for single plant produce but also for the produce of rows and plots. However, care should be taken to see that the seeds do not get into crevices and become mixed up with later ginned seeds causing seed contamination From this point and when the size of the sample is very small, the table model gin (5″ roller) is more elegant and satisfactory, although it takes a slightly longer time for ginning. Its efficiency also could be enhanced by using electric drive. It has also been found above that the value of the ginning percentage is not affected by the size of the sample. For normal working, however, 25 gm. of kapas, made up of lumps of seeds or of whole locks selected at random appears to be a suitable quantity for a ginning test and the time taken for ginning this sample is about half a minute in Platts hand gin. The time for weighing could be saved considerably by using a cement balance. It is essential that, before weighing the kapas for ginning, it should be thoroughly opened out by hand so as to remove all foreign matter that may be present in it.

It is pointed out above that some seeds get crushed in Parbhani and Bardoli gins. However, this crushing is not uniform in all varieties. The fuzzy *hirsutum* cottons generally appear to be more susceptible than the indigenous cottons which are hardier. Of the latter cottons, Jarila and Wagotar appear to be exceptions as a number of their seeds are crushed. It is also found that these cottons take a relatively longer time to gin a specified quantity of kapas, which may possibly be due to the fact that the fibres are held more strongly to the seeds in these cottons. It appears, therefore, worthwhile to determine the strength of attachment of the fibres to the seed in these and other cottons.

Another point requires mention and that is that in Bardoli and Parbhani gins the fibres are held under pressure between two rollers and pulled out from the seed whereas in the other gins the fibres adhere to small bristles in the leather roller and the moving knife pushes the seed and effects the separation of the fibres from the seed. In the former case the pressure between the rollers is high and this may cause some injury to the fibres and perhaps, weaken them. If this were so, the strength of the hand spun yarn, which is generally spun out of lint obtained from such gins used in the villages, would be badly affected. Hence it would be valuable to compare the fibre strength of the lint samples obtained from Bardoli gin with those obtained from Platts hand gin. This could be done by using the Pressley Strength Tester available in the Laboratory.

This work is being done by Dr. R. L. N. Iyengar and Mr. G. G. Oka.

(5) *Technique of cleaning kapas to obtain better quality lint*—A large amount of valuable information is available from the pre-cleaning tests made so far in the Laboratory. However, before a particular technique could be recommended for general use it is necessary to undertake further trials with various combinations of pre-cleaning machinery on cottons with differing amounts of foreign matter. For this purpose it was proposed firstly to clean the kapas once only by a single passage in each of the machines installed in the Laboratory and then to clean twice, either by double passage in the same machine or by passage in combinations of two of the three pre-cleaning machines.

On account of limitations of storage space and of other work planned for the year, only one cotton, Jarila, was obtained during 1946-47 season and tests on this cotton were undertaken during the period under report 400 lbs. of kapas were used for each pre-cleaning test and duplicate tests were made for each treatment. 80 lbs. of the cleaned kapas was ginned in the double roller gin and the lint obtained was tested in the Shirley Analyser to get an idea of the cleanliness of the lint in each treatment. On account of heavy pressure of work in the spinning section it is not possible to do spinning tests on the large number of samples obtained from these tests. But some limiting cases, *e g.*, samples of lint giving the lowest and highest Shirley Analyser loss could be spun and if the results for these samples indicate any definite trend, other samples that may be considered necessary may also be spun.

Furthermore, it is proposed to examine the trash obtained in each pre-cleaning treatment in order to find out quantitatively the various kinds of foreign matter that are removed in each process. These data would enable us to understand the efficiency of particular machines or combinations of machines suited for the removal of particular kinds of foreign matter. Tests on Jarila cotton are in progress.

This work is being done by Mr. G. G. Oka and Dr. R. L. N. Iyengar.

(6) *Standard method for estimating the ginning percentage of cotton in saw gin and roller gins.*—A sample of kapas consists of seed, lint, linters, moisture and foreign matter. In order to estimate the correct ginning percentage it is necessary, in the first place, to eliminate all foreign matter from the kapas. Then allowance has to be made for changes in moisture content of the kapas and of the ginned lint so as to make the values correspond to those of standard condition. The weight of ginned lint (corrected for moisture) divided by the weight of cleaned kapas (similarly corrected) multiplied by 100 gives the correct ginning percentage of the cotton samples.

In order to determine this value, foreign matter has to be removed from the kapas with the use of pre-cleaners. Experiments have already been undertaken, as described above under item (5) to find out the most efficient way of doing this and when the appropriate method is established, kapas will be cleaned by this process. Specified weights of cleaned kapas will then be ginned in saw gin and roller gins and the weights of lint and the seed will be determined in each case. The moisture contents of the kapas and lint, while they are weighed, will be determined and corrections will be made to the weights before calculating the ginning percentage.

Using the above-mentioned technique, the standard ginning percentage of cotton ginned in saw gin and roller gins will be worked out at the Laboratory for all important cottons and the data so obtained will be incorporated in the Technological Reports on Standard Indian cottons.

(7) *Combing of good quality Indian cottons.*—(Comparative tests on cloth samples from combed yarns from Indian cottons with those from carded Kampala.) As reported at the last meeting, 289F/K 25 (S-G.) and Sind-Sudhar (S.G.) cottons were combed to the extent of 18% and spun into 44s warp and 50s weft yarns which were finally woven into plain cloth. Both grey and bleached cloth samples were subjected to various tests in the Laboratory. The results indicate that these two cloths give somewhat inferior tests as compared to the cloth made from combed Co.3 cotton yarns though the feel and general appearance are very nearly the same. The cost of production of cloth, in both cases, however, is lower than when prepared either from combed Co.3 or carded Kampala yarns.

At the request of the Director of Agriculture, Madras, the Local Sub-Committee have decided that similar combing tests should be made with Co.4 cotton. Accordingly, 110 lbs. of Co.4 cotton have been requisitioned from the Cotton Specialist, Coimbatore for this purpose but the cotton has not been received in the Laboratory during the period under review. Information has,

however, been received that the sample will be available only in November or December this year.

Further, it was decided in the last Committee meeting that combing experiments, should be conducted on M.4 and 199F cottons and accordingly 125 lbs. of each of these two varieties from Mirpurkhas and Lyallpur respectively have been requisitioned. No test could be carried on these cottons as samples were not received.

This work was being done by Mr. V. V. Gupte.

(8) *Causes of neppiness in Indian cotton yarns.*—Apart from a short note on the subject published in the *Indian Cotton Growing Review* Vol. I, No. 2, a detailed paper has been written up. The following causes of neppiness are indicated by this study.

(*i*) While neps in grey cloth or yarn can be distinguished from seed-coat and leaf fragments, in bleached materials, although the non-fibrous part of the latter impurities is dissolved away, their fuzz and fibrous contents add to the number of existing neps.

(*ii*) Fibres entering the structure of neps are either matted or entangled. The matted fibres originate on diseased and pre-maturely dead seeds. Although most of the entangled fibres are generally immature, yet half-mature and mature fibres also get entangled to form neps The latter are either broken apical ends of fibres, severely injured mechanically or by the agency of moulds, or are characterised by natural deformities such as kinks, spurs, and branches.

(*iii*) Since most of the short fibres in the staple are eliminated in notably the card fly waste beside other wastes, and broken apical ends of long fibres occur in neps, it was logical to look for a relationship of neps per yard with the proportion of long fibres in a staple. This search proved successful and revealed that the relation holds good not only in the samples selected for the study but also in standard Indian cottons. On the basis of this relation, a prediction formula is being developed in the Laboratory.

(*iv*) The fuzz on seed coat bits, hairs on leaf fragments, projecting cellular unit ends in pieces of jute, and rough surface of cocoon pieces, all are conducive to entanglement of fibres for the formation of neps.

(*v*) Seed-coat bits are derived both from healthy and deceased seeds as shown by the development of fuzz borne on them, and they are fragmented first in the gin, then in the blow-room and finally in the card. Leaf bits originate from leaf, sepals and bracteoles. Jute fibre pieces come from the hessian cover of the bale, and cocoons taking part in nep formation are derived from spotted bollworm.

These findings suggest that a cotton should have the following pre-requisites to yield nep-free yarns.

(*i*) low immaturity notably in fibres longer than an inch, (*ii*) absence of long-drawn out tail ends in long fibres, (*iii*) absence of kinks, spurs and branches in fibre-structure, (*iv*) absence of matted fibre or diseased locks in kapas, (*v*) absence of aborted ovules, (*vi*) hairlessness in sepals, bracteoles and leaves, and (*vii*) naked or fuzzless and easily ginnable seeds.

Further work is now in progress to determine how the saw gin increases neppiness. The few samples studied so far show that the increase in neps in the saw ginned cotton yarn is all accounted for by neps containing mature fibres mostly. The exact conditions leading to such increase are being studied. Samples for studying the effect of environmental factors on neps will be taken up after studying the effect of saw gin on neps.

This work is being done by Mr. A. N. Gulati.

(9) *Tests on medium staple Indian cottons for their suitability to manufacture hosiery yarns.*—At the suggestion of the Ahmedabad Millowners' Association, the Indian Central Cotton Committee decided at their meeting held in February 1946 that tests for the above problem should be carried out at the Laboratory. Accordingly, 25 lb. lint samples of each of the three cottons, Wagad, 1027 certified and 289F, were requisitioned from the Association which were received during the period under review. Wagad and 1027 certified were spun into 16's and 20's yarns respectively using $2\frac{3}{4}$ twist-multiplier while 289F was spun into 30s and 36s counts using 3 twist-multiplier as specified by the Millowners' Association. A 20s sample cone manufactured by Madura Mills for hosiery purpose was also obtained for tests. All yarns were tested in the Laboratory which showed that the Madura Mills had used harder twist of 17.6 turns per inch. The spun yarns together with full spinning particulars and yarn test results were sent to the Ahmedabad Millowners' Association who had kindly arranged to have these yarns tested in a hosiery factory regarding their suitability for hosiery. The hosiery factory reported that all samples appeared very clean but weak. It was not possible to wind any of the yarns on to hosiery bobbins as the test was low and could not bear tension. The Millowners' Association requested that fresh samples may be spun to give the requisite strength. Samples of these three cottons were therefore requisitioned of which 289F had already been received. It was spun into 30s and 36s counts with such a twist-multiplier as to yield 27 lbs. and 22 lbs. test respectively. The yarns were forwarded to the Ahmedabad Millowners' Association to arrange for tests at a hosiery factory. The other two cottons will also be spun and yarns forwarded to the Association for necessary tests as soon as the cottons are received.

(10) *Performance of mixings of Indian cottons with special reference to their fibre properties* —As mentioned in the last report, the fibre properties of 22 Indian cottons, received from various mills for this experiment, have been determined. In addition to mean fibre length, fibre length irregularity, fibre-weight per unit length, swollen diameter and fibre maturity, the clinging power of these cottons has also been determined with a new apparatus designed for this purpose. As, however, marked differences between cottons in clinging power, determined at a pressure of about 5 cms. of mercury under temperature and relative humidity prevailing in the Laboratory, were not observed, it was decided to repeat these experiments with a lower pressure under constant humidity and temperature. These tests were completed on all the 22 cottons during the period under review, and the results obtained generally confirmed the previous findings. Furthermore, 31 mixings, each of two cottons in suitable proportions, were worked out for 30s counts, taking the fibre properties into

consideration. These have also been spun on 3 roller system using two twist multipliers, *viz.*, 4 and 4¼; five of these mixings have subsequently been spun on 4 roller high draft system. The yarns are being tested. This work is in progress.

This work is being done by Messrs. C. Nanjundayya and V. V. Gupte.

(11) *Prediction of strength of yarn spun with different twist multipliers.*— It may be mentoned here that sufficient work has been done for this investigation. During the period under review, 15 samples were spun and 26 samples tested for lea, single thread and twist tests, which include the 14 samples that had been spun earlier.

The total number of samples spun from the commencement is 92, each spun with 4-7 twist multipliers *i.e.*, 441 doffings in all, on which lea, single thread and twist tests have been completed. From the available data, appropriate values were selected and subjected to elaborate statistical analysis during this period. The following chief conclusions are drawn from the analysed results:—

(*i*) The percentage change in lea strength from multiplier of 4 to 4¼ is generally correlated with lea strength at twist multiplier of 4 for 20s, 24s, 30s, and 40s counts, while for other twist multipliers the relationship is not so marked.

(*ii*) The method, given in (1), is of limited application. Consequently the following general method has been worked out. Cottons, whose nominal counts lie within about 8 counts of the highest standard warp counts, were grouped together. The lea and single thread strengths, were plotted separately against the twist multipliers and the resulting curve for each nominal count was a parabola both for the lea and the single thread strength. A second degree equation was, therefore, fitted to each curve. The agreement between the theoretical and the experimental values was found to be good. Next, the percentage changes in yarn strength, lea and single thread, from one twist multiplier to the next, the percentage being based on the value of the lower twist multiplier, were calculated. It was observed that these percentage changes were nearly the same for counts, 16s to 40s, for the corresponding change in twist multipliers and 20s to 40s for lea and single thread strength respectively. Thus, the percentages may be used to predict the yarn strength from one twist multiplier to another.

(*iii*) The peak value of lea strength is reached at a lower twist multiplier than that of single thread.

(*iv*) It is of interest to note that the yarn variability as estimated by the coefficient of variation of single thread values, was observed to be generally the lowest in the neighbourhood of the optimum twist multiplier for each cotton, the highest value being recorded for the lowest twist multiplier. Thus, the variation in yarn strength appears to be minimum when the yarn is spun with the optimum twist multiplier.

(*v*) The optimum twist multiplier for obtaining maximum yarn strength depends to some extent on the average fibre length and fibre weight per unit

length; an approximate classification of optimum twist multiplier based on these two fibre properties is made.

(*vi*) Lea Ratio *i.e.*, $\frac{\text{Lea strength}}{\text{single thread strength} \times 160}$ at different twists gives the following conclusions :—

(*a*) Higher counts give a lower lea ratio for the same twist multiplier.

(*b*) Lea Ratio tends to increase upto the optimum twist multiplier and then to decrease.

(*c*) In view of the variation in the lea ratio owing to several factors, it is not safe to predict the single thread strength from the lea strength

This work is being done by Mr. C. Nanjundayya.

(12) *Prediction of the spinning values of cottons from their chief fibre properties.*—As mentioned in the last report, a paper on this subject was written up last year. In this paper, the cottons grown in India were divided into four broad classes, and the method of classification adopted was based on the fibre-properties themselves and was independent of the botanical variety to which a strain belonged. After this paper was completed it was thought desirable to calculate also a set of regression equations for some of the chief botanical varieties During the period under review the regression equations were worked out for two botanical varieties *viz.*, G *arboreum var neglectum forma indica* and G. *arboreum var neglectum forma bengalensis* These have been designated as A N I and A. N. B respectively, for the purpose of this note. When the spinning values estimated by the A. N I variety equations are compared with those estimated by the group equations based on technological classification, it is found that, in general, the estimate made by the former is more precise There are reasons to believe that a greater precision is attainable, if the cottons belonging to the A N I group are further sub-divided into two or more sub-groups, either on the basis of their fibre-properties or the localities where they are grown and regression equations are calculated for each of the sub-groups It is proposed to carry out this work, if a sufficient number of samples is available for each sub-group. For the A. N. B. group it is found that the spinning values estimated by the regression equation worked out from the A N. B. grouping gives practically the same result as estimated by the old equation derived from technological classification.

This work is being done by Mr. Hari Rao Navkal.

(13) *Causes of abnormal spinning performance in cottons.*—The spinning performance of a cotton obtained at the Technological Laboratory is a very useful guide to the cotton breeders in the selection of types for multiplication. It is, however, found that certain strains, in spite of their good length, do not spin upto what might be expected from a consideration of their length alone. An investigation was therefore started to find out the cause of such abnormalities. For this purpose, the spinning performance of a cotton is regarded as abnormal, if the difference between the actual spinning value and that calculated by the newly developed formulæ exceeds by five counts.

In addition to the usual tests on raw cotton, fibre-length and fibre-strength tests are being carried out on (*i*) scutcher lap, (*ii*) card sliver, and (*iii*) roving sliver of these samples in order to find whether they give any clue to the abnormal nature of the cotton.

So far, tests on 26 sets have been completed, and it is proposed to continue these tests till sufficient data are available for a proper statistical analysis.

This work has been done by Mr. Hari Rao Navkal.

(14) *Influence of different length-groups of fibres on yarn strength.*—It may be recalled that 60 gm. of 1027 A L.F. was divided in six equal lots and dyed distinctively in six different shades. From each of these shades of dyed cotton a particular length-group was sorted out From these sorted fibres the following seven yarns with the undermentioned composition in each case were spun.

(*a*) Red fibres without 4/16″ and smaller fibres
(*b*) Brown ,, ,, 7/16″ ,, ,, ,,
(*c*) Green ,, ,, 10/16″ fibres only
(*d*) Blue ,, ,, 13/16″ ,,
(*e*) Yellow ,, ,, 16/16″ ,,
(*f*) Orange ,, ,, 19/16″ ,,
(*g*) Mixed fibres removed from each of the above samples in known proportions

The first six of these yarns have been tested for single thread strength and actual counts. The results show that length groups of 10/16″ and 13/16″ when eliminated record the lowest value of count-strength product, and the highest value of count strength product is obtained if the longest and the shortest fibres *i.e.*, 19/16″ and 4/16″ are removed. Removal of 16/16″ fibres and 7/16″ fibres registers similar values of count-strength product which are intermediate between the first two sets. An obvious conclusion from these results is that the fibres in the region of model length have the maximum share in contributing yarn strength and that as the fibres are farther removed from the mode, their removal affects the yarn strength less and less.

This work is being done by Mr. A. N. Gulati.

(15) *Maturity coefficient for Indian cottons.*—The results obtained in connection with this problem (*Vide* Annual Report, 1943) together with those obtained from the measurement of the mature and immature fibres were written up in the form of a paper and submitted for publication by Dr. R. L. N. Iyengar

(16) *Comparison of different methods of measuring the halo length.*—As decided at the Third Conference of Cotton Research Workers held in February 1946, work on this investigation was continued by studying samples obtained from replicated varietal trials. For this purpose *hirsutum* varieties were grown at Lyallpur, *arboreum* varieties at Indore and *herbaceum* varieties at Surat. Out of these three trials, samples were only received from Lyallpur and Indore during the close of the period under report and those from the former place were taken up for test. They were sampled out plot-wise and four sets of

samples of 10 seeds per plot were thus obtained. One set of these was sent to each of the three places, Lyallpur, Indore and Coimbatore, to be tested by the methods followed at the respective places In the case of Coimbatore, however, the modification suggested by the Laboratory, *viz.*, taking three readings instead of five, was recommended. The fourth set of samples was retained at the Laboratory and these are being tested by all the three methods stated above

The remaining kapas from each plot will be ginned and the lint obtained will be tested by Balls Sorter to obtain the mean fibre-length. Then, the produce of four plots of each variety will be pooled together and, if possible, spun into yarn to get the value of H. S. W. C. The values of the halo length obtained by the different methods will then be correlated with the Balls Sorter length and with H. S. W. C., if the latter figures are available. Furthermore, these results will be analysed to obtain the seed-to-seed error and plot-to-plot error. From the values of the correlation coefficients, the errors and the time consumption for each method and also taking into consideration the other findings made so far, it is proposed to decide upon the most satisfactory method of measuring the halo length.

It was stated above that samples from the Lyallpur experiment were sent to different places for halo length tests. The data of these tests were received from Indore and Coimbatore while Lyallpur report is still awaited The Laboratory tests are in progress

This work is being done by Dr. R L. N. Iyengar.

(17) *Effect of agronomical factors on fineness of cotton*—A set of 144 samples of Gaorani 12F-2 grown at Latur provided the material for this investigation These samples belong to a lay-out at Latur in which Gaorani 12F-2 was grown with (*a*) two sources of nitrogen, *viz.*, groundnut cake and ammonium sulphate, (*b*) four doses of the manures, namely 0, 20, 40 and 60 lbs per acre, (*c*) three manners of application, (*d*) three levels of soil fertility, and (*e*) two replications.

Tests on 72 samples grown with groundnut cake are now completed. It has been found that the cotton becomes significantly finer when grown with 60 lbs. dose than with other doses, but with this dose of manure the mean staple length deteriorates significantly Detailed analysis of these data is in progress.

This work is being done by Mr. A. N. Gulati.

(18) *Effect of storage on 15 lbs. samples in the Laboratory.*—Until last February, 18 samples were under quarterly observations in connection with this investigation. However, as 16 of these samples, *viz* , 12 of Jarila from six localities, and two each of Verum 434 and Broach Vijay, showed no deterioration in strength even after storage for two years, unlike fully pressed cottons in mills, these samples were discarded for replacement by fresh samples for repeating the observations according to the decision at the last Committee meeting.

The following 15 lb. samples are now under observation.

(1) Cambodia Co.2	Two samples of clean and dirty cotton.
(2) Jarila (Khamgaon)	Do.
(3) Broach Vijay	Do.
(4) P. A. 289F/43	Do.

Verum 434 sample will also be stored when received.

In the course of observations on stored cotton, it was noticed that fungal infection occurred in patches which fluoresced brightly under ultra-violet light. The incidence of such spots in every drawing is being noted as a new feature besides bundle strength, lustre, and percentage of infected fibres.

It is also interesting to mention in this connection that the fluorescing spots were characterised by three shades, *viz*, (*i*) brown to orange, (*ii*) yellow to green, and (*iii*) pale blue to white. While orange fluorescence was noticed only in P. A. 289F/43, yellow was found in both Jarila and Co 2, and blue was met with in all the three cottons. The organisms associated with these fluorescing spots were isolated. These are.—

(*a*) Brown to orange	*Trichothecium sp* and *Aspergillus sp* 1
(*b*) Yellow to green	*Aspergillus niger* and *Rhizopus nigricans*
(c) Blue to white	*Aspergillus niger* and *Aspergillus sp.* 2

Note —These fungi in these spots were generally in mycelial form only.

This work is being done by Mr. A. N. Gulati.

(19) *Effect of storage of Indian trade bales in Upcountry centres and in Bombay* —Proposals indicating the various centres and the lines on which experiments should be conducted for the above problem were submitted and approved by the Committee with some modifications at the January 1946 meeting. The scheme, as approved, is that experiments should be made on four cottons, namely, P. A. 124F, Jarila, Broach Vijay and a Madras cotton. The Madras Agricultural Department recommended Cambodia Co.2 for these experiments. 45 trade bales of P. A. 124F are to be purchased at Khanewal, 15 of which are to be stored in a godown at Khanewal, another 15 at Karachi and the remaining 15 bales are to be stored in a cotton godown in Bombay. 30 trade bales of each of the other three cottons, Co 2, Jarila and Broach Vijay, are to be purchased respectively at Coimbatore, Jalgaon and Broach, 15 of each being stored at the respective centres while the other 15 bales of each of the three cottons are to be stored along with the bales of P. A. 124F in a cotton godown at Bombay. Thus, on the whole, 135 bales have to be purchased for this investigation. The Upcountry centres for storage are Khanewal, Karachi, Coimbatore, Jalgaon and Broach. 15 lb. samples are to be drawn initially from each bale before storage for tests. Subsequent drawings are to be made at intervals of 6 months from 3 bales out of 15 bales of each cotton at each centre. Thus, there will be, on the whole, 5 subsequent drawings so that the investigation will extend for 2½ years. Arrangements are also to be made for recording temperature and humidity near about the stored bales in all godowns by means of thermo-hygrograph. In accordance with this scheme, 45 bales of P. A. 124F of the new crop have been purchased at Khanewal

during the period under review. Initial samples from 15 bales were drawn and the bales stored at Khanewal. The other 30 bales were despatched to Karachi and Bombay. 30 bales of Cambodia Co.2 and 30 bales of Jarila have also been purchased at Coimbatore and Jalgaon respectively during the period. Half the number of bales were stored at their respective places of origin and the remaining half were brought to Bombay and stored. Samples are being drawn and tested. Moisture tests, lustre measurements, bundle strength tests and spinning tests are being carried out on the initially drawn samples of P. A. 124F, Cambodia Co.2 and Jarila. They are also being sent to the Grader for valuation.

The present season's crop of Broach Vijay cotton received at Broach under the control of seed distribution scheme, unfortunately suffered damage due to heavy shower of rain in the middle of April. The earlier crop was also reported to be very much stained. In view of this it was decided to postpone the storage experiment on this variety until next season.

(20) *Preparation of cellulose sheets and similar materials from Indian cotton linters.*—Chemical cotton was prepared from various grades of linters 285F, 289F and 4F seeds by the method specially evolved in this Laboratory and described in the last Annual Report. In preparing continuous transparent cellulose films by the viscose process, relationships between certain factors in viscose preparation have been examined. The relationships between

(1) the ratio of the weight of alkali-cellulose to that of chemical cotton and the ripening period and the period of ripeness, and

(2) the quantity of CS_2 used as a percentage of the weight of chemical cotton and the ripening period and the period of ripeness,

have been studied. (1) An increase in the weight of alkali-cellulose from 3.1 to 5.6 times the weight of chemical cotton decreases the ripening time and increases the period during which the viscose continues to be ripe. (2) When the quantity of CS_2 used increases from 66 to 70 per cent by weight of chemical cotton, the ripening time tends to increase and the period of ripeness to decrease. Use of over 100 per cent by weight of CS_2 depresses both the ripening time and the period of ripeness

Transparent and glossy cellulose sheets were prepared by leaving viscose on specially levelled glass plates to dry up into sheets of uniform thickness and then subjecting these sheets to precipitation, desulphurisation, bleaching and souring. The glass-like transparency of these sheets was proof of the good quality of the viscose.

For producing a continuous roll of cellulose film an extrusion jet has been newly designed here for attachment to the viscose container. With the specially purchased "Kismet" air pump, sufficient pressure was applied to the viscose in the air-tight viscose container to enable the extrusion of viscose in a broad strip along the entire length of the aperture of the extrusion jet. This strip of viscose was then passed through the precipitating, etc., baths to give long lengths of cellulose film. Many lengths of cellulose film have so far been produced but all of them have turned out to be translucent Efforts are now being made in making these films transparent.

This work is being done by Mr. S. Rajaraman.

(21) *Acetylation of cotton fibres.*—By partial acetylation of the cotton fibre, it is modified and rendered highly resistent to mildewing, rotting and other attacks from micro-organisms The form of the fibre remains unchanged but some of the hydroxyl groups of the cellulose molecules are replaced by acetyl radicals. The method of partial acetylation has been worked out in the Laboratory Yarn or cotton sample is first soaked in glacial acetic acid,then put in a mixture of acetic anhydride and glacial acetic acid and finally adding the catalyst, say, sulphuric acid dissolved in glacial acetic acid The temperature during the period of reaction, other than soaking is maintained below 18°C A large number of samples of Jayawant 20s yarn were acetylated by treating with different proportions of the reacting mixture, different concentrations of the catalyst and varying the periods of reaction Some of the treated samples were found to be highly resistant to micro-organismal attack, when they were examined after two months storage over water in a closed chamber. The treated yarn practically retained its original strength during this period of long exposure over water, while the untreated yarn almost completely lost its strength under similar conditions But the value of the initial strength of the treated yarn was rather less, when compared with that of the untreated yarn, showing that some strength was lost by the treatment. In order to prevent the loss in strength, the concentration of the glacial acetic acid used (1) for dissolving the catalyst and (2) for soaking the yarn was varied It was found that by the latter change, the deterioration of initial strength could be prevented. These treated yarns are being tested for their resistance to the attack of micro-organisms. The work is in progress.

This work is being done by Dr. R. L. N Iyengar.

(22) *Fire proofing of cotton bale covers.*—Preliminary investigation was made in the Laboratory to render cotton bale covering cloth (hessian) fire-proof by using some of the cheaper inorganic chemicals Various concentrations of the aqueous solutions of the following compound or compounds were tried for this purpose:

(1) Borax and boric acid
(2) Ammonium sulphate, borax and boric acid
(3) (*a*) Aluminate of soda (*b*) Ammonium chloride
(4) Ammonium phosphate
(5) (*i*) (*a*) silicate of potash (*b*) hydrochloric acid
(*ii*) (*a*) silicate of soda (*b*) hydrochloric acid and
(6) (*a*) zinc sulphate (*b*) sodium carbonate.

Compounds (1) and (2) were efficient as fire-proofing reagents and the cost worked out approximately 1 anna and 3 annas respectively per 3 square yards of jute cloth required for covering one bale of cotton (48 in. × 18 in. × 21 in.). Compounds (3), (4) and (5) (*ii*), which were equally efficient as fireproofing reagents, cost 10, 20 and 52 annas respectively. Further work is in progress.

VI. GINNING SECTION

The work under this section is described on pages 15-21 During the period under review, Dr R. L. N. Iyengar continued to be in charge of the technical supervision of the section. The Ginning Supervisor, Mr. G. G. Oka, was sent to the ginning factory of the British Cotton Growing Association at Khanewal to carry out tests on saw gin and single roller gin on 124F cotton for purposes of comparison with similar tests to be done at the Laboratory. After completing these tests he proceeded, for making similar tests on Jarila cotton, to the ginning factories of Messrs Volkart Brothers at Khamgaon, for tests on saw gin, and at Amraoti for tests on single and double roller gins

Besides this, tests on small scale ginning were completed on 12 cottons for standardising the ginning technique for small samples for use at the cotton breeding stations. Furthermore, pre-cleaning tests were carried out on Jarila cotton in order to evolve a technique for cleaning kapas for obtaining better quality lint.

VII. PUBLICATIONS.

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

I. *Technological Bulletins, Series A*—

(1) Technological Bulletin Series A No 65, Technological Reports on Trade varieties of Indian Cottons, 1946 by D L Sen, M.Sc., Tech. (Manch), M.Sc. (Bom) , A I. I Sc , F R.I C

(2) Technological Bulletin Series A No 66, Technological Reports on Standard Indian Cottons, 1946 by D L. Sen, M Sc , Tech. (Manch.), M Sc. (Bom.), A.I I Sc., F.R I C.

II. *Technological Bulletins, Series B*—

During the period under report, the following three papers were prepared and approved by the referees and they are now under publication

(1) Paper entitled "Dyeing Properties of Indian Cottons" by Mr. D. L. Sen and Dr. Nazir Ahmad.

(2) Paper entitled "Estimation of wax-content and feel of a cotton from its physical characters" by Mr. C. Nanjundayya

(3) A new method for the determination of the average diameter of textile fibres, filaments, fine wires, etc., by Dr Nazir Ahmad and Dr R L N. Iyengar.

III. *Technological Leaflets Nos* 21 to 29—

(1) Technological Leaflet No. 21, "Pre-cleaning and Ginning Tests on Indian Cottons—Gaorani 6 (1943-44 season)" by D. L Sen, M.Sc , Tech,. M.Sc., A.I.I.Sc., F R I.C. and V Venkataraman, M.A

(2) Technological Leaflet No 22, "Pre-cleaning and Ginning Tests on Indian Cottons-Surat 1027 A.L.F. (1941-42 season)." by D. L Sen, M.Sc. Tech. M S.c , A I I.Sc , F.R I C. and V. Venkataraman, M.A.

(3) Technological Leaflet No. 23, "Pre-cleaning and Ginning Tests on Indian Cottons—Punjab-American 4F. (1941-42 season)" by D. L. Sen, M.Sc., Tech., M.Sc., A.I.I.Sc., F.R.I.C. and V. Venkataraman, M.A.

(4) Technological Leaflet No. 24, "Pre-cleaning and Ginning Tests on Indian Cottons—Punjab-American 289F/K25 (1941-42 season)" by D. L. Sen, M.Sc., Tech., M.Sc., A.I.I Sc., F.R.I.C. and V. Venkataraman, M.A.

(5) Technological Leaflet No. 25, "Pre-cleaning and Ginning Tests on Indian Cottons—Verum (1941-42 season)." by D. L. Sen M.Sc., Tech , M.Sc., A.I.I.Sc., F.R I.C., and V. Venkataraman, M.A.

(6) Technological Leaflet No. 26, "Pre-cleaning and Ginning Tests on Indian Cottons—Punjab-American 289F/43 (1941-42 season)" by D. L. Sen, M.Sc., Tech., M.Sc., A.I.I.Sc., F R.I.C. and V. Venkataraman, M.A.

(7) Technological Leaflet No. 27, "Pre-cleaning and Ginning Tests on Indian Cottons—Jayawant (1943-44 season)." by D. L. Sen M Sc , Tech., M.Sc., A.I.I Sc., F.R.I.C. and V. Venkataraman, M.A.

(8) Technological Leaflet No 28, "Pre-cleaning and Ginning Tests on Indian Cottons—Sind-American M4 (1943-44 season)." by D L Sen, M Sc., Tech , M Sc , A I I Sc , F.R I.C. and V. Venkataraman, M A.

(9) Technological Leaflet No. 29, "Pre-cleaning and Ginning Tests on Indian Cottons—Punjab-American 289F/K 25 (1943-44 season)" by D. L. Sen, M.Sc., Tech., M Sc , A.I.I.Sc , F.R.I.C and V. Venkataraman, M A.

IV. *Technological Circulars Nos.* 664 *to* 702 *as per list given below* .—

Tech. Circular No.	Title.	Date of publication
664	Spinning Test Report (No 2024) on Samples of 289F/K25, 1944-46	May 1946.
665	Spinning Test Report (No. 2032) on Samples of Westerns (Anantapur) Cotton, 1943-46	June 1946
666	Spinning Test Report (No. 2033) on Samples of Vijay Cotton, 1944-46	,,
667	Spinning Test Report (No 2037) on Samples of Broach B D. 8 Cotton, 1943-46,	,,
668	Technological Report on Punjab-American, 4F, 1945-46	,,
669	Spinning Test Report (No 2039) on Samples of Navsari Cotton, 1938-46	,,
670	Spinning Test Report (No 2040) on Samples of Sind-Sudhar Cotton, 1938-46	,,
671	Spinning Test Report (No 2041) on Samples of P. A 4F. (Bahawalpur), 1943-46	,,
672	Spinning Test Report (No. 2042) on Samples of Suyog (Seg 8-1) Cotton, 1945-46	,,
673	Spinning Test Report (No. 2043) on Samples of Bijapur Cotton, 1945-46	,,
674	Spinning Test Report (No. 2046) on Samples of L. S. S. (Lyallpur) Cotton, 1945-46	July 1946.
675	Spinning Test Report (No 2047) on Samples of Cambodia Co.2 (Avanashi) Cotton, 1945-46	,,
676	Spinning Test Report (No. 2048) on Samples of Cambodia Co.2 (Dharapuram) Cotton, 1945-46	,,
677	Spinning Test Report (No. 2049) on Samples of Karunganni (Coimbatore) Cotton, 1945-46	,,

IV. *Technological Circulars Nos.* 664 *to* 702 *as per list given below:*—contd.

Tech. Circular No.	Title.	Date of publication.
678	Technological Report on V. 434 (Akola), 1945-46	July 1946.
679	Technological Report on P. A. 289F/K25, 1945-46	,,
680	Spinning Test Report (No 2055) on Samples of Upland Gadag Cotton, 1945 46	,,
681	Spinning Test Report (No 2057) on Samples of African A. R. B P 52 Cotton, 1946	August 1946.
682	Spinning Test Report (No 2062) on Samples of Jayawant (Bailhongal) Cotton, 1945-46	July 1946.
683	Spinning Test Report (No 2063) on Samples of Punjab-American 4F (Montgomery), 1945-46	,,
684	Technological Report on Gaorani 6, 1945-46	,,
685	Technological Report on Jayawant (Kumpta), 1945-46	August 1946.
686	Spinning Test Report (No 2076) on Samples of A. R Busoga Cotton, 1945-46	,,
687	Spinning Test Report (No. 2077) on Samples of Karunganni (Sattur) Cotton, 1945-46	,,
688	Spinning Test Report (No 2080) on Samples of Tinnevelly Cotton, 1945-46	,,
689	Spinning Test Report (No 2082) on Samples of Farm Westerns Cotton, 1945-46	Sept 1946.
690	Spinning Test Report (No. 2091) on Samples of Cambodia Co 3 Cotton, 1945-46	,,
691	Technological Report on Surat 1027 A L F, 1945-46	,,
692	Spinning Test Report (No 2123) on Samples of Gaorani 6 Cotton, 1946-47	January 1947.
693	Spinning Test Report (No. 2154) on Samples of C P No 1 Cotton, 1946-47	Feb 1947.
694	Technological Report on Jarila, 1946-47	March 1947.
695	Spinning Test Report (No 2163) on Samples of Malvi Cotton, 1946-47	April 1947.
696	Spinning Test Report (No 2170) on Samples of Jarila (Berar) Cotton, 1946-47	May 1947.
697	Spinning Test Report (No. 2173) on Samples of P A. 289F/K25, (Roller-ginned), 1946-47	April 1947
698	Spinning Test Report (No. 2174) on Samples of 289F/K25, (saw-ginned), 1946-47	,,
699	Spinning Test Report (No 2180) on Samples of Jarila (West Khandesh) Cotton, 1946-47	May 1947.
700	Spinning Test Report (No. 2181) on Samples of Jarila (East Khandesh) Cotton, 1946-47	,,
701	Spinning Test Report (No 2182) on Samples of Verum Cotton, 1946-47	,,
702	Spinning Test Report (No. 2184) on Samples of Suyog (Seg. 8-1) Cotton, 1946-47	,,

In addition, the following articles were submitted for publication in the *Indian Cotton Growing Review* —

(1) Review of work carried out at the Technological Laboratory during the past year by D. L. Sen.

(2) Pre-cleaning and ginning tests on Indian cottons I, by V. Venkataraman.

(3) Neppiness of Indian cotton yarns by A. N. Gulati.

(4) A new method for finding the diameter of cotton fibres by R. L. N. Iyengar.

(5) A method for distinguishing and estimating Mollisoni and P. A. 4F. cottons in mixture by A. N. Gulati.

(6) Pre-cleaning and ginning tests on Indian cottons II, by V. Venkataraman.

(7) Variation of fibre length in a sample of cotton by R. L. N. Iyengar.

(8) A note on the qualitative method for the identification of Punjab-American and Mollisoni (Desi) cottons in a mixture of the two by D. L. Sen.

(9) Effect of manurial treatment on the yield, fibre properties and spinning value of cotton by D. L. Sen.

During the period under review the following two articles were prepared for the Dictionary of Economic Products and Industrial Resources in India which is under preparation by the Council of Scientific and Industrial Research.

1 "Storage of Cotton" by Mr C Nanjundayya

2 "Statistical techniques applied to Cotton Technological Problems" by Mr V Venkataraman.

Summaries of Technological Bulletins Series B No. (1) and No. (3) noted above were already published in the previous report. Summary of No. (2) is given below.

Estimation of wax-content and feel of a cotton from its physical characters.— The following conclusions are deduced from the results of the present investigation :—

(1) Wax-content of a cotton is highly correlated with the surface area per gram, which, in turn, is a function of the ratio $\frac{\text{Ribbon-width}}{\text{Fibre-weight per unit length}}$ or the reciprocal of the square root of fibre-weight per unit length.

(2) The ratio $\frac{\text{Ribbon-width}}{\text{Fibre-weight per unit length}}$ expressed in English units directly gives the experimental value of wax-content of a cotton, the calculated value being in close agreement with the experimental value in the majority of cases.

(3) It is deduced that the coating of wax is nearly the same for all cottons and its distribution on the fibre surface is fairly uniform.

(4) "Feel" of a cotton, as ordinarily estimated by an expert grader, is related primarily to the fibre-weight per unit length or to the ratio of ribbon-width to fibre-weight per unit length.

(5) Scales of fibre-weight per unit length, and the ratio of ribbon-width to fibre-weight per unit length for classifying cottons into different grades of 'Feel' are given for the first time.

VIII. MISCELLANEOUS.

Equipment—It may be recalled that in 1944, the Committee sanctioned a sum of Rs. 50,000 for the purchase of special equipment and apparatus from the U. S. A. for the Laboratory and authorized Dr. Nazir Ahmad, the then Director, to place an order for various equipment from that country. Dr. Nazir Ahmad, after the selection of the equipment and apparatus, made arrangements for the purchase and despatch through the India Supply Mission, Washington, U.S.A Below is a list of the equipment and apparatus, so far received under this arrangement.

1.	Semi-Automatic Moisture Tester ..	(Brabender, U S.A.)
2.	Air Permeability Apparatus ..	(Sherman W. Fraizer).
3.	Compressometer	Do.
4.	Friction Meter	Do.
5.	Planoflex	Do.
6	Readex Projector with transformer.	(Readex Microprint Corporation N. Y)
7.	High Speed Camera (Eastman) with transformer	(Eastman Kodak Company)
8.	Pressley Fibre Strength Tester ..	(Joseph M. Doebrich).
9.	Kymograph	(Phipps and Bird).
10.	Photo cells	(Photovolt Corporation, N Y.)
11.	Precision Balance (0-50 mgms.) ..	(Alfred Suter, N Y)
12.	Haynes Photometer..	(Haynes Products Co., N.Y.)
13	Volt-Ohmyst with transformer ..	(R. C. A., New Jersey).
14.	Waring Blender and Transformer..	(Central Scientific Co., Chicago).
15.	Micromax Recorder (complete with parts)	(Leeds & Northrup & Co., Philadelphia)
16.	Supersensitive Analyser Model 779	(Weston Electrical Instrument Corp., N. J.)
17.	Volt-ohmeter Model 564	(Do.)
18.	Incline Plane Serigraph	(Scott Testers Inc. Providence, R. I.)
19.	Thermo Regulator and Relays ..	(Central Scientific Co., Chicago)
20.	Projection Lantern	(Do.)
21.	Photronic Cells	(Weston Electrical Ins. Corp., N. J.)

Some more apparatus are yet to be received under this arrangement. In addition to this, the following equipments have been purchased.

1. Resistance boxes, 16 coils Series.
2. Galvanometer, Reflecting resistance 100 ohms.

Visitors.—As usual, a large number of visitors and students from the various institutions visited the Laboratory during the period under review and among them the following may be mentioned :—

(1) Members of the Egyptian Cotton Delegation.
(2) Students of the Sydenham College of Commerce, Bombay.
(3) Senior Physics Students of Wilson College, Bombay.
(4) Members of the Staff of three local Mills.
(5) Chief Inspector of Military Explosives, Kirkee.
(6) Dr. Shia from China
(7) Mr. Henry W. Spielman of Washington, U.S.A.
(8) Agricultural Adviser to the American Consul in India
(9) Members of the Staff of the Botanical and Plant Breeding Section, Giza, Egypt.
(10) Members of the Belgian Cotton Delegation, Ghent, Belgium
(11) Students of the V. J. T. Institute, Bombay.
(12) Students of the Government Central Textile Institute, Cawnpore.

The members of the Egyptian Cotton Delegation headed by Mr Maward (Hon. Finance Member to the Government of Egypt) visited the Laboratory on the 22nd June, 1946. The delegation was received at the Laboratory by the Vice-President, Sir Chunilal B. Mehta, Offg Secretary and the writer They were taken round the Laboratory after which they were entertained at a tea party by the Vice-President at the Laboratory.

Refresher Course and Conference of Technological Assistants.—The Technological Assistants working in the mofussil Laboratories attended the Laboratory for the usual annual refresher course and conference between them and the senior research staff of the Laboratory in November-December, 1946. The Conference took place on the 3rd December, 1946 when several subjects of interest to the Technological Assistants were fully discussed. It may be stated here that in pursuance of the decision of the Indian Central Cotton Committee Mr. V. M. Chavan, Dy. Director of Agriculture, Crop Research, Poona was deputed by the Director of Agriculture, Bombay. His participation in the conference proved very useful. A full report of the conference was placed before the meeting of the Committee held in January, 1947.

Staff.—The important details in respect of the staff regarding leave, appointments, transfer etc., are given below :—

During the period under review, the writer continued to officiate as Director.

Leave —Mr. V. V Gupte, Spinning Master proceeded on leave for rest and recreation from the 24th June to 3rd August, 1946. He was further granted leave from 1st March, 1947, to 23rd April, 1947 with permission to retire from Committee's services and accept private employment during the leave period. However, on his representation, after the expiry of leave, he was allowed to withdraw the resignation and to rejoin the post of Spinning Master, which

he did, on the 12th May, 1947. During this period, Mr. A. G. N. Iyengar officiated as Spinning Master.

Mr. S. Rajaraman, Junior Research Assistant, proceeded on leave for rest and recreation from 5th October, 1946 to 9th November, 1946.

Transfers and Appointments—Mr. S. B. Mogre, who was transferred to Mirpurkhas as Technological Assistant in December 1945 reverted to his substantive post at this Laboratory in October 1946. Mr L. R. Jambunathan, Junior Tester was transferred to Mirpurkhas in this vacant post and was relieved from the Laboratory on the afternoon of the 4th November, 1946.

Messrs. G. S. Phadke, B.Sc., and V K Junnarkar, B Sc , were appointed Offg Junior Testers with effect from the 11th and 24th June 1946 respectively. Both the Junior Testers resigned their appointments from the 1st December, 1946.

Mr. R K Tandon proceeded on leave preparatory to retirement with effect from the 28th September, 1946.

Mr. R. A. Deshmukh, Laboratory Keeper, resigned his post with effect from the 15th August, 1946 and this post was filled up by the appointment of Mr. R K. Dam with effect from the 1st November, 1946

Mr G S Kane, Offg Draughtsman resigned his post and Mr. Y N. Tendulkar was appointed in his place with effect from the 1st July, 1946.

One of the posts of Statistical Clerk was converted into a Senior Statistical Clerk's post and Mr. R. Krishna Iyer, Offg. Senior Tester was appointed to this post with effect from the 14th October, 1946.

Messrs. P. S. Sambamurthy, P D. Vakil and M T Sundaram continued to be on duty in the Department of Industries and Supplies, Bombay.

Mr. R. Narayanrao, B.Sc., was appointed as Junior Tester with effect from the 7th November, 1946.

Mr. V. G. Pisharodi, Typist Clerk, resigned his post from the 2nd December 1946. This post was filled up by the appointment of Mr. M. C. D'Souza who joined on the 19th December, 1946.

Messrs. M. M. Pai and M. Radhakrishnan were appointed Junior Testers in the vacancies arising out of resignations and transfers.

Mr. T. L. Thomas, Junior Tester resigned his post and Mr. H. M. Almeida, B.Sc., was appointed to this post with effect from the 13th May, 1947.

A new post of Assistant Technological Assistant was created at Coimbatore and Mr. T. G. Sankaram, B.Sc., was transferred from the Laboratory to this post. He was relieved on the 27th December, 1946 to take up this new appointment.

Major G. J. Kharkar was relieved from military duty and he rejoined the Laboratory as Senior Tester on the 23rd April, 1947 Major Kharkar was on active military service since February 1940, and held various officers' posts in the army. He was discharged during this year and reverted to his substantive post of Senior Tester.

According to the usual practice, four students, *viz.*, Mr. B. G. Jayavant, Mr. B. K. Kimothi, Mr. D. S. Murthy, and Mr. R. Subramanyan were selected for training in the elements of cotton technology, fibre, yarn and cloth testing for a period of six months. The training commenced on the 2nd January, 1947.

The scheme on 'the survey of cellulose bearing materials in India' financed by the Council of Scientific and Industrial Research, Delhi was continued during the year, with a short suspension. Mr. M. G. Karnik continued as Research Assistant in this scheme.

In the conference between the senior members of the staff of the Laboratory and the Technological Assistants working under the various schemes, it was suggested that the senior members of the Laboratory who have not got experience in actual cotton breeding work may be sent to some cotton breeding stations during the cotton growing season to study the crop and allied problems on the spot. This suggestion was approved and accordingly Mr. V. Venkataraman, Statistician and Personal Assistant and Mr. A N. Gulati, Senior Research Assistant visited Viramgam, Jagudan and Amreli Farms during November 1946. During their tour, they got opportunities to visit two cotton mills at Ahmedabad where they discussed with the mill authorities regarding the tests conducted under mill and Laboratory conditions. This tour proved very useful.

ACKNOWLEDGMENTS

I wish to express my thanks to the office-bearers of the Indian Central Cotton Committee for their continued interest in the work of the Laboratory My thanks are also due to Messrs. Purushotamdas Harkisondas and Gatulal Rangildas Shah of Messrs Bhaidas Cursondas & Co., Bombay for their valuable help in grading the large number of agricultural samples sent to the Laboratory for tests. My thanks are also due to the Standards Committee of the East India Cotton Association Limited, Bombay for kindly grading a large number of trade variety samples. My thanks are also due to Messrs B C G. A., (Punjab) Ltd. and Volkart Brothers who very kindly permitted the Gin Supervisor to visit their factories at Khanewal and Berar respectively when comparative ginning tests were being carried out and for supplying kapas for comparative tests in the Laboratory. My thanks are also due to Messrs. B. C. G. A., (Punjab) Ltd., Narandas Rajaram & Co. Ltd , Bombay and Karachi Cotton Association and to the Cotton Specialist, Coimbatore and the Cotton Breeder, Jalgaon for giving all necessary facilities for the investigation on storage of commercial cotton bales.

I also take this opportunity to express my thanks to the Technical and administrative staff of the Laboratory without whose loyal co-operation it would not have been possible for me to accomplish the work described in this report.

(Sd.) D. L. SEN,

Dated, the 16th June, 1947. *Officiating Director, Technological Laboratory.*

APPENDIX

LIST OF SCIENTIFIC AND TECHNICAL STAFF OF THE TECHNOLOGICAL LABORATORY AS ON 31st MAY, 1947.

	Designation.	Name	Remarks.
1.	Director (Offg.)	Mr. D. L Sen, M Sc Tech (Manch), M.Sc. (Bom), A.I.I.Sc., F R I.C.	Research Student of the Indian Institute of Science and Manchester College of Technology.
2.	Senior Research Assistant (Chemist), and Superintendent, Testing House.	Do.	Do.
3.	Senior Research Assistant (Physicist).	Mr. Harirao Navkal, M Sc (Calcutta) ..	Research Scholar, Technological Laboratory (Textile Physics).
4.	Senior Research Assistant (Microscopist.)	Mr A. N. Gulati, M.Sc. (Punjab).	Imperial Institute of Veterinary Research, Mukteshwar, U.P.
5.	Spinning Master	Mr. V. V. Gupte, B.Sc. (Tech) (Manch), B.Sc. (Bombay).	....
6.	Statistician and Personal Assistant ..	Mr V. Venkataraman, M A. (Madras) ..	Statistical Assistant, Labour Office Government of Bombay.
7.	Junior Research Assistant (Physicist) .	Mr. C. Nanjundayya, M Sc (Calcutta) ..	Research Scholar, Technological Laboratory (Textile Physics).
8.	Junior Research Assistant (Physicist)	Dr R. L. N. Iyengar, D Sc (Madras) ..	Research Scholar, Technological Laboratory and Technological Assistant, Coimbatore.
9.	Junior Research Assistant (Physicist) .	Mr S Rajaraman, B A., M Sc , A. Inst P	Technological Assistant, Lyallpur.
10.	Head Tester	Mr H. B Joshi, B Sc	.. .
11.	Senior Tester	Mr. K. V. N. Nayar	. ..
12.	Do.	Mr V N. Modak, B.Sc.	....
13.	Do.	Mr. R. G. Panvalkar, B.Sc.	....

APPENDIX—(*contd.*)

LIST OF SCIENTIFIC AND TECHNICAL STAFF OF THE TECHNOLOGICAL LABORATORY AS ON 31st MAY, 1947.

	Designation.	Name.	Remarks.
14.	Senior Tester	Major G. J Kharkar B Sc	....
15.	Do.	Mr. A. J Farid	....
16.	Do.	Mr. P. V Nachane, B Sc.	....
17.	Do.	Mr. B G. Mehta	. ..
18.	Junior Tester	Mr. S. B. Mogre, M Sc.	....
19.	Do.	Mr. C A. S. Iyer, B.Sc.	....
20.	Do.	Mr S Ramanathan	....
21.	Do.	Mr. N. C. Chiplonkar, B.Sc.	....
22.	Do.	Mr S K. Iyer, B A.	....
23.	Do.	Mr J M. Shah, B Sc.	....
24.	Do.	Mr. K P. Ramkrishna Pillai, B.Sc	....
25.	Do.	Mr M M. Pai, B.Sc.	(Offg.)
26.	Do.	Mr. M Radhakrishnan, B.Sc.	„
27.	Do.	Mr R Narayan Rao, B.Sc...	„
28.	Do.	Mr. H M. Almeida, B.Sc.	„
29.	Gin Supervisor	Mr G G. Oka	....
30.	Senior Statistical Clerk	Mr P Krishna Iyer	....
31.	Junior Statistical Clerk..	Mr K Venkateswaran, B.A.	....
32.	Electrician	Mr H V. Tamhankar, L M.E , L.E E. (V J T I.)	(Offg.)
33.	1st Spinning Asstt.	Mr. A C. N. Iyengar	....
34.	2nd „ „	Mr R Narayanaswamy, L.T.M. (V.J T.I.).	....
35.	Draughtsman	Mr Y. N. Tendulkar	(Offg.)
36.	Mechanic	Mr. J. B Kharas	....