



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Report
Ag. 84A+

**Bleaching, Dyeing and Mercerizing
Test Results on Some Varieties
of Cotton Grown by Selected
Cotton Improvement Groups,
Crop of 1955**



Washington, D. C. October 1956

UNITED STATES DEPARTMENT OF AGRICULTURE.

Agricultural Marketing Service

CONTENTS

	Page
Purpose of study	1
Test procedures	2
Test results and analyses	9
Table 1.--Finishing test results on short and medium length upland cottons	10
Table 2.--Finishing test results on long staple upland cottons	16
Table 3.--Finishing test results on American Egyptian cottons	17
Table 4.--Varietal averages for short and medium length upland cottons	18
Table 5.--Varietal averages for long staple upland and American Egyptian cottons	18
Basis for interpretation of test results	19
Literature cited	21

This publication provides information with respect to the performance in the chemical finishing processes of representative samples of cotton from the 1955 crop. The fiber characteristics and spinning performance of these cottons were reported in Agriculture Information Bulletin No. 152, Summary of Fiber and Spinning Test Results for Some Varieties of Cotton Grown by Selected Cotton Improvement Groups, Crop of 1955, issued February 1956.

ACKNOWLEDGMENTS

This study was planned and conducted under the direction of John W. Wright, Chief, Standards and Testing Branch, Cotton Division. The bleaching, dyeing and mercerizing tests were made at the Clemson Cotton Laboratory of the Standards and Testing Branch. Staff members of the Branch in Washington assisted in the analysis and interpretation of the data.

BLEACHING, DYEING AND MERCERIZING TEST RESULTS ON SOME VARIETIES
OF COTTON GROWN BY SELECTED COTTON IMPROVEMENT GROUPS
CROP OF 1955 1/

Purpose of Study

Fiber and spinning test results have been published for cotton produced commercially by cotton improvement groups in the United States since 1946 (3, 4, 5, 6, 7, 8, 9, 10, 11, 12) 2/. The purpose of these reports is to aid cotton merchants and manufacturers in locating sources of cotton possessing the fiber characteristics and spinning performance desired for specific uses. Farmers in those areas that produce cotton having the characteristics desired by manufacturers for specific uses indirectly benefit by improved efficiency of marketing and an increased demand for their product.

The usefulness of these reports has been limited somewhat because they included only data for fiber and spinning tests. They have not included information relating to the performance of the different cottons when subjected to the various chemical finishing processes. The finishing performance of cotton has become increasingly important in recent years as more attention is being given to the technological aspects of textile processing and as competition from synthetic fibers has increased.

Information with respect to the bleaching and dyeing properties of different varieties and growths of cotton is of particular significance to textile manufacturers from the standpoint of providing a basis for avoiding problems that may result from blending different varieties and growths. Although dyeing procedures may be modified to compensate for differences in dyeing properties of specific types of cotton, uniform results are not attained if the yarn or fabric is made from a mixture of cottons of different dyeing properties. At least it is necessary in such instances to accomplish a perfect blending of such cottons if uniform results are to be attained in dyeing. Data with respect to the chemical finishing properties of the principal varieties and growths of cotton may thus be used as a basis for selecting cottons of similar finishing properties.

Before data on the chemical finishing performance of cotton samples could be provided, it was necessary to develop or adapt equipment and procedures for small scale testing in connection with the various chemical finishing processes. Recently, the principal chemical finishing processes have been adapted to small scale laboratory testing of cotton samples. Equipment and procedures, which show a high degree of

1/ The fiber characteristics and spinning performance of these cottons were reported in Agriculture Information Bulletin No. 152, Summary of Fiber and Spinning Test Results for Some Varieties of Cotton Grown by Selected Cotton Improvement Groups, Crop of 1955.

2/ Underscored numbers in parenthesis refer to literature cited, page 21.

reproducibility of test results, have been standardized for the dyeing, bleaching and mercerizing of raw cotton, yarn and fabric. Color and luster measurements of the natural and treated materials provide the basis for evaluating the finishing properties of specific samples of cotton. Since the reproducibility of test results is somewhat better when the tests are made at the yarn stage and because yarn is regularly processed from cottons tested in connection with these annual studies, the finishing tests reported were made at the yarn stage.

Although routine bleaching, dyeing and mercerizing tests were scheduled for the 1955 crop cottons, the results were not available in time to be included in the summary report on fiber and spinning test results for that crop year (12). They are, therefore, being presented in both detailed and summary form in this supplemental report. The results of tests of finishing properties will supplement the fiber and spinning test results and will provide additional criteria by which cotton producers, marketing agencies, and textile manufacturers may select the cotton varieties and grades best suited for specific end uses.

It was concluded after a comprehensive study, that the most practical method of evaluating the finishing performance of cotton is to make color measurements on grey (natural) as well as on bleached and dyed yarn samples and to make luster and strength measurements on grey and mercerized yarn samples. This report includes the results of color and luster measurements on yarn processed from cottons representative of the 1955 crop, as well as the results of luster measurements on the raw cotton in each instance. The results of strength tests on mercerized yarns processed from these cottons were included in Agriculture Information Bulletin No. 152 published in February 1956 (12).

Test Procedures

The basic procedures used for the routine chemical finishing tests made in connection with this study, were developed by Clemson Agricultural College under a contract with the United States Department of Agriculture. The objectives of the work under that contract were to: (1) Develop small scale test procedures for measuring the comparative performance of different samples of cotton in bleaching, dyeing and mercerizing; (2) to ascertain the stage - raw cotton, yarn or fabric - at which such tests could most advantageously be performed; and (3) develop tentative benchmarks of test results as a basis for interpreting the results of such finishing tests.

Small scale test procedures were developed for each of the three chemical finishing processes - bleaching, dyeing and mercerizing. These procedures were applied in sufficient replication in each instance to establish the reproducibility of test results. A control sample from a specific lot of cotton was included with each group of samples tested in order to assure the maintenance of a uniform level of bleaching and dyeing.

It was found that color changes following bleaching or dyeing were independent of the physical state of the cotton, although the level of the

individual color attributes depended on whether the sample being tested was in raw stock, yarn, or fabric form. As a practical matter, however, when applying the tests and measuring color, the yarn stage was found to be more advantageous. The study indicated also that from the standpoint of repeatability of test results, as measured in terms of improvement in luster and strength, mercerizing tests also can best be performed at the yarn stage.

The yarn used in the chemical finishing tests was processed in connection with the spinning tests for each lot of cotton. Skeins of these yarns were subjected to the following chemical finishing processes employing highly standardized procedures:

1. Bleaching (hydrogen peroxide)
2. Direct dyeing of grey yarn (calcodure blue, color index No. 533)
3. Dyeing after bleaching
4. Mercerizing (sodium hydroxide)

The bleaching process was performed in a commercially built tank equipped with both steam and cold water coils for temperature control, a cascade arm for revolving the material, and an electric pump for circulating the bath. (Figure 1.) Four skeins of yarn were bleached for each lot of cotton tested. The skeins were wet out for 15 minutes at 176 degrees F. in a water and wetting agent solution with a 100 to 1 ratio by weight of bath to yarn after which 0.6 percent sodium silicate and 2.0 percent hydrogen peroxide (35 percent strength) based on the weight of the yarn, was added. They were bleached in this bath at 176 degrees F. for two hours. After bleaching, the samples were rinsed, drained, and dried without tension at 120° to 130° F. for four hours.

The dyeing process was performed in the same commercially built tank used for the bleaching operations. One of the bleached skeins and one grey skein were dyed for each lot of cotton tested. The skeins were wet out for 10 minutes at 207° F. in a solution of water and wetting agent with 200 to 1 ratio by weight of bath to yarn after which 1-1/2 percent of dye (calcodure blue 4GL, color index No. 533) based on the weight of the yarn, was added to the bath. They were dyed in this bath for 10 minutes at 207° F., after which 30 percent sodium chloride, based on the weight of the yarn, was added. They were dyed in this bath for 30 minutes at 207° F. before being rinsed in cold water and removed to a drying room.

A direct dye, 1.5 percent calcodure blue 4GL (color index No. 533) was used for routine dyeing tests. A direct dye was selected rather than a vat or a naphthol dye because it is simpler and quicker to use with the laboratory equipment than the latter two, and gives more reproducible results. The 1.5 percent dye concentration, based on cotton weight, appeared to give the best compromise with respect to the spread among the various color values. The blue dye chosen effectively eliminates the red-green color component, thereby simplifying the analysis of results.

The mercerizing process was performed in a specially built tank which is equipped with a rotating skein rack designed to maintain uniform tension

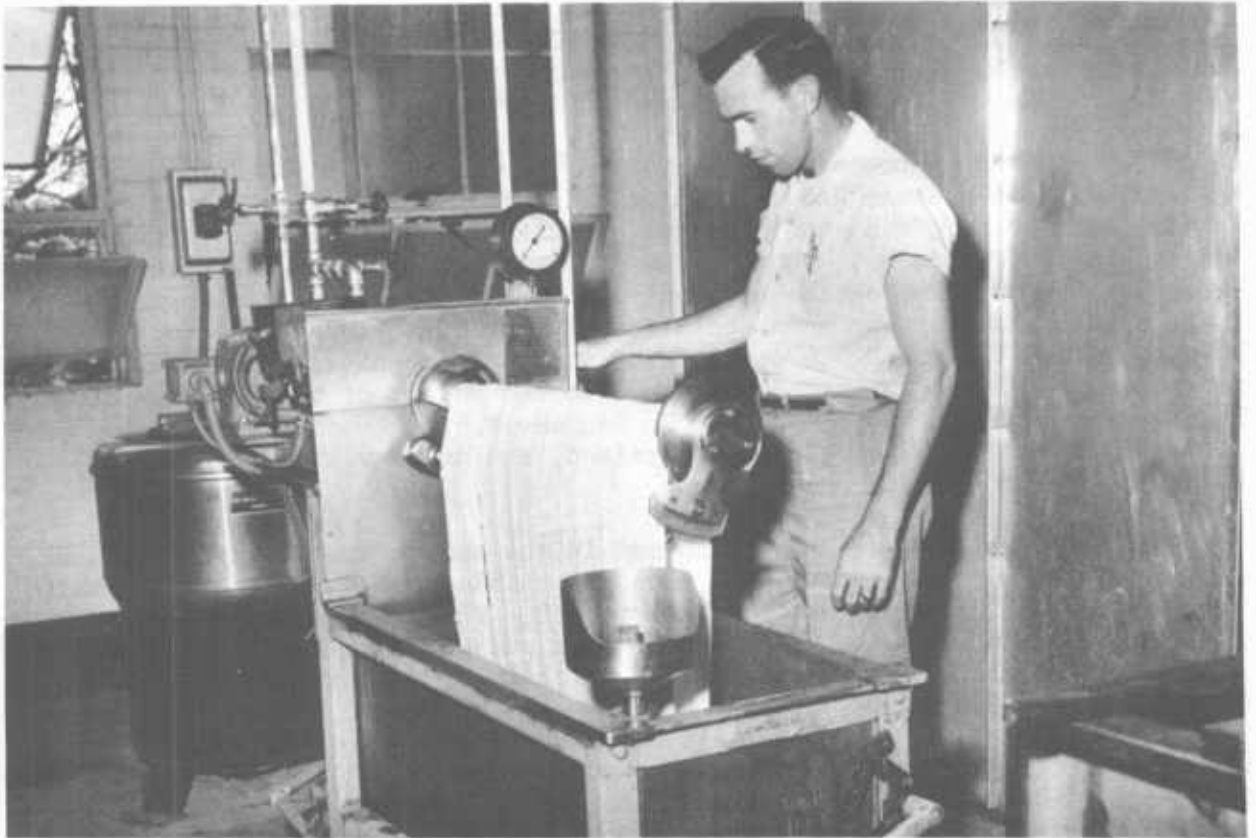


Figure 1.--Equipment used for applying small scale bleaching and dyeing tests to skeins of cotton yarn.

on the yarn during treatment (Figure 2). This equipment is similar in design and specifications to that described by Goldthwait (1). Only the combed yarns were mercerized, because this process is rarely used except for the higher quality end products. Twenty-eight skeins were mercerized for each lot tested. The skeins, under a standard tension, were rotated through the caustic solution for 4 minutes. After 4 rinses, the yarn was rotated for 3 minutes through a .125 percent acetic acid solution, rinsed, drained, and air-dried for 4 hours at 120-130° F. in a relaxed condition.

Color measurements of cotton yarn samples reported in tables 1 through 5 were made on a Gardner Automatic Color Difference Meter (Figure 3) and are reported in terms of 2 of the 3 scales of this instrument, R_d and $+b$. For these tests the Colorimeter is provided with a special turret top and clamp for holding specially prepared yarn samples. The size of the sample measured is about $1/2 \times 1/2$ inch. There are three scales on the instrument, R_d , a and b . The R_d scale measures percentage of diffuse reflectance from 0 to 100. The b scale provides a measure of yellowness in the direction of $+b$ and of blueness in the direction of $-b$; the degree of yellowness or blueness increasing as the scale numbers increase. In effect, the b measurements are used in this report as an indication of saturation. The "a" scale provides a measure of redness in the direction of $+a$ and greenness in the direction of $-a$, but since the inclusion of this factor would simply help to indicate the hue of the blue, which for the purpose of this test is not as important as saturation, results for the "a" scale are not reported. If another color were used for the dyeing it might be necessary to report the "a" instead of, or in addition to, the "b" factor. To plot the R_d and b data, the R_d should be used as the vertical ordinate, and b as the horizontal ordinate. It is in similar fashion that the color data are measured and reported in the cotton grade standards diagram. See Figure 16 of AMS Report No. 16, Cotton Testing Service.

Luster measurements reported for these finishing tests were made by means of a Hunterlab Cotton Lustermeter (Figure 4). For a detailed description of this instrument see Item (2) of literature cited. This instrument is a direct-reading unit that is provided with a turret-top and clamp for holding yarn samples. A new and rapid method of sample preparation and measurement by means of the Lustermeter was developed in connection with this study. The size of a sample measured is approximately $1/2 \times 1/2$ inch. Luster is a measure of contrast gloss expressed as a ratio of the specular reflectance to the diffuse reflectance of a sample. In order to express luster on a percentage scale, with high luster at 100% and zero luster (matte surface) at 0%, the scale of this instrument reads directly in terms of $1-(D/S)$ which, when multiplied by 100, provides a scale in which 100 percent equals high gloss and 0 equals zero gloss. On this scale raw cottons of the upland type usually measure within the range of 55 to 65 percent, grey yarns measure approximately 30 to 40 percent, and mercerized yarns generally range from 40 to 50 percent luster.

Strength tests were also made on 25 skeins for each combed yarn lot after being mercerized. As previously indicated, the results of these strength tests were published along with the comparable grey yarn strength results in Agriculture Information Bulletin No. 152 (12).

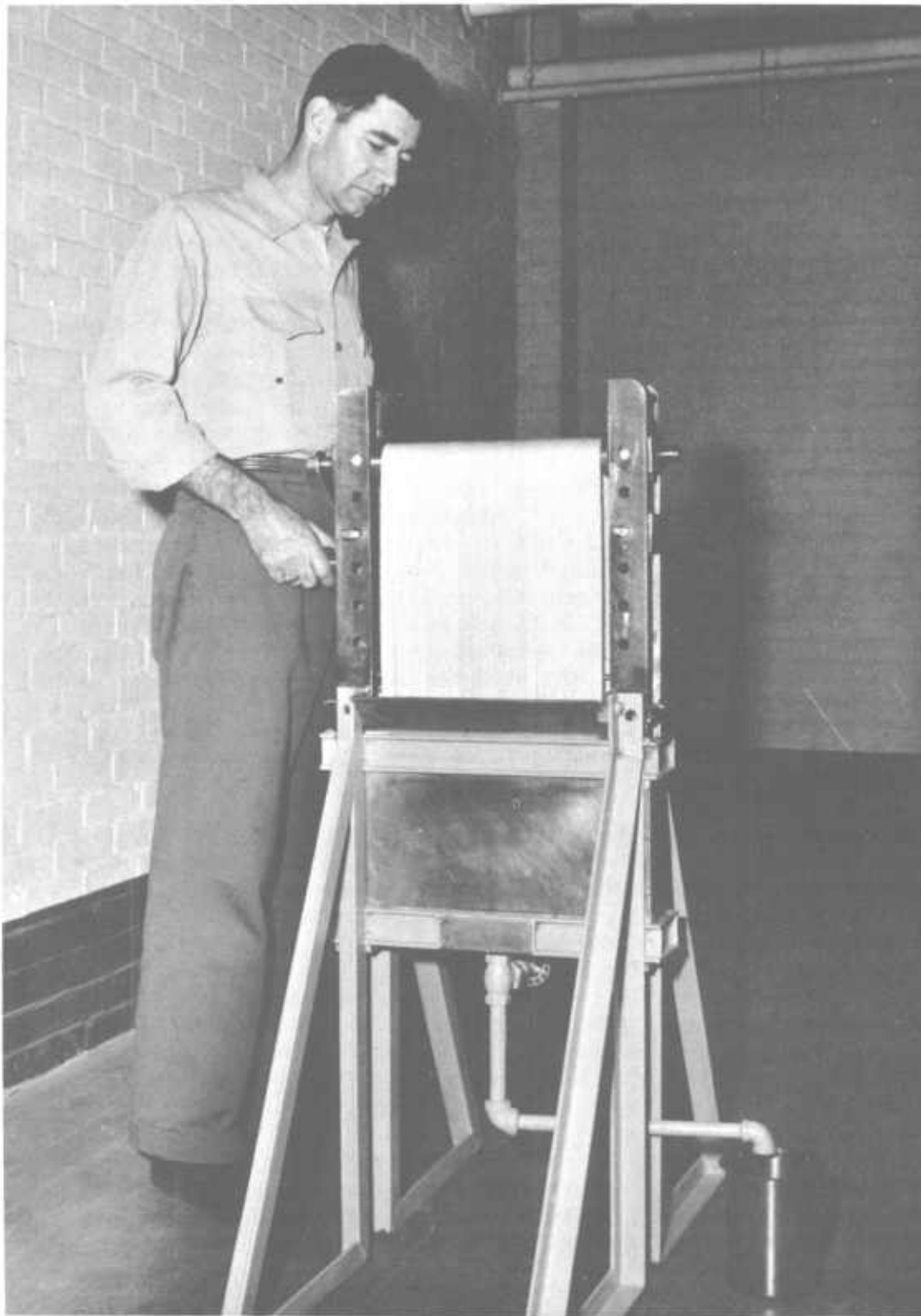


Figure 2.--Equipment used for applying small scale mercerization tests to skeins of cotton yarn.

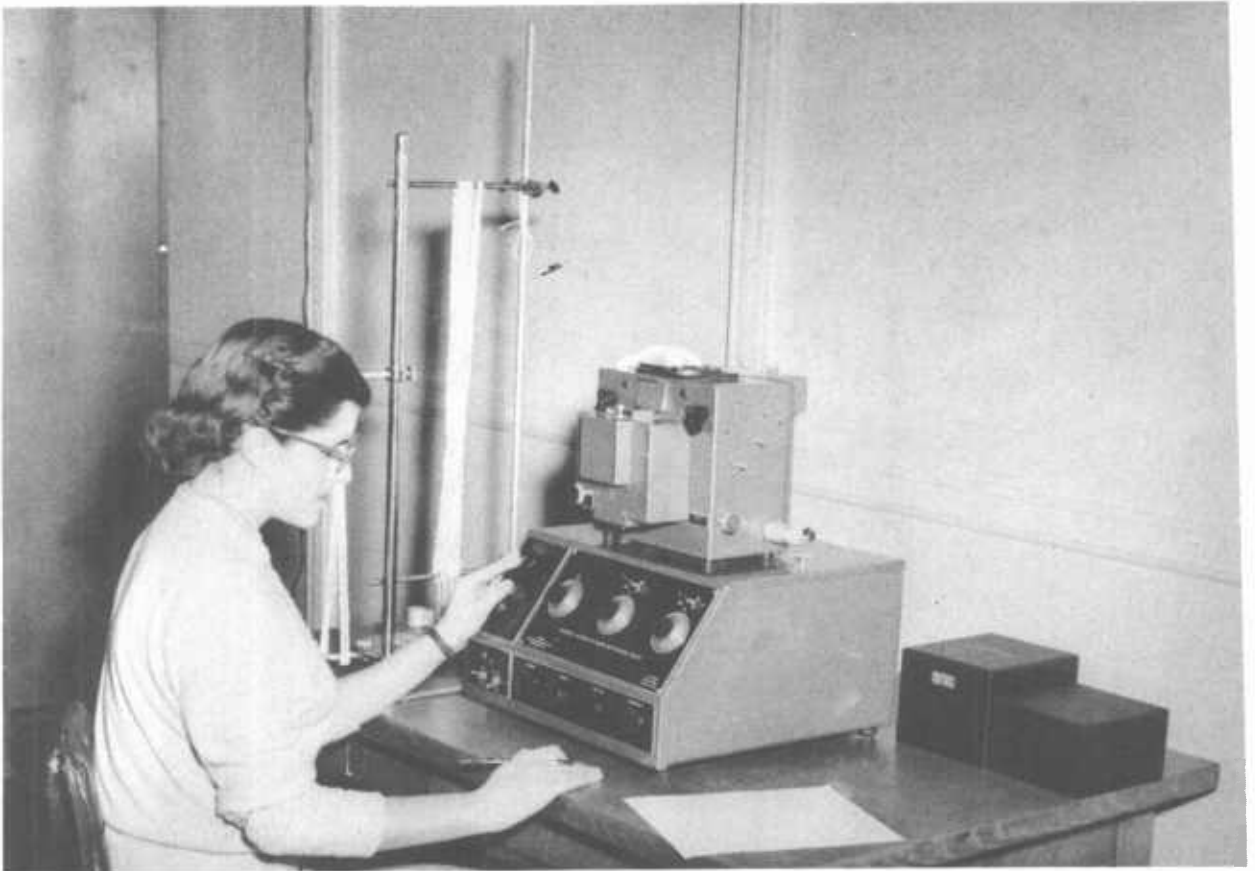


Figure 3.--The Gardner Automatic Color Difference meter used for measuring color of grey (natural), bleached and dyed cotton yarn.

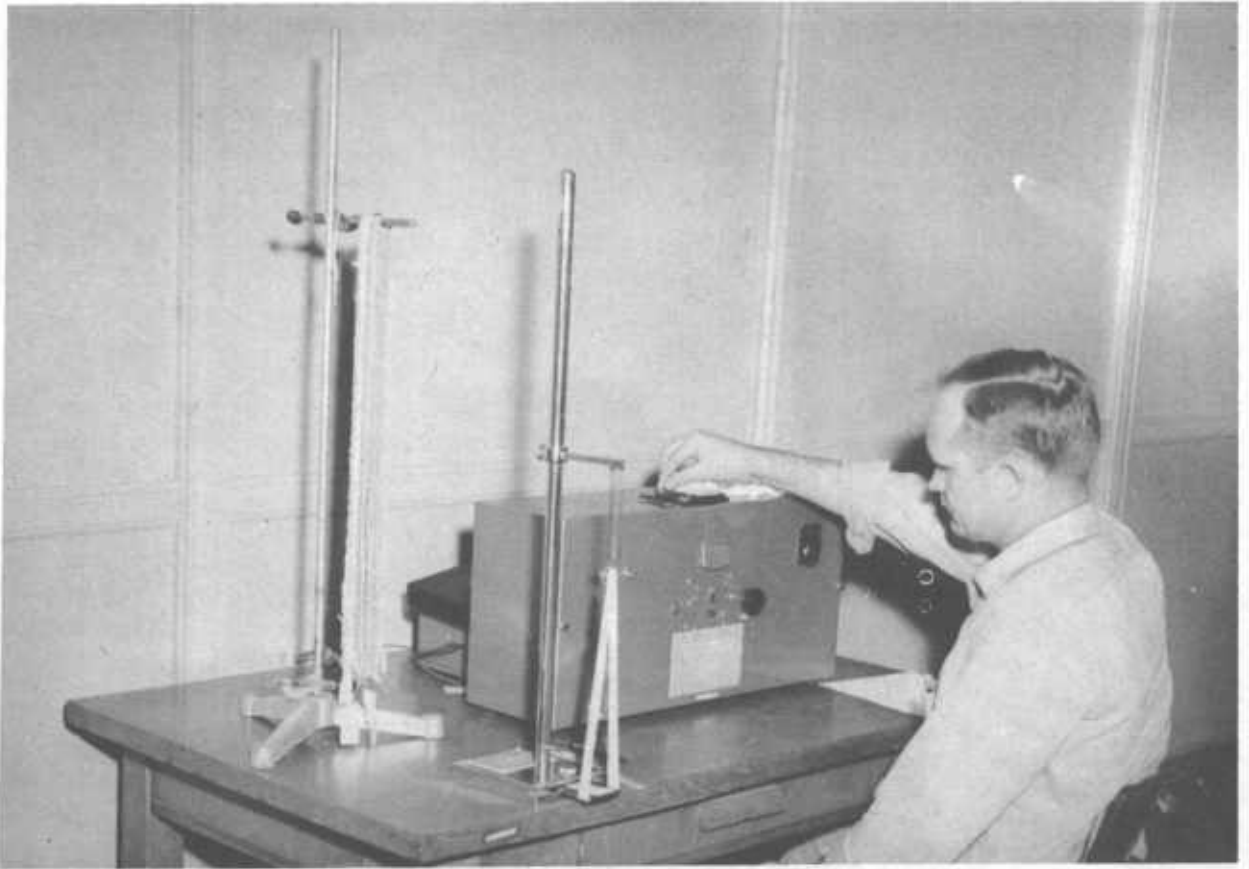


Figure 4.--The Hunterlab Cotton Lustermeter used for measuring luster of raw cotton, grey (natural), cotton yarn and mercerized cotton yarn.

Test Results and Analyses

Results of color and luster measurements on yarns processed from specified varieties of cotton grown in designated market areas in 1955 are shown in tables 1 through 5. Table 1 includes measurements of yarns spun from short and medium length upland cottons processed at card production rates of 12-1/2 and 9-1/2 pounds per hour. Values shown are those for 22s carded yarn. Table 2 gives color and luster values for longer staple upland cottons, those processed at a card production rate of 6-1/2 pounds per hour and spun into carded and combed 22s and 50s yarns. Color measurements of grey (natural) and finished 22s carded yarns and luster measurements of 50s combed yarns in the grey and mercerized states have been tabulated. Table 3 lists color and luster results for combed American Egyptian cottons processed at a card production rate of 4-1/2 pounds per hour. The color values shown in this table are for 50s combed yarns, and the luster values represent grey and mercerized 50s combed yarn. Table 4 summarizes by variety the color and luster values given in table 1. Table 5 is a summary of varietal averages for cottons shown in tables 2 and 3. Because luster measurements were made on all raw cotton samples in connection with the 1955 crop study, these values are also reported in tables 1 to 5.

Differences in the color of grey, bleached, or dyed yarns among various qualities of cotton were pronounced and easily discernible. The grade of the raw cotton, or the color of grey yarn, was the dominant factor affecting the color of the finished material, particularly when dyed in the grey. When the material was bleached and then dyed, fiber fineness and maturity were also found to be important factors in determining the level of color. Coarse fibers showed more color change in the blueness factor and less change in reflectance than fine fibered cottons of otherwise similar quality. The relative positions of cottons in the color space were maintained generally throughout the grey, bleached and dyed, and grey dyed states. High grade cottons bleached whiter and dyed bluer than low grade cottons. Differences in color change from the grey to the dyed state varied as much as 50 percent among high and low grade cottons and as much as 10 percent among coarse and fine fibered cotton.

Bleaching before dyeing reduced the spread among dyed yarns by about 50 percent. But despite this reduction, significant differences remained. Bleaching also resulted in a deepened shade of the dyed material because during the bleaching process waxes, pigments, and foreign material were removed permitting better dye penetration.

Luster measurements did not exhibit the marked differences among cotton qualities that were found in the color measurements. For a given botanical type of cotton, these values fell into a very restricted range, and there seems to be no close association between luster and grade of raw cotton or between fiber properties. However, American Egyptian cottons have higher luster than upland cottons, and mercerized yarns have more luster than grey yarns. Combing also increased luster so direct comparison should not be made between the results in table 1 and those in table 2.

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey		Bleached		Dyed				Raw	Carded
	R _d 3/	+b 4/	R _d 3/	+b 4/	In grey		After bleaching		Cotton	yarn (grey)
				R _d 3/	-b 5/	R _d 3/	-b 5/	Percent	Percent	
Acala 4-42										
California										
Bakersfield										
Early.....	74.2	10.6	83.6	2.6	22.7	22.5	25.9	27.6	59	30
Midseason.....	74.4	10.2	82.5	2.5	23.6	21.8	27.0	26.6	59	31
Late.....	72.1	10.5	81.2	2.8	23.8	21.5	27.0	25.9	61	29
Blythe										
Early.....	72.6	10.4	82.6	2.4	25.4	21.0	27.6	26.4	60	30
Midseason.....	73.4	11.0	83.6	2.8	23.8	22.0	27.0	26.2	60	31
Late.....	74.4	10.8	84.9	2.6	24.8	20.9	27.0	25.8	60	29
Corcoran										
Early.....	74.5	10.6	81.6	2.4	23.2	22.3	25.8	26.2	60	31
Midseason.....	74.0	10.4	84.6	2.4	23.4	22.1	25.7	27.6	59	30
Late.....	70.4	10.4	82.5	2.9	23.6	21.1	26.6	26.0	60	30
El Centro										
Early.....	73.4	10.6	81.9	2.8	24.4	22.2	26.4	25.8	60	31
Midseason.....	71.6	10.2	83.0	2.9	23.9	21.3	27.5	26.1	61	32
Late.....	71.0	10.5	83.6	3.0	25.0	20.5	27.8	25.4	61	31
Firebaugh										
Early.....	75.1	10.6	82.6	2.9	22.0	23.7	26.5	26.6	60	30
Midseason.....	71.4	10.3	82.9	3.0	22.5	21.6	25.8	26.5	59	31
Late.....	72.8	9.8	82.3	2.8	24.5	21.2	26.7	25.7	60	31
Madera										
Early.....	72.8	10.6	81.1	3.0	23.2	21.9	27.2	26.2	59	31
Midseason.....	73.4	10.2	83.3	2.4	23.4	22.2	26.8	26.0	59	30
Late.....	69.2	9.6	81.7	2.8	25.6	19.6	28.1	25.6	60	31
Tulare										
Early.....	72.6	11.0	82.0	2.6	24.0	21.4	26.2	26.0	59	29
Midseason.....	70.8	10.2	82.2	3.0	23.3	21.2	26.8	26.6	58	31
Late.....	70.6	10.7	82.8	3.1	24.0	20.8	27.6	25.6	59	30
A-44										
Arizona										
Buckeye										
Early.....	71.3	11.6	83.5	2.9	22.9	21.0	26.4	26.9	60	31
Midseason.....	70.4	11.0	82.8	3.0	24.0	20.4	27.2	26.2	60	31
Late.....	69.6	11.2	83.2	2.7	22.8	20.6	25.9	26.6	61	31
Chandler										
Early.....	71.6	11.4	83.9	3.0	23.5	21.4	27.0	26.1	59	31
Midseason.....	71.6	11.2	84.4	2.9	23.8	21.2	26.0	26.3	60	29
Late.....	71.1	11.0	83.4	2.7	23.6	20.8	27.1	25.7	61	30
Eloy										
Early.....	70.2	11.7	82.8	3.4	23.4	21.2	26.7	26.0	58	31
Midseason.....	71.9	11.0	84.0	2.7	22.4	21.9	27.0	26.8	59	29
Late.....	70.8	11.2	83.4	3.0	23.6	20.8	27.2	25.8	60	31
Phoenix										
Early.....	69.7	11.2	81.6	3.2	23.0	21.2	25.9	26.1	59	31
Midseason.....	71.6	11.0	84.0	2.6	23.0	21.0	26.4	26.4	59	30
Late.....	70.6	11.0	82.4	2.9	23.6	20.2	26.8	25.1	61	31
Yuma										
Early.....	70.2	11.4	82.8	3.0	23.8	20.6	26.9	26.1	60	30
Midseason.....	71.7	11.2	80.8	3.2	24.3	20.7	27.4	26.0	61	32
Late.....	71.6	11.2	82.5	2.6	23.6	21.2	26.5	26.2	61	30
Bobshaw 1-A										
Mississippi										
Indianola										
Early.....	71.1	11.8	82.4	3.0	22.0	22.0	25.9	27.0	60	32
Midseason.....	66.5	10.4	80.4	2.9	25.9	18.5	29.0	24.9	60	32
Late.....	-	-	-	-	-	-	-	-	-	-
Coker 100 W										
Alabama										
Huntsville										
Early.....	71.9	11.5	83.0	3.0	23.6	21.0	26.6	26.1	59	31
Midseason.....	72.2	11.2	81.8	2.6	25.4	20.2	27.6	26.2	59	31
Late.....	71.0	10.4	82.6	3.2	25.7	20.0	27.6	25.7	60	31
Thomasville										
Early.....	71.0	10.8	84.2	2.4	24.2	21.6	26.4	27.1	58	31
Midseason.....	70.2	11.0	82.0	3.3	25.1	20.1	26.7	26.3	58	31
Late.....	69.4	10.9	81.4	3.3	27.0	18.6	29.2	24.8	57	31
Troy										
Early.....	71.6	11.6	83.2	3.4	23.7	21.2	26.1	27.0	58	31
Midseason.....	69.7	10.9	83.2	3.4	24.2	20.5	26.4	26.4	58	31
Late.....	69.0	10.6	81.6	3.2	25.0	20.1	28.2	25.2	59	30
Wetumpka										
Early.....	70.6	11.4	82.4	2.7	23.8	21.6	25.7	27.2	58	31
Midseason.....	69.1	10.9	84.0	3.0	25.4	20.4	27.4	25.5	58	29
Late.....	73.0	10.9	82.8	2.4	26.2	20.3	28.8	25.2	58	31

Continued on page 21

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey		Bleached		Dyed				Raw Cotton Percent	22s Carded Yarn (grey) Percent
	Rd 3/	+b 4/	Rd 3/	+b 4/	In grey		After bleaching			
	Rd 3/	+b 4/	Rd 3/	+b 4/	Rd 3/	-b 5/	Rd 3/	-b 5/		
Coker 100 W (Continued)										
Georgia										
Arlington										
Early.....	70.2	11.4	82.4	2.4	24.0	20.7	26.1	27.2	59	33
Midseason.....	69.2	10.7	82.4	2.8	25.9	19.4	27.1	25.6	60	32
Late.....	67.3	10.9	83.0	3.4	26.2	18.8	28.5	25.3	59	32
Baxley										
Early.....	70.0	11.0	82.4	2.5	24.6	20.5	27.1	26.9	59	32
Midseason.....	66.8	10.4	81.9	2.8	26.6	18.6	28.2	24.8	58	32
Late.....	65.0	10.9	81.8	3.2	26.5	18.4	29.3	24.6	57	31
Cartersville										
Early.....	72.2	11.0	82.1	2.8	22.3	21.8	26.2	26.6	60	31
Midseason.....	70.6	11.2	82.8	3.6	25.7	19.6	28.6	24.6	59	31
Late.....	68.6	10.4	79.7	4.2	26.0	18.9	28.6	24.1	58	32
Jonesboro										
Early.....	71.0	11.5	83.1	2.8	24.6	20.4	26.7	26.1	60	31
Midseason.....	70.6	12.0	83.1	3.0	24.4	20.6	26.4	25.9	58	32
Late.....	70.2	11.1	81.9	3.4	25.8	19.4	28.4	25.6	60	32
Madison										
Early.....	69.3	11.2	82.0	3.5	23.5	20.7	26.4	26.6	57	32
Midseason.....	67.3	12.4	79.2	5.9	24.5	18.8	27.0	24.4	59	33
Late.....	69.2	10.9	81.1	4.0	26.8	19.2	28.8	24.6	59	30
Sandersville										
Early.....	70.2	11.7	83.8	2.8	24.0	20.3	25.5	27.0	55	32
Midseason.....	67.6	11.5	82.7	3.2	26.5	18.2	28.4	24.5	59	32
Late.....	66.4	10.5	82.2	3.0	26.6	18.7	29.8	24.5	57	30
Mississippi										
Beathman										
Early.....	72.7	11.6	83.0	3.0	22.8	22.2	26.6	26.5	59	30
Midseason.....	67.8	10.6	81.7	2.6	26.3	18.8	28.7	25.0	58	30
Late.....	66.8	9.8	79.8	3.4	27.4	18.4	29.9	23.6	59	32
North Carolina										
Monroe										
Early.....	70.2	11.0	82.0	3.0	23.8	20.6	26.4	26.2	55	31
Midseason.....	67.8	11.4	82.8	4.0	26.5	18.4	28.4	24.9	58	32
Late.....	69.0	11.0	81.4	3.4	26.6	18.6	29.8	24.2	57	32
Rae ford										
Early.....	65.6	10.4	79.8	3.2	27.3	17.7	28.7	25.2	57	31
Midseason.....	65.2	9.6	82.3	2.8	28.0	17.6	30.4	24.2	58	32
Late.....	63.0	9.3	81.0	2.6	28.5	16.0	30.6	24.1	57	32
Scotland Neck										
Early.....	64.1	10.4	79.9	2.8	25.0	18.4	27.8	25.8	58	33
Midseason.....	63.5	9.8	82.4	3.0	26.8	17.0	28.4	25.4	59	32
Late.....	62.3	10.1	82.0	3.0	26.5	16.6	29.6	24.9	58	32
South Carolina										
Allendale										
Early.....	71.1	11.2	81.9	2.6	24.6	20.4	27.0	26.4	59	32
Midseason.....	66.1	11.6	83.6	2.9	27.7	17.7	30.7	24.0	57	32
Late.....	63.6	10.4	83.1	3.4	27.8	15.6	29.9	24.3	57	31
Chester										
Early.....	70.5	11.1	83.0	2.9	23.8	21.1	25.9	26.5	58	32
Midseason.....	72.6	11.6	82.4	2.6	24.1	22.0	26.6	26.8	56	30
Late.....	69.4	10.3	81.3	3.0	27.6	18.9	30.2	24.4	57	32
Dillon										
Early.....	60.9	9.7	80.7	3.4	25.4	17.1	28.5	25.0	59	32
Midseason.....	63.2	9.6	79.6	3.0	27.0	17.4	29.0	24.6	58	32
Late.....	62.0	9.4	81.3	3.0	27.6	16.6	30.0	24.8	57	32
Westminster										
Early.....	69.2	11.4	79.6	4.0	23.2	20.2	26.2	26.1	59	32
Midseason.....	71.8	11.0	81.9	2.8	23.3	21.6	26.6	26.1	58	32
Late.....	71.2	10.8	81.1	4.0	24.9	20.2	27.2	25.3	58	32
Deltapine 15										
Alabama										
Florence										
Early.....	72.0	11.4	83.2	3.0	22.6	21.6	26.6	26.2	58	31
Midseason.....	71.8	11.4	82.6	2.6	25.0	19.8	26.9	26.2	59	31
Late.....	71.2	11.0	83.1	3.0	25.4	19.8	27.9	25.5	57	30
Sulligent										
Early.....	71.3	11.0	82.2	2.8	23.4	21.0	27.0	25.8	59	31
Midseason.....	72.4	11.3	84.4	2.8	25.3	19.6	27.7	25.4	57	32
Late.....	70.9	10.8	83.8	2.8	25.4	20.1	28.2	25.5	59	30
Arkansas										
Blytheville										
Early.....	72.2	11.8	83.8	3.1	21.7	22.1	25.7	27.2	59	31
Midseason.....	67.8	10.4	80.6	3.0	25.5	19.5	28.6	25.2	58	31
Late.....	64.2	9.4	76.9	3.4	24.9	17.9	28.6	23.4	60	32

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey		Bleached		In grey		Dyed		Raw Cotton	22s Carded yarn (grey)
	R _a 3/	+b 4/	R _a 3/	+b 4/	R _a 3/	-b 5/	R _a 3/	-b 5/	Percent	Percent
Deltapine 15 (Continued)										
Arkansas										
Bradley										
Early.....	72.1	11.8	81.3	3.2	22.2	22.0	26.0	26.8	59	32
Midseason.....	68.3	11.4	83.7	3.6	26.0	18.8	27.4	26.4	59	32
Late.....	68.6	10.6	82.2	3.2	27.1	18.2	29.6	25.2	59	31
Marianna										
Early.....	71.3	11.0	81.2	3.0	22.2	21.6	26.2	26.0	59	31
Midseason.....	71.4	11.1	82.8	3.2	25.4	20.3	28.6	25.8	59	31
Late.....	68.7	10.2	82.7	2.8	27.0	19.0	29.2	25.0	60	30
Marion										
Early.....	72.6	11.0	83.0	2.7	22.0	22.6	25.2	27.6	59	31
Midseason.....	68.6	10.8	82.8	2.6	25.0	18.6	27.5	25.4	59	32
Late.....	65.6	9.8	79.2	3.4	25.4	18.2	28.6	24.8	60	31
Marked Tree										
Early.....	72.8	11.9	83.6	3.0	22.3	21.6	25.8	27.3	62	32
Midseason.....	70.7	10.6	80.4	3.2	24.3	20.6	27.6	26.0	60	32
Late.....	65.5	10.0	78.3	3.0	25.1	18.0	29.1	24.7	62	32
Pine Bluff										
Early.....	70.8	12.0	81.9	3.2	22.7	21.3	25.4	26.9	60	31
Midseason.....	67.9	11.0	81.7	3.3	25.0	19.1	27.8	25.8	58	32
Late.....	68.7	11.1	81.1	2.8	25.8	18.6	28.8	25.0	59	30
Louisiana										
Bossier City										
Early.....	72.3	11.8	82.7	3.2	22.4	22.0	26.2	26.6	59	32
Midseason.....	70.2	11.6	82.3	3.3	23.7	21.2	27.3	26.4	56	31
Late.....	68.8	10.7	82.6	3.1	26.1	20.0	28.6	25.5	57	30
Cheneyville										
Early.....	66.3	11.5	83.1	3.4	22.7	20.6	26.2	26.4	58	31
Midseason.....	64.5	11.4	79.8	3.2	23.7	19.0	27.2	25.4	58	32
Late.....	68.5	10.4	81.8	3.0	24.4	20.3	28.2	25.2	57	31
Lake Providence										
Early.....	73.4	11.6	83.8	3.2	23.3	21.6	26.2	26.6	59	31
Midseason.....	70.9	11.1	82.3	2.4	26.1	19.8	27.8	25.6	58	30
Late.....	70.1	10.8	83.8	2.8	26.7	19.6	28.8	25.6	59	29
Mer Rouge										
Early.....	71.8	11.9	82.9	3.0	22.7	21.8	25.8	26.8	58	31
Midseason.....	71.4	10.9	82.5	2.4	25.9	20.3	27.8	25.4	58	31
Late.....	71.2	10.6	83.5	2.8	27.0	19.0	29.0	25.8	57	29
Natchitoches										
Early.....	70.6	11.8	80.9	3.2	23.7	21.2	27.0	26.0	59	30
Midseason.....	68.6	11.2	80.4	3.0	25.0	19.8	28.0	24.9	58	31
Late.....	65.9	11.1	80.8	3.0	26.1	18.0	29.2	25.6	57	30
Tallulah										
Early.....	68.7	11.0	84.2	3.0	24.3	19.7	26.8	26.1	59	31
Midseason.....	68.0	10.3	83.2	2.6	25.4	19.4	28.0	24.8	57	30
Late.....	70.4	10.7	82.0	2.8	27.0	18.9	28.8	25.4	58	29
Ville Platte										
Early.....	69.8	11.6	82.8	3.5	23.0	21.2	25.1	26.8	60	32
Midseason.....	70.4	11.4	81.8	2.6	22.8	21.4	25.8	27.4	60	31
Late.....	70.4	11.6	82.7	3.3	24.8	20.2	28.0	26.0	59	32
Winnsboro										
Early.....	71.4	11.7	82.3	3.0	22.8	21.8	26.4	26.6	59	30
Midseason.....	68.6	11.0	82.8	2.8	26.8	19.4	28.6	25.1	59	31
Late.....	68.7	11.3	83.2	2.8	27.4	18.6	29.5	25.2	60	31
Missouri										
Caruthersville										
Early.....	74.0	11.5	83.0	3.2	22.7	22.6	25.7	26.5	60	30
Midseason.....	70.7	11.0	82.6	3.0	24.6	20.3	26.8	26.2	58	31
Late.....	71.2	10.7	82.6	2.6	25.0	20.2	27.3	26.3	60	30
Mississippi										
Aberdeen										
Early.....	72.9	12.0	83.3	3.5	23.3	21.4	26.8	25.3	59	32
Midseason.....	70.2	11.2	82.1	3.2	25.1	19.4	28.0	26.0	59	30
Late.....	71.0	10.7	82.6	2.8	26.2	19.2	29.6	25.6	59	30
Belzoni										
Early.....	72.1	12.0	83.0	3.2	22.4	21.9	26.1	26.8	59	30
Midseason.....	72.0	10.2	83.7	2.4	26.0	20.6	27.7	25.9	59	31
Late.....	72.8	10.4	81.2	2.7	26.2	20.8	29.1	25.0	59	30
Clarksdale										
Early.....	71.1	11.8	83.0	3.2	22.6	21.2	26.4	26.3	60	32
Midseason.....	67.6	11.2	80.8	3.4	25.5	19.2	28.2	25.5	60	32
Late.....	68.8	10.5	80.2	3.2	25.3	19.8	29.1	24.5	59	31

Continued on page 13

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey				Dyed				Raw Cotton	22s Carded yarn (grey)
	Rd 3/	+b 4/	Bleached Rd 3/	+b 4/	In grey Rd 3/	-b 5/	After bleaching Rd 3/	-b 5/		
Deltapine 15 (Continued)										
Mississippi										
Doddsville										
Early.....	72.3	12.1	82.9	3.4	23.0	21.6	27.5	25.7	60	32
Midseason.....	69.6	10.4	82.0	2.8	26.1	19.4	27.7	25.4	60	30
Late.....	69.6	10.3	79.2	3.0	26.5	19.2	29.4	24.8	61	31
Fayette										
Early.....	69.8	12.2	81.7	3.2	22.1	21.5	25.0	26.8	60	31
Midseason.....	71.2	11.8	84.4	3.4	22.8	21.0	26.2	26.8	58	30
Late.....	69.0	11.8	82.6	3.2	24.2	20.3	27.4	25.4	60	30
Greenville										
Early.....	72.5	11.6	82.6	3.1	24.0	21.4	27.1	25.8	60	31
Midseason.....	65.0	10.6	80.4	3.2	25.3	18.2	28.1	25.2	58	33
Late.....	65.3	10.6	82.9	3.0	26.8	17.1	30.3	24.2	60	32
Macon										
Early.....	71.4	11.9	83.0	3.0	23.0	21.5	25.6	26.7	60	32
Midseason.....	71.8	11.4	84.4	3.0	24.2	20.8	26.2	27.0	57	30
Late.....	70.7	11.1	82.5	3.2	25.1	20.1	27.5	25.5	58	31
Magee										
Early.....	72.0	11.6	84.0	3.2	21.8	22.4	25.0	27.1	58	32
Midseason.....	72.7	11.8	84.8	3.3	22.8	21.2	26.6	25.6	58	31
Late.....	70.0	11.5	81.2	3.3	24.5	20.4	28.4	25.4	58	31
Senatobia										
Early.....	71.6	11.8	81.4	3.5	22.6	22.0	26.0	26.7	59	31
Midseason.....	69.6	11.2	81.0	3.2	23.3	20.8	26.8	26.4	59	32
Late.....	71.4	11.0	82.1	3.2	24.7	20.2	28.4	25.8	59	29
Tennessee										
Brownsville										
Early.....	72.2	11.9	82.7	3.2	22.0	21.8	25.8	26.5	59	30
Midseason.....	71.2	11.3	82.2	3.0	23.8	20.4	26.4	26.3	58	32
Late.....	70.9	11.0	83.0	3.1	24.7	19.0	27.2	26.2	58	30
Covington										
Early.....	72.6	12.0	83.5	2.8	21.6	21.9	25.1	26.9	61	32
Midseason.....	72.2	11.3	82.7	3.4	24.2	19.6	26.3	26.4	58	31
Late.....	71.0	10.6	81.4	3.4	24.4	19.8	27.7	25.6	58	30
Millington										
Early.....	72.0	11.7	83.8	3.0	21.0	22.4	24.9	27.4	61	32
Midseason.....	70.2	10.4	82.3	2.5	24.8	20.0	26.2	26.2	60	31
Late.....	72.2	10.9	81.8	3.2	24.1	20.7	28.2	25.8	59	32
Wynburg										
Early.....	73.3	11.3	83.4	2.7	22.4	22.4	25.0	27.1	59	31
Midseason.....	69.8	11.4	82.3	3.0	23.0	20.8	26.4	26.5	59	33
Late.....	71.2	10.4	81.4	3.0	25.0	20.6	28.6	25.8	59	30
Texas										
Brownsville										
Early.....	73.6	11.6	83.6	3.1	22.6	23.0	25.6	26.6	58	30
Midseason.....	72.7	11.4	84.2	3.4	23.6	22.0	26.8	26.9	59	30
Late.....	71.6	11.3	83.3	3.3	25.4	20.7	27.4	26.4	60	31
Calvert										
Early.....	67.4	13.4	83.1	4.2	24.3	18.0	28.1	25.0	57	32
Midseason.....	70.9	12.5	83.0	3.4	24.4	19.6	27.8	25.6	59	31
Late.....	70.3	11.6	82.4	4.0	28.0	18.0	29.7	24.8	60	31
De Kalb										
Early.....	71.5	11.8	82.6	3.2	23.6	20.8	26.1	26.5	59	32
Midseason.....	72.4	11.9	82.0	3.1	24.4	20.8	26.0	26.9	58	30
Late.....	68.4	11.4	82.0	3.6	25.5	19.4	29.1	24.8	60	31
Lyford										
Early.....	72.0	12.0	83.4	3.1	23.4	21.7	27.4	26.4	59	30
Midseason.....	69.2	11.6	82.3	3.4	24.4	20.1	27.6	25.4	59	31
Late.....	68.4	11.9	81.8	3.6	25.7	18.8	27.5	25.9	61	31
Munday										
Early.....	68.0	12.4	81.0	4.3	24.2	18.6	26.7	25.9	60	33
Midseason.....	70.0	11.6	82.8	3.6	23.0	21.2	26.8	26.5	57	32
Late.....	69.9	11.8	81.5	3.0	20.6	21.0	25.0	27.4	60	31
Navasota										
Early.....	70.3	13.0	80.8	3.6	25.0	18.4	28.2	25.7	59	32
Midseason.....	71.0	12.0	83.2	3.4	25.4	19.6	28.6	25.2	59	31
Late.....	71.3	11.5	84.0	3.2	25.0	20.0	27.5	25.3	60	30
Port Lavaca										
Early.....	72.6	12.2	84.2	3.2	23.4	21.2	26.8	27.0	58	30
Midseason.....	71.4	12.0	84.1	3.4	24.9	19.5	27.8	26.1	59	30
Late.....	70.2	11.6	82.0	3.4	26.0	19.2	29.5	25.1	60	30

Continued on page 14

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area, and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey		Bleached		In grey		After bleaching		Raw Cotton	22s Carded yarn (grey)
	R _d 3/	+b 4/	R _d 3/	+b 4/	R _d 3/	-b 5/	R _d 3/	-b 5/	Percent	Percent
Deltapine 15 (Continued)										
Texas										
Sugarland										
Early.....	72.3	11.9	83.5	3.6	24.2	21.0	26.8	26.7	59	32
Midseason.....	72.8	11.7	82.4	3.1	25.1	20.8	28.2	26.0	60	31
Late.....	70.0	11.3	80.8	3.4	27.1	18.8	28.7	25.3	59	31
Deltapine Fox										
Mississippi										
Gunnison										
Early.....	70.8	11.5	81.8	3.3	22.5	21.0	24.8	27.7	60	31
Midseason.....	66.2	10.8	80.3	3.4	25.1	19.4	28.7	25.0	58	32
Late.....	66.8	10.0	81.7	2.8	26.8	18.8	29.6	24.9	57	30
Missouri										
Hayti										
Early.....	73.0	11.3	82.4	3.0	22.2	23.0	26.0	27.0	60	31
Midseason.....	69.1	10.8	81.4	3.4	25.1	19.2	27.4	25.6	58	30
Late.....	69.1	10.2	82.3	2.9	26.6	18.4	29.6	24.8	58	30
Deltapine TPSA										
Texas										
Danevang										
Early.....	71.5	11.7	82.6	3.4	23.9	21.6	26.2	26.8	58	31
Midseason.....	68.2	11.7	81.8	3.4	23.8	19.8	27.9	24.8	58	31
Late.....	65.8	11.0	80.2	3.4	25.8	18.0	28.8	25.0	61	32
Edcouch										
Early.....	71.8	11.7	82.0	3.2	23.8	21.6	26.4	26.7	58	30
Midseason.....	71.6	11.3	82.0	3.1	24.1	21.1	26.6	26.2	58	30
Late.....	72.4	11.8	82.0	3.0	24.2	21.4	27.7	26.2	60	31
Weslaco										
Early.....	72.1	11.6	82.8	3.0	23.2	21.5	27.0	26.6	57	31
Midseason.....	73.3	12.0	82.2	3.0	24.2	21.6	26.4	25.9	58	29
Late.....	73.0	11.6	82.5	3.1	25.4	21.4	26.3	26.6	59	30
Delfos 9169										
Texas										
Corpus Christi										
Early.....	72.5	11.8	83.6	3.4	23.6	21.2	27.4	25.8	58	31
Midseason.....	70.4	12.1	81.8	3.3	24.2	20.0	27.0	25.6	58	29
Late.....	72.8	12.2	81.6	3.1	24.2	21.0	27.8	25.5	60	29
Empire										
Georgia										
Buchanan										
Early.....	71.2	11.3	80.7	2.8	24.0	20.2	27.0	26.3	60	31
Midseason.....	73.2	11.2	82.6	3.2	24.6	20.6	27.2	25.5	59	32
Late.....	71.8	11.1	81.9	3.6	23.8	20.2	27.1	25.8	59	32
Fayetteville										
Early.....	72.0	11.3	84.0	2.7	24.2	21.0	26.8	25.8	59	31
Midseason.....	71.3	11.4	84.4	3.0	24.2	20.6	27.0	26.2	60	32
Late.....	71.0	11.2	84.0	3.4	25.0	20.0	27.6	26.0	59	30
Hibred										
Oklahoma										
Davidson										
Early.....	70.4	12.6	82.2	3.7	21.6	21.2	25.0	26.9	59	30
Midseason.....	64.3	12.1	82.0	4.2	23.9	18.8	27.0	25.4	57	30
Late.....	65.0	11.6	81.0	4.0	23.8	18.0	26.7	26.0	57	31
Lankart 57										
Oklahoma										
Altus										
Early.....	66.9	11.7	81.2	3.6	22.8	20.2	26.0	26.4	56	31
Midseason.....	64.7	12.5	82.6	3.7	22.1	17.7	26.8	25.6	57	31
Late.....	60.1	13.8	84.3	3.5	20.1	13.7	25.0	25.8	58	31
Clinton										
Early.....	67.4	12.2	82.0	3.6	22.4	19.3	26.5	25.4	58	31
Midseason.....	67.1	12.4	81.2	4.0	23.0	19.5	26.8	26.3	58	31
Late.....	65.0	12.6	82.9	3.4	20.9	17.6	25.2	26.4	59	31
Mangum										
Early.....	69.5	12.2	82.9	3.4	21.8	20.5	26.6	26.2	59	31
Midseason.....	67.3	11.8	82.4	3.2	23.0	19.5	27.0	26.4	58	30
Late.....	65.7	12.0	81.4	4.0	22.3	18.4	26.4	25.9	58	31
Texas										
Cooper										
Early.....	69.4	12.1	81.2	3.2	22.6	20.4	26.4	27.0	58	31
Midseason.....	71.2	11.6	81.9	2.9	23.7	20.0	27.0	26.5	58	31
Late.....	66.6	11.2	83.2	2.6	25.9	18.6	29.0	26.2	59	30

Continued on page 15

Table 1.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/	
	Grey		Bleached		In grey		Dyed		Raw Cotton	22s Carded yarn (grey)
	R _d 3/	+b 4/	R _d 3/	+b 4/	R _d 3/	-b 5/	R _d 3/	-b 5/	Percent	Percent
Lankart 57 (Continued)										
Texas										
Hillsboro										
Early.....	67.8	12.3	82.2	3.2	23.8	19.6	27.7	25.5	57	31
Midseason.....	67.5	12.5	80.6	3.3	23.5	18.6	27.0	25.8	59	31
Late.....	65.6	11.8	79.6	4.2	25.7	17.4	28.8	24.9	57	32
Lubbock										
Early.....	63.5	11.6	82.1	3.9	23.4	19.3	26.8	25.6	56	31
Midseason.....	69.0	11.8	81.9	3.0	22.1	21.0	26.0	26.2	54	29
Late.....	64.0	12.6	83.5	3.1	21.0	16.9	25.0	26.2	57	29
Stamford										
Early.....	67.0	12.0	81.2	4.2	23.2	19.3	27.9	25.9	57	32
Midseason.....	69.2	12.1	81.8	3.2	23.4	19.7	26.4	26.1	57	30
Late.....	67.0	11.8	81.9	3.5	23.9	19.0	26.7	26.6	58	30
Taft										
Early.....	71.6	12.2	82.4	2.8	22.0	21.4	25.7	27.0	56	30
Midseason.....	69.8	12.2	83.3	3.2	23.6	20.2	26.0	26.3	56	29
Late.....	70.6	12.4	82.2	3.2	23.4	20.4	26.2	26.4	57	30
Waco										
Early.....	69.2	12.3	83.0	3.2	24.4	19.0	27.6	26.0	58	30
Midseason.....	70.2	12.3	83.3	3.1	24.0	20.4	26.7	26.4	59	30
Late.....	66.4	11.7	80.5	3.4	26.2	17.5	28.8	24.7	58	30
Lankart 611										
Texas										
Idalou										
Early.....	63.6	12.3	80.2	4.0	23.1	19.3	27.2	25.5	57	32
Midseason.....	69.3	11.4	82.0	3.5	21.5	21.4	25.6	26.3	54	29
Late.....	62.4	12.4	82.1	3.4	21.4	16.2	25.3	25.9	56	30
Lockett SP-1										
Texas										
Lubbock										
Early.....	65.6	11.8	81.6	4.4	23.8	19.0	27.3	24.9	57	30
Midseason.....	69.2	11.3	82.6	2.8	21.4	20.8	25.4	27.2	55	28
Late.....	-	-	-	-	-	-	-	-	-	-
Northern Star										
Texas										
O'Brien										
Early.....	69.0	12.1	83.1	3.2	22.0	20.5	25.8	27.1	60	31
Midseason.....	69.6	11.8	82.6	3.7	23.9	20.2	27.3	25.8	58	31
Late.....	64.4	12.8	82.0	3.4	20.4	17.6	24.5	27.0	58	31
Paymaster 54 B										
Texas										
Plainview										
Early.....	69.5	12.0	82.8	3.4	22.7	21.2	26.3	26.4	54	30
Midseason.....	70.2	12.3	82.4	3.4	21.2	21.2	24.3	26.4	53	29
Late.....	63.6	13.4	83.6	3.4	21.2	16.3	25.3	25.6	58	30
Plains										
Alabama										
Centre										
Early.....	70.8	11.3	81.8	2.9	23.3	21.0	26.5	26.0	59	30
Midseason.....	72.5	11.2	82.4	2.6	24.0	21.4	25.8	26.6	59	31
Late.....	71.0	10.8	83.3	3.4	24.8	20.4	26.4	25.6	58	30
Rowden										
Texas										
Corsicana										
Early.....	72.2	11.2	81.6	3.2	24.6	20.8	28.1	25.7	57	31
Midseason.....	71.0	11.0	82.3	2.8	25.6	20.4	29.2	25.3	59	30
Late.....	69.6	11.0	81.6	3.1	28.3	18.6	31.2	24.6	59	30
Stoneville 2 B										
Arkansas										
McGehee										
Early.....	72.2	11.9	82.7	3.2	22.6	21.2	26.0	26.2	61	31
Midseason.....	68.5	11.0	81.8	3.2	26.4	18.2	29.4	24.4	59	30
Late.....	67.8	10.8	82.4	3.0	27.4	17.7	31.0	23.8	60	30
Missouri										
Hornersville										
Early.....	72.7	11.8	83.5	3.4	23.7	21.6	28.0	25.4	61	31
Midseason.....	71.0	11.0	82.6	3.2	26.1	19.2	29.7	24.8	59	30
Late.....	68.7	10.0	81.0	3.0	25.5	19.4	28.2	25.4	60	30

1/ Reported in terms of R_d and b scales of the Gardner Automatic Color-Difference Meter.
 2/ Measured by means of the Hunterlab Cotton Lustermeter with 0 equaling no gloss and 100% maximum gloss.
 3/ R_d Values indicate percent reflectance from 0 to 100.
 4/ +b Values indicate degree of yellowness.
 5/ -b Values indicate degree of blueness.

Table 2.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955

Variety, state, market area and season of harvest	Color of 22s carded yarn 1/								Luster 2/		
	Grey		Bleached		In grey		Dyed		Raw	50s Combed yarn	
	Rd 3/	+b 4/	Rd 3/	+b 4/	Rd 3/	-b 5/	Rd 3/	-b 5/	Percent	Grey	Mercurized
Acala 1517 C											
Arizona											
Willocox											
Early.....	74.8	11.1	83.0	2.6	23.0	22.4	27.2	25.8	61	32	43
Midseason.....	75.7	10.6	84.8	3.0	23.3	21.6	26.4	25.9	60	34	41
Late.....	76.2	11.4	85.6	2.8	23.1	21.6	26.7	25.6	60	32	41
New Mexico											
Artesia											
Early.....	71.5	11.2	83.0	2.6	25.3	20.6	27.4	25.6	61	34	42
Midseason.....	74.1	10.8	82.8	2.2	23.6	22.4	27.0	25.6	62	33	43
Late.....	70.8	10.7	81.2	3.0	23.4	20.1	26.4	25.1	62	34	44
Carlsbad											
Early.....	71.0	10.8	83.8	3.2	24.9	20.4	27.6	25.8	61	35	44
Midseason.....	75.0	10.7	83.2	2.2	23.9	22.2	27.0	25.1	61	33	44
Late.....	71.0	10.8	81.2	3.0	22.9	20.4	26.6	24.7	61	33	43
Deming											
Early.....	75.4	11.0	84.0	2.2	22.5	22.8	26.1	26.8	60	33	46
Midseason.....	74.1	10.5	83.5	2.9	22.0	22.6	26.7	26.2	61	33	42
Late.....	74.2	11.2	85.0	3.2	22.6	21.4	26.8	25.2	62	32	44
Hatch											
Early.....	73.9	11.4	82.3	2.4	24.0	21.0	26.8	26.6	60	34	43
Midseason.....	74.5	10.8	83.8	3.0	22.4	22.4	25.8	26.4	60	33	42
Late.....	74.7	11.2	83.6	3.0	22.6	21.6	26.1	25.3	61	33	42
Las Cruces											
Early.....	73.8	11.2	83.5	2.4	23.0	22.2	25.7	27.0	59	33	44
Midseason.....	75.0	11.2	83.0	2.4	22.4	22.8	26.0	26.7	60	33	43
Late.....	73.3	11.2	83.8	3.2	22.6	20.8	26.4	25.5	62	34	45
Texas											
Dell City											
Early.....	74.5	11.0	84.2	2.3	22.5	22.4	26.0	26.8	61	32	42
Midseason.....	74.3	10.9	84.2	2.8	22.6	22.3	26.4	26.0	60	33	43
Late.....	75.1	11.4	84.0	2.8	23.0	21.0	26.8	25.0	61	32	42
El Paso											
Early.....	73.0	10.9	83.2	2.6	24.8	21.0	27.1	25.6	60	34	44
Midseason.....	74.6	10.8	84.3	2.8	23.2	22.0	27.2	25.7	60	33	43
Late.....	74.1	10.8	83.6	2.9	23.4	20.8	27.8	25.4	60	34	44
Pecos											
Early.....	68.6	10.4	82.6	3.2	24.2	21.0	26.6	25.8	61	34	41
Midseason.....	73.5	10.5	83.0	2.4	23.8	22.0	25.5	26.7	61	34	42
Late.....	71.9	10.9	84.4	2.8	23.7	20.6	26.2	24.9	61	33	40
Acala 4-42											
California											
Fresno											
Early.....	75.5	10.4	83.7	2.3	22.8	23.2	25.6	27.2	60	33	44
Midseason.....	71.6	10.0	82.5	3.0	22.8	21.6	26.0	26.2	61	33	42
Late.....	72.7	10.5	81.4	2.8	24.4	20.8	27.4	25.0	58	33	42
A-44											
Arizona											
Marana											
Early.....	71.8	11.8	82.2	3.0	24.0	20.6	26.2	25.9	60	34	37
Midseason.....	71.1	11.4	84.0	3.0	22.9	21.6	25.3	26.2	60	34	41
Late.....	70.7	10.7	82.0	2.9	23.5	20.3	27.0	25.8	61	33	42
Coker 100 W											
Mississippi											
Greenwood											
Early.....	71.4	10.7	82.6	2.9	24.4	21.1	27.5	25.8	59	33	42
Midseason.....	69.0	10.1	83.4	2.6	26.0	19.4	28.4	25.2	59	34	44
Late.....	67.1	9.0	80.4	2.8	29.2	17.6	30.6	24.0	58	34	42
North Carolina											
Shelby											
Early.....	65.9	11.7	79.4	5.2	25.2	18.0	27.4	24.5	57	34	42
Midseason.....	67.6	11.5	81.4	5.0	26.6	17.2	29.2	23.4	58	33	41
Late.....	68.4	10.8	80.0	4.4	26.5	18.6	28.7	25.0	57	33	40
Deltapine 15											
Arkansas											
Leachville											
Early.....	68.3	11.5	82.6	3.2	23.0	19.6	27.7	25.0	55	33	45
Midseason.....	68.2	10.8	81.4	3.0	25.0	18.0	28.2	25.4	60	35	42
Late.....	65.4	10.3	78.6	3.4	24.6	18.0	28.4	24.8	60	34	48
Mississippi											
Tunica											
Early.....	72.6	11.4	82.3	2.9	23.4	21.2	26.4	26.2	57	34	43
Midseason.....	71.6	10.9	81.7	2.6	26.1	19.9	27.6	26.1	57	32	40
Late.....	69.4	10.0	81.4	3.0	25.8	19.2	26.8	25.6	59	34	41

Continued on page 17

Table 2.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955--Continued

Variety, state, market area, and season of harvest	Color of 22s carded yarn 1/						Luster 2/				
	Grey		Bleached		Dyed		Raw Cotton	50s Combed yarn			
	R _d 3/	+b 4/	R _d 3/	+b 4/	In grey R _d 3/	-b 5/	After bleaching R _d 3/	-b 5/	Percent	Grey Percent	Mercurized Percent
Delfos 9169											
Arkansas											
Blytheville											
Early.....	71.0	10.6	83.1	2.9	23.5	21.3	27.5	26.0	56	32	40
Midseason.....	71.6	10.4	83.8	2.8	27.8	17.8	29.9	24.5	58	33	42
Late.....	66.6	9.4	79.4	2.8	27.2	17.6	29.9	24.0	58	34	40
Pine Bluff											
Early.....	70.9	10.8	82.6	2.8	23.8	21.6	28.2	25.4	57	34	42
Midseason.....	68.4	10.0	82.2	3.1	27.0	18.9	28.7	25.0	58	34	40
Late.....	69.7	9.8	83.2	2.8	27.4	18.8	30.4	24.2	60	35	43
Mississippi											
Belzoni											
Early.....	71.6	10.7	82.6	2.8	25.0	21.0	27.2	25.8	58	32	39
Midseason.....	69.2	10.0	80.6	2.8	26.8	20.0	28.6	24.9	60	33	40
Late.....	70.2	9.6	82.2	2.6	28.0	19.2	29.8	25.2	59	33	42
Stoneville											
Early.....	72.8	11.6	83.5	3.0	25.2	21.2	27.4	26.4	57	33	41
Midseason.....	68.6	10.6	80.8	2.7	25.7	19.2	28.2	25.4	57	33	41
Late.....	64.6	10.2	79.6	3.2	24.9	18.2	28.5	24.4	57	34	42
Missouri											
Hayti											
Early.....	70.9	11.2	81.8	2.9	23.3	20.8	26.1	26.6	58	33	44
Midseason.....	71.7	10.9	82.4	2.4	26.0	19.9	27.2	26.0	57	33	40
Late.....	69.9	10.0	82.4	2.7	26.0	19.9	28.6	25.6	59	33	41
Stoneville 2 B											
Mississippi											
Leland											
Early.....	70.6	11.2	80.8	3.0	25.2	19.6	27.6	25.6	58	32	41
Midseason.....	63.0	10.5	82.2	3.4	27.8	16.4	30.0	24.4	58	33	41
Late.....	66.6	10.4	81.7	3.2	28.0	17.2	30.7	24.3	59	33	41

1/ Reported in terms of R_d and b scales of the Gardner Automatic Color-Difference Meter.
 2/ Measured by means of the Hunterlab Cotton Lustermeter with 0 equaling no gloss and 100% maximum gloss.
 3/ R_d values indicate percent reflectance from 0 to 100.
 4/ +b values indicate degree of yellowness.
 5/ -b values indicate degree of blueness.

Table 3.--Results of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955

Variety, state, market area, and season of harvest	Color of 50s combed yarn 1/						Luster 2/				
	Grey		Bleached		Dyed		Raw Cotton	50s combed yarn			
	R _d 3/	+b 4/	R _d 3/	+b 4/	In grey R _d 3/	-b 5/	After bleaching R _d 3/	-b 5/	Percent	Grey Percent	Mercurized Percent
Pima S-1											
Arizona											
Marana											
Early.....	62.9	13.3	81.5	4.8	23.6	14.1	28.1	25.5	64	40	48
Midseason.....	65.2	12.8	82.2	4.2	22.6	15.0	27.6	26.0	66	40	50
Late.....	64.6	13.0	82.5	4.1	22.6	14.8	27.7	25.6	66	40	51
Peoria											
Early.....	65.7	13.2	82.0	4.3	25.2	14.2	28.6	25.4	66	38	47
Midseason.....	66.1	13.0	82.2	4.3	25.3	14.2	30.6	24.2	66	40	49
Late.....	65.5	12.8	82.8	4.6	24.8	14.2	28.9	25.5	67	40	50
Safford											
Early.....	62.2	12.8	82.8	4.4	23.0	14.0	28.2	25.9	68	41	49
Midseason.....	64.6	13.1	82.2	4.3	22.2	15.4	27.3	26.2	67	42	53
Late.....	64.4	13.4	82.4	4.4	23.2	13.7	28.8	24.9	68	40	55
Texas											
El Paso											
Early.....	63.2	13.2	82.7	4.3	23.8	13.9	29.6	24.8	67	41	50
Midseason.....	64.4	13.0	82.2	4.4	21.4	15.0	27.8	25.9	66	41	52
Late.....	64.4	13.3	82.4	4.6	22.2	13.7	27.9	25.6	70	40	51

1/ Reported in terms of R_d and b scales of the Gardner Automatic Color-Difference Meter.
 2/ Measured by means of the Hunterlab Cotton Lustermeter with 0 equaling no gloss and 100% maximum gloss.
 3/ R_d values indicate percent reflectance from 0 to 100.
 4/ +b values indicate degree of yellowness.
 5/ -b values indicate degree of blueness.

Table 4.--Averages of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955

Variety	: Number : : of : : Lots :	Color of 22s carded yarn 1/						Luster 2/			
		Grey		Bleached		Dyed		Raw Cotton	22s Carded Yarn		
		R _d 3/	+b 4/	R _d 3/	+b 4/	In grey R _d 3/	-b 5/	After bleaching R _d 3/	-b 5/	Percent	Grey Percent
Acala 4-42.....	21	72.6	10.4	82.7	2.7	23.8	21.6	26.8	26.2	60	30
A-44.....	15	70.9	11.2	83.0	2.9	23.4	20.9	26.7	26.2	60	30
Bobshaw 1-A.....	2	68.8	11.1	81.4	2.9	23.9	20.2	27.4	26.0	60	32
Coker 100 W.....	54	68.5	10.8	81.8	3.2	25.5	19.4	27.9	25.5	58	31
Deltapine 15.....	114	70.4	11.3	81.7	3.1	24.4	20.3	27.4	25.9	59	31
Deltapine Fox.....	6	69.2	10.8	81.7	3.1	24.7	20.0	27.7	25.8	58	31
Deltapine TP5A.....	9	71.1	11.6	82.0	3.2	24.3	20.9	27.0	26.1	58	31
Delfos 9169.....	3	71.9	12.0	82.3	3.3	24.0	20.7	27.4	25.6	59	30
Empire.....	6	71.8	11.2	82.9	3.1	24.3	20.4	27.1	25.9	59	31
Hibred.....	3	66.6	12.1	81.7	4.0	23.1	19.3	26.2	26.1	58	31
Lankart 57.....	27	67.4	12.1	82.1	3.4	23.1	19.1	26.7	26.1	57	30
Lankart 611.....	3	65.1	12.0	81.4	3.6	22.0	19.0	26.0	25.9	56	30
Lockett SP-1.....	2	67.4	11.6	82.1	3.6	22.6	19.9	26.4	26.1	56	29
Northern Star.....	3	67.7	12.2	82.6	3.4	22.1	19.4	25.9	26.6	59	31
Paymaster 54-B.....	3	67.8	12.6	82.9	3.4	21.7	19.6	25.3	26.1	55	30
Plains.....	3	71.4	11.1	82.5	3.0	24.0	20.9	26.2	26.1	59	30
Rouven.....	3	70.9	11.1	81.8	3.0	26.1	19.9	29.5	25.2	58	30
Stoneville 2-B.....	6	70.2	11.1	82.3	3.2	25.3	19.6	28.7	25.0	60	30

- 1/ Reported in terms of R_d and b scales of the Gardner Automatic Color-Difference Meter.
- 2/ Measured by means of the Hunterlab Cotton Lustermeter with 0 equaling no gloss and 100% maximum gloss.
- 3/ R_d values indicate percent reflectance from 0 to 100.
- 4/ +b values indicate degree of yellowness.
- 5/ -b values indicate degree of blueness.

Table 5.--Averages of luster measurements on raw stock and color and luster measurements on yarn processed from specified varieties of cotton grown in designated market areas, crop of 1955

Variety	: Number : : of : : Lots :	Color of 22s carded yarn 1/						Luster 2/				
		Grey		Bleached		Dyed		Raw Cotton	50s Combed yarn			
		R _d 3/	+b 4/	R _d 3/	+b 4/	In grey R _d 3/	-b 5/	After bleaching R _d 3/	-b 5/	Percent	Grey Percent	Mercerized Percent
Acala 1517 C.....	27	73.7	10.9	83.5	2.7	23.3	21.6	26.6	25.8	61	33	43
Acala 4-42.....	3	73.3	10.3	82.5	2.7	23.3	21.9	26.3	26.1	60	33	43
A-44.....	3	71.2	11.3	82.7	3.0	23.5	20.8	26.2	26.0	60	34	40
Coker 100 W.....	6	68.2	10.6	81.2	3.8	26.3	18.6	28.6	24.7	58	34	42
Deltapine 15.....	6	69.3	10.8	81.3	3.0	24.6	19.3	27.5	25.5	58	34	42
Delfos 9169.....	15	69.8	10.4	82.0	2.8	25.8	19.7	28.4	25.3	58	33	41
Stoneville 2 B.....	3	66.7	10.7	81.6	3.2	27.0	17.7	29.4	24.8	58	33	41
Pima S-1.....	12	64.4	13.1	82.3	4.4	6/	6/	6/	6/	67	40	50

- 1/ Reported in terms of R_d and b scales of the Gardner Automatic Color-Difference Meter.
- 2/ Measured by means of the Hunterlab Cotton Lustermeter with 0 equaling no gloss and 100% maximum gloss.
- 3/ R_d values indicate percent reflectance from 0 to 100.
- 4/ +b values indicate degree of yellowness.
- 5/ -b values indicate degree of blueness.
- 6/ 50s combed yarn.

Basis for Interpretation of Test Results

Color differences among cottons are of little practical significance unless they are clearly visible. At the color levels reported, the following differences are easily distinguishable under good viewing conditions:

<u>Type of yarn</u>	<u>R_d (reflectance)</u> (Units)	<u>b (yellowness or blueness)</u> (Units)
Grey	2.0	1.8
Bleached	2.0	1.8
Dyed	1.0	1.8

A change in one color value is generally accompanied by a corresponding change in the other. Therefore, a bad filling bobbin might cause rejection of a fabric if it differed in color from its neighbors by even as much as indicated in the foregoing tabulation.

Standard errors associated with the measurements shown in tables 1 through 5 were approximately as follows:

<u>Measure</u>	<u>Standard error</u>
Color	
R _d	
Grey (units)	.5
Bleached (units)	.6
Dyed (units)	.4
b	
Grey (units)	.3
Bleached (units)	.2
Dyed (units)	.4
Luster (percent)	.5

Standard small scale bleaching, dyeing and mercerizing tests were applied in a routine manner on a large number of samples of yarn representing a wide range in the various factors of raw cotton quality. These form the basis of the following tentative adjective descriptions of color and luster values, and may be helpful in the interpretation of the test results reported in tables 1 through 5. It should be pointed out that because the color factors R_d and b are not independent of each other they should be considered together in any overall interpretation.

1. Relative diffuse reflectance (R_d) of grey and bleached yarn

<u>Grey yarn</u>	<u>Bleached yarn</u>	<u>Adjective description</u>
Below 67	Below 80	Low (poor)
67 - 72	80 - 84	Average
Above 72	Above 84	High (good)

2. Relative yellowness (+b) of grey and bleached yarn

<u>Grey yarn</u>	<u>Bleached yarn</u>	<u>Adjective description</u>
Below 10.5	Below 2.5	Low (good)
10.5 - 12.4	2.5 - 3.9	Average
Above 12.4	Above 3.9	High (poor)

3. Relative diffuse reflectance (R_d) of yarn dyed in grey and yarn dyed after bleaching *

<u>Dyed in Grey</u>	<u>Dyed after bleaching</u>	<u>Adjective description</u>
Below 23	Below 26	Low (good)
23 - 26	26 - 29	Average
Above 26	Above 29	High (poor)

4. Relative blueness (-b) of yarn dyed in grey and yarn dyed after bleaching

<u>Dyed in grey</u>	<u>Dyed after bleaching</u>	<u>Adjective description</u>
Below 18.0	Below 25.0	Light (low dye uptake)
18.0 - 21.9	25.0 - 26.5	Average (average dye uptake)
Above 21.9	Above 26.5	Deep (high dye uptake)

5. Relative percentage of luster

<u>Raw cotton</u>	<u>Grey yarn</u>		<u>Mercerized yarn</u>	<u>Adjective description</u>
	<u>22 carded</u>	<u>50s combed</u>	(50s combed)	
Below 58	Below 30	Below 33	Below 40	Low
58 - 60	30 - 32	33 - 34	40 - 44	Average
Above 60	Above 32	Above 34	Above 44	High

* Note that reflectance is reversed between grey and dyed materials. Low reflectance indicates good, and high reflectance poor, dyeing properties.

LITERATURE CITED

- (1) Goldthwait, C. F., et. al.
1952. Mercerization of Yarn - Experimental Apparatus and Techniques
Textile Res. Jour. Vol. 22, No. 8 , 540-548. (August 1952).
- (2) Nickerson, Dorothy
1957 A new Cotton Luster Meter - For Yarns and Fibers. Textile
Res. Jour. (Scheduled for publication January 1957).
- (3) United States Department of Agriculture
1946. Fiber and Spinning Test Results for Some Upland Cottons Grown
in Selected Standardized-Variety Areas, Crop of 1946.
Prod. and Mktg. Admin. (December 1946).
- (4) 1947. Fiber and Spinning Test Results for Some Pure Varieties Grown
by Selected Cotton Improvement Groups, Crop of 1947 and
Supplement No. 1. Prod. and Mktg. Admin. (November 1947).
- (5) 1949. Summary of Fiber and Spinning Test Results for Cotton Varieties
Grown by Selected Cotton Improvement Groups, Crop of 1948.
Prod. and Mktg. Admin. (January 1949).
- (6) 1950. Summary of Fiber and Spinning Test Results for Cotton Varieties
Grown by Selected Cotton Improvement Groups, Crop of 1949.
Prod. and Mktg. Admin. (January 1950).
- (7) 1951. Summary of Fiber and Spinning Test Results for Cotton Varieties
Grown by Selected Cotton Improvement Groups, Crop of 1950.
Prod. and Mktg. Admin. (January 1951).
- (8) 1952. Summary of Fiber and Spinning Test Results for Some Varieties
of Cotton Grown by Selected Cotton Improvement Groups, Crop
of 1951. Prod. and Mktg. Admin. (February 1952).
- (9) 1953. Summary of Fiber and Spinning Test Results for Some Varieties
of Cotton Grown by Selected Cotton Improvement Groups, Crop
of 1952. Prod. and Mktg. Admin. (February 1953).
- (10) 1954 Summary of Fiber and Spinning Test Results for Some Varieties
of Cotton Grown by Selected Cotton Improvement Groups, Crop
of 1953. Agri. Mktg. Serv. (February 1954).
- (11) 1955. Summary of Fiber and Spinning Test Results for Some Varieties
of Cotton Grown by Selected Cotton Improvement Groups, Crop
of 1954. Agri. Mktg. Serv. Agri. Inf. Bul. 137. (February 1955)
- (12) 1956. Summary of Fiber and Spinning Test Results for Some Varieties
of Cotton Grown by Selected Cotton Improvement Groups, Crop
of 1955. Agri. Mktg. Serv. Agri. Inf. Bul. No. 152.
(February 1956).