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To the Graduate Council:

I am submitting herewith a thesis written by Jack R. Fontana entitled "Cotton Fiber Testing by Shippers in Memphis, Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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COTTON FIBER TESTING BY SHIPPERS IN MEMPHIS, TENNESSEE

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

by
Jack R. Fontana
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CHAPTER I

INTRODUCTION

Cotton has been marketed on the basis of some quality standard since it was first sold commercially. In the early nineteenth century, cotton was classified by origin of growth in both Europe and the United States. This system was inadequate because quality varied greatly among lots of cotton grown in the same area. Later, American spot and future markets established their own individual standards of quality. This resulted in much confusion and many arguments in inter-market sales. The industry and the federal government, recognizing the situation, took steps to standardize the various grading systems. The result was the establishment of compulsory standards for grade in 1914 and for staple length in 1918 by the United States Department of Agriculture.¹ International standards for grade were adopted in 1924 by the exchanges in Europe and the United States.²

While these standards have been revised several times, grade and staple (as determined by the subjective evaluation of a trained cotton classer) are still the primary factors in determining the quality of cotton. Cotton classers now, knowing the grade and staple specifications, class within one thirty-second of an inch the average

¹U. S. Department of Agriculture, The Classification of Cotton, Miscellaneous Publication No. 310 (Washington: Government Printing Office, Revised June, 1956), p. 11.

²Robert L. Hunt, Smith-Doxey Classification, Fiber Testing, and Problems of the Cotton Trade, Texas Agricultural Experiment Station, Bulletin 832, 1956, p. 5.

length of the fiber, and make an evaluation of the color, leaf and trash content, and preparation; the latter three being the main variables of determining grade.

As the industry developed, spinners through experience and the United States Department of Agriculture through research, discovered that there were other qualities of raw cotton besides those included under the heading of grade and staple which affected the processing of cotton and its end-product performance. "Character" was the term given to describe such other qualities as fineness, tensile strength, length uniformity, maturity, color, nonlint content, and nep count. These were recognized by the cotton classer and were evaluated by the use of such terms as "hardbodied," "fine fiber," "strong cotton," "weak," "wasty," or "perished."³ These subjective evaluations did not give the precise information needed by the spinner for efficient processing and failed also to adequately differentiate between these factors of "character," which varied in importance among the end-products produced.⁴

To answer this need for more objective information, instruments and tests were developed to evaluate accurately these qualities of character. The cotton industry has given these tests much attention in efforts to meet competition in price and quality from foreign cotton and from artificial fibers. More information is needed to determine present and future effects of these tests on the cotton

³U. S. Department of Agriculture, op. cit., p. 38.

⁴Loc. cit.

industry, from producer to the vendor of the end-product. This study is concerned with effects of the tests on one particular geographical segment of the industry and with one link in the marketing chain, the Memphis cotton shipper.

The Problem

Several state and regional studies have been made of the buying practices of foreign and domestic spinning mills. These studies indicate that as early as 1945 many cotton mills and merchants were employing laboratory fiber tests to supplement grade, staple length, variety and area designations in buying, assembling, and selling cotton.⁵ Since then, an increasing number of cotton merchants in Memphis have purchased instruments or have used laboratory techniques for appraising the factors that make up character.

This study is concerned with the present and the probable future effects of cotton fiber testing on the buying, assembling, and selling of cotton by shippers in the Memphis market. The problem may

⁵B. D. Raskopf, Improvements Needed in Tennessee Cotton Quality and Marketing Practices to Meet Mill Requirements, Tennessee Agricultural Experiment Station, Monograph No. 259, June 25, 1950.

B. D. Raskopf, and J. R. Fontana, Cotton Fiber Testing in Foreign Countries, Tennessee Agricultural Experiment Station, Bulletin No. 271, September, 1957.

Regional Cotton Marketing Research Project SM-1, Buying Practices and Procedures of Cotton Mills in Five Southeastern States, Southern Cooperative Series, Bulletin No. 28, August, 1952.

be sub-divided into the following seven objectives:

1. To determine the extent and use of cotton fiber tests in the Memphis market.
2. To determine the reasons for using cotton fiber tests.
3. To determine what operating practices are used in testing cotton.
4. To determine how fiber tests are used in buying and selling cotton.
5. To determine the cost of fiber testing.
6. To determine the shippers' appraisal of cotton fiber tests in marketing cotton.
7. To compare the use of fiber tests in the Memphis market with their use in other areas of the country.

Importance of The Study

The Memphis market has supplied a considerable portion of the cotton used by both domestic and foreign spinning mills. For the past ten years, the Memphis Cotton Exchange has handled an average of 4,240,000 bales annually. In the 1956-57 season, the exchange handled 5,129,601 bales, which was equivalent to 40 percent of the United States production in 1956.⁶ An estimated 44 percent of this cotton was exported.⁷

⁶U. S. Department of Agriculture, Agricultural Marketing Service, The Cotton Situation, CS-180 (Washington: Government Printing Office, 1959), p. 25.

⁷Based on data contained in this study.

The marketing policies of the Memphis shippers exert a strong influence on the entire cotton industry, from the producer of cotton to the manufacturer of cotton products. The increased demand for cotton fiber tests by foreign and domestic mills in addition to grade and staple specifications on sales contracts has affected these policies. Shippers have purchased more testing instruments and have made increased use of the facilities of commercial testing laboratories. No economic evaluation has been made of these tests. Information is needed to determine the effects of these tests on the price structure, the direct and indirect costs of the tests, and their probable future use.

This study should prove useful in estimating the effects of cotton fiber tests by showing what fiber properties are considered most important by foreign and domestic mills. Memphis shippers may also observe how their use of the tests compares with that of shippers in other sections of the country, and by shippers in other size groups. Any variation in the use of these tests on cotton originating in different geographical areas is also shown.

An increasing reliance upon cotton fiber tests as a supplement to grade and staple could alter the methods of production and merchandising of cotton and in so doing, affect the position of cotton in the highly competitive fiber market. Their use may also influence intra-industry competition between the various cotton markets and between the individual shippers. Information which may shed light on these vital areas should be of interest to all cotton merchants.

Method and Scope of the Study

Schedules of information were secured by personal interview from forty-six Memphis shippers from June to August, 1957 (Appendix A). These firms marketed 5,106,605 bales purchased from the open-market and the Commodity Credit Corporation during the season August 1, 1956 to July 31, 1957. These purchases were equivalent to more than 99 percent of all cotton handled on the Memphis exchange during that period.

A cotton shipper was defined as a merchant who purchased cotton in mixed lots, concentrated the cotton into even-running lots and sold to foreign and/or domestic mills. The volume of cotton handled annually by the 46 shippers ranged from around 10,000 bales each for two of the smallest to over 250,000 bales for five of the largest shippers. For purposes of analysis, shippers were divided into four volume groups, and the cotton was specified as to its origin of purchase (Table I). No data were available on the origin of cotton purchased through the Commodity Credit Corporation; however, data were obtained on volume of purchases and on sales outlets of C.C.C. stocks.

Several of the shippers included in the study operated offices in other states. Data from these shippers reflect only their buying and selling operations in the Memphis market.

Review of Related Studies

A study completed in 1957 by the Tennessee Agricultural Experiment Station concerned the effects of cotton fiber tests in the

TABLE I

NUMBER OF BALES PURCHASED IN THE OPEN-MARKET AND FROM THE COMMODITY CREDIT CORPORATION
BY ORIGIN OF COTTON AND SIZE OF SHIPPER, 46 SHIPPERS, AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper (Bales handled)	Number of shippers	Geographical origin of open-market purchased cotton			C.C.C. purchases	Total purchases
		Southeast	Southcentral	Southwest ^a		
		(Bales of cotton)				
				West Mexico		
Under 30,000	12	4200	175900	6100	3500	1200
30,000-99,999	23	8865	707621	53767	73469	-
100,000-249,999	6	-	440575	32100	76000	5100
250,000 and over	5	124181	576710	188584	250902	14000
Total	46	137246	1900806	280551	403871	20300
					2742774	2363831
						5106605

^aInclude all of Texas cotton in the Southwestern section.

international cotton market.⁸ The principle objectives of this study were to determine the extent and use of these tests by foreign firms and their main reasons for using them. Information on the costs of these tests, their effects on the price structure, and foreign agency appraisal of them were also studied. The study pertains more to cotton mills than to shippers.

A bulletin was published in 1957 by the Arkansas Agricultural Experiment Station on the use of cotton fiber tests by the following types of marketing agencies: shippers, shipper representatives, mill buyers, selling brokers, and local merchants.⁹ Information was secured from fifty-eight Arkansas firms concerning the extent and use of these tests, their costs, and their effects on cotton merchandising.

A report similar in nature was published in 1958 by the Texas Agricultural Experiment Station.¹⁰ Thirty Texas shippers were interviewed to obtain information concerning the use of instrument tests as a supplement to grade and staple in the merchandising of cotton.

The most extensive research report on this subject to date is a Southern Cooperative Series Bulletin.¹¹ The data were secured during

⁸B. D. Raskopf and J. R. Fontana, op. cit.

⁹Curtis C. Cable, Jr., and Shelby H. Holder, Use of Fiber Testing In Marketing Arkansas Cotton, Arkansas Agricultural Experiment Station, Bulletin No. 594, 1957.

¹⁰J. M. Ward, Evaluation of the Use of Fiber Tests in Marketing Cotton, Texas Agricultural Experiment Station, Progress Report 2040, 1958.

¹¹Southern Regional Cotton Marketing Research Committee, Use of Cotton Fiber Tests by United States Cotton Shippers, Southern Cooperative Series, Bulletin No. 62, 1959.

the 1956-57 season from 164 shippers located throughout the United States. The three principle objectives of this study were to determine (1) the nature and extent of the differences in fineness, strength, and other fiber properties in addition to grade and staple length at various stages of the marketing process; (2) the influence of these measurements on prices paid for cotton; and (3) charges for, or estimated costs of fiber tests. The questionnaire used in this study was the same one used with the Memphis shippers. Frequent reference will be made to this report in the comparison of information obtained from Memphis shippers with that obtained from shippers in other areas.

Definition of Terms

Grade and staple are the principle factors upon which almost all cotton transactions are based. When reference is made in this report to purchases and sales on certain fiber tests, it is not meant at the exclusion of grade and staple, but as a supplement to them.

For purposes of analysis, the cotton-growing states are divided into five sections. These sections and the states they include are as follows:

<u>Southeast</u>	<u>South Central</u>	<u>Southwest</u>	<u>West</u>	<u>Mexico</u>
North Carolina	Louisiana	Texas	New Mexico	All Sections
South Carolina	Tennessee	Oklahoma	Arizona	
Georgia	Arkansas		California	
Alabama	Missouri			
	Mississippi			

The term "cotton fiber testing" refers to a series of tests measuring fiber characteristics (other than grade and staple) which

affect the spinning quality of cotton and its end-product performance. These factors are referred to frequently as "character." The tests most used by Memphis shippers in the order of their volume importance are fineness, strength, length uniformity, maturity, nep count, nonlint content, and color. A description of these qualities and the tests used for their evaluation follows.

Fiber Fineness

Fiber fineness is the weight per linear inch. It is determined by taking a specimen of cotton weighing fifty grains, placing it in a fiber compression cylinder and passing air through it at the constant pressure of six pounds per square inch. A gauge measures the amount of resistance the sample offers. The finer the fibers, the greater the resistance and subsequent smaller air flow through the fiber mass. The gauge showing the relationship between rate of air flow and diameter or thickness of the fiber is read in micrograms per inch. The United States Department of Agriculture has devised the following scale for a practical comparison of fiber fineness results:

<u>Micronaire units</u>	<u>Fineness rating</u>
Below 3.0	Very fine
3.0-3.9	Fine
4.0-4.9	Average
5.0-5.9	Slightly coarse
6.0 and above	Coarse

Fiber fineness has an effect on spinning efficiency. Increased nep count, manufacturing waste, and ends down, along with the production

of irregular and neppy yarn are associated with fiber that is too fine.¹²

The dyeing ability of the cotton is affected by the fineness of cotton. Fine fiber is also associated with yarn strength since the finer cotton has more fibers per cross-section of yarn. Cotton which is extremely coarse or with a high Micronaire reading may cause excessive ends down and produce extremely weak yarns. Variations in mill mix of cotton with low and high Micronaire reading may produce a non-uniform product, with color streaks caused by the varying ability of the fiber to absorb dye. Outside the two extreme fineness groups, which are satisfactory only for very limited uses, spinners' demand for various fineness values will depend upon the end-product of the mill.

The various fiber properties, the names of the instruments used for their measurement, and the factors of spinning performance affected are shown in Table II.

Strength

Fiber strength is usually determined on a mechanical instrument called the Pressley Fiber Strength Tester, which uses the flat bundle method. A "tuft" of cotton is combed into a smooth bundle of parallel fibers with each end being placed in a clamp. A sliding weight on a balance beam then increases the tension on the fibers until they break. The breaking point, read to the nearest tenth of a pound, is then divided

¹²Ends down refers to the number of breaks in the yarn per 1000 hours of spindle operation.

TABLE II

FOUR MAJOR COTTON FIBER PROPERTIES CURRENTLY BEING MEASURED, THE INSTRUMENTS OR METHOD USED, AND FACTORS OF SPINNING PERFORMANCE AFFECTED^a

Fiber property and instruments or methods used for testing	Factors of spinning performance affected by fiber property
<u>Fineness</u>	
Micronaire Arealometer Speedar Port-Ar Fibronaire	Blending and mixing Finishing and dyeing Yarn appearance Nep count Ends down Carding speed Yarn strength
<u>Strength</u>	
Pressley Stelometer Clemson flat bundle tester	Yarn strength Spinning and weaving quality
<u>Length uniformity</u>	
Suter-Webb sorter Fibrograph	Yarn strength Machinery settings Ends down Blending and mixing
<u>Maturity</u>	
Causticaire	Nep count Dyeing Yarn strength and appearance Spinning waste Finishing and dyeing

^aSource: Burt Johnson, Cotton Fiber and Spinning Tests, (National Cotton Council, September, 1956) and U. S. Department of Agriculture, Cotton Testing Service, AMS No. 16 (Washington: Government Printing Office, February, 1955).

by the weight of the "tuft" giving the Pressley index in pounds per milligram per fixed length.¹³

The United States Department of Agriculture has devised the following table for comparing various fiber strength readings:

<u>Thousand pounds</u> <u>(per sq. in.)</u>	<u>Strength rating</u>
Above 95	Very strong
86-95	Strong
76-85	Average
66-75	Fair
65 and below	Weak

The factor of strength in cotton is considered important because it influences spinning quality and yarn strength. The names of the instruments used to measure fiber strength with the effects of this characteristic on processing are given in Table II.

Length Uniformity

This is a machine measure of the variation in the individual fiber lengths in a given sample of cotton. The classer recognizes this when he has difficulty in obtaining a definite, smooth, rectangular "tuft" of cotton. The uniformity ratio is calculated in the following manner: the upper half mean length (which is the average length of the longer half of the fibers by weight) is divided by the mean length (which is the average length of all fibers longer than 1/4 inch). This percentage figure is then multiplied by 100, giving the uniformity ratio. The following table developed by the United

¹³This index can be converted to tensile strength by the following formula: $10.8116 \times \text{Pressley index} - .1200 = 1000 \text{ lbs. per square inch.}$

States Department of Agriculture may be used for a practical comparison of fiber uniformity results.

<u>Uniformity ratio</u>	<u>Rating</u>
Above 80	Uniform in fiber length
75-80	Average uniformity
74 and below	Irregular in fiber length

Length uniformity is important for its effects on manufacturing waste, yarn strength, and yarn appearance. It is closely related to spinning utility and influences carding and drafting settings and ends down in spinning. The more irregular the cotton the greater the waste and adverse processing performance. The effects of length uniformity and the names of the instruments used to measure it are shown in Table II.

Maturity

Maturity refers to the thickness of the fiber wall in relation to the width of the lumen, or underdeveloped section containing protoplasm located in the middle of the fiber. The thicker the wall the more mature the fiber. Fibers whose lumen width is less than twice that of the wall are considered mature. Those whose lumen is more than twice the wall width are considered immature. There are several methods of determining fiber maturity. Statistical analysis of the results of empirical tests have shown the maturity values obtained by the Causticaire method have greater significance from the standpoint of relationship to spinning performance than maturity values obtained by other available methods.¹⁴

¹⁴U. S. Department of Agriculture, Agricultural Marketing Service, Cotton Testing Service, AMS No. 16 (Washington: Government Printing Office, February, 1955), p.13.

This utilizes a Micronaire or similar instrument with a special scale, in the following way: the raw fibers are tested first. Then they are soaked in an 18 percent caustic soda solution and retested. The maturity index is the ratio of the untreated to the treated Causticaire readings multiplied by 100. This value gives the degree of cell wall development through the entire length of the fiber. The United States Department of Agriculture has devised the following table for comparing the maturity of various cottons:

<u>Maturity index</u>	<u>Rating</u>
82 and above	Mature
76-81	Average
70-75	Immature
Below 70	Very immature

Fiber maturity is important since immature fibers cause excessive neps and affect yarn appearance and the ability of the fiber to dye uniformly. Increased manufacturing waste is also associated with immature fibers. Maturity is closely associated with fineness in American upland cotton. Cotton with a low Micronaire reading will usually have a large percentage of immature fibers. The processing factors affected by cotton maturity and the test for measuring this characteristic are shown in Table II.

Nep Count

This refers to the number of neps, which are tangled masses of fine fibers, in 100 square inches of web. A three gram sample is blended on a mechanical blender and processed into a thin web. The number of neps observed serve to classify cotton with respect to nep

count. The United States Department of Agriculture devised the following standards of the comparison of neppiness of cotton:

<u>Number of neps</u> (per 100 sq. in. of web)	<u>Rating</u>
10 and below	Low
11-20	Average
21-30	High
31 and above	Very high

The number of neps affects spinning quality, yarn appearance, and the bleaching and dyeing properties. High nep counts detract from the appearance of finished products when they are to be dyed or printed.

Nonlint Content

Nonlint content is expressed as the percentage of waste separated from a cotton sample of known weight. The Shirley Analyzer makes an almost perfect separation of lint from trash and this trash contains practically no fiber. The trash can then be analyzed for various research purposes. The United States Department of Agriculture, using white grade standards, devised the following scale to represent percentages of non-lint removed from different grades by the Shirley Analyzer:

<u>Grade</u>	<u>Nonlint content percent</u>
Strict Good Middling	2.0
Good Middling	2.4
Strict Middling	2.9
Middling	5.1
Low Middling	7.6
Strict Good Ordinary	11.0
Good Ordinary	17.0

Nonlint content is considered an important factor since it influences grade, percent waste, spinning quality, and yarn appearance.

Color

This is an exact measurement of one of the most important determinants of grade and is measured on an instrument called the Nickerson-Hunter Cotton Colorimeter. This machine provides, on a two dimensional scale, values in terms of reflectance (Rd values), and the degree of yellowness (in terms of b values). The Rd scale measures percentage of reflectance from zero to 100 and the b scale provides a measure from yellow to blue. Cotton with the least yellow and the greatest reflectance gives the best yarn appearance and has the best bleaching qualities. This type cotton will have a high value on the Rd scale and a low reading on the Hunter's b factor.

Other Tests

Tests for the evaluation of other fiber qualities which were not used by the Memphis shippers include the following: picker and card waste, acid-alkaline values in terms in PH units, oxidation, elongation, wax content, moisture regain, and yarn skein strength. These factors also have an effect on processing performance and the quality of the end-product. However, since these tests were not used by the Memphis shippers, they will not be discussed further in this study.

Organisation of the Study

Chapter I is a general introduction to the study giving its importance, its objectives, and a definition of the principle terms used. The scope of the study, the method used to secure the data, and a review of related studies are also included.

Chapters II and III show the extent and use of cotton fiber tests in the Memphis market and review the operating practices employed in fiber testing.

Chapter IV is a coverage of the use of fiber tests in the purchase of open market and Commodity Credit Corporation cotton through the use of commercial fee laboratories and shipper-owned instruments. Sampling procedures and the effects of these tests on price is analyzed. The actual fineness of cotton purchased on the Memphis market is shown.

Chapter V covers the extent and use of fiber tests in cotton sales. The demands and specifications of mills are emphasized.

Chapter VI concerns the direct and indirect costs of cotton fiber testing and lists the major costs encountered and their relative importance. Claims and their methods of settlement is included, and a theoretical cost model is established for shipper operation of the fineness test.

Chapter VII gives the shippers' appraisal of cotton fiber tests on such subjects as their advantages and disadvantages, attitudes toward placing the fineness value on Form I cards, and the usefulness of present reports on fiber testing.¹⁵ A shippers' estimate of the volume of sales in the 1957-58 season on test specifications is given.

Chapter VIII compares the use made of fiber tests by shippers in the Memphis market with their use in other cotton markets of the country.

Chapter IX contains the summary and conclusions of the study.

¹⁵Form I cards are green colored cards showing the grade and staple of government classed bales. They are sometimes referred to as "green" cards.

CHAPTER II

THE EXTENT AND USE OF COTTON FIBER TESTS IN THE MEMPHIS MARKET

The forty-six Memphis shippers covered in the study owned fifty-nine instruments for the measurement of cotton fiber properties (Table III). Seventy-eight percent of these instruments, including the Micronaires and Port-Ars, were for testing fineness. About 17 percent of the instruments, including the Pressleys and Stelometer were used in testing for strength. Only 5 percent of the instruments, the Fibrographs and Suter-Webb Sorter, were used in measuring length and length uniformity. There was a definite relationship between the size of the shipper and the ownership of instruments. Twenty-nine instruments were owned by the five largest shippers. Those six handling between 100,000 and 249,000 bales had seven, those handling from 30,000 to 99,999 bales had nineteen, and the smaller shippers owned only four. There were no merchants handling less than 250,000 bales that owned instruments for testing fiber qualities other than fineness.

All firms but one of the eleven handling more than 100,000 bales owned instruments. Fourteen of the remaining thirty-five shippers did not own them (Table IV). Seven of the eleven largest shippers owned more than one instrument, one owning as many as nine. Only one shipper handling less than 100,000 bales had more than one instrument and these consisted of one Micronaire and two Port-Ars.

TABLE III

NUMBER OF FIBER TESTING INSTRUMENTS OWNED BY VOLUME OF COTTON
HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Type of instru- ment owned	No. of instruments owned by shippers handling				Total instruments owned
	Under 30,000 bales	30,000- 99,999 bales	100,000- 249,999 bales	250,000 and above bales	
Micronaire	4	17	6	14	41
Port-Ar	-	2	1	2	5
Pressley	-	-	-	9	9
Stelometer	-	-	-	1	1
Fibrograph	-	-	-	2	2
Suter-Webb Sorter	-	-	-	1	1
Total instruments owned	4	19	7	29	59
No. of shippers reporting	12	23	6	5	46

TABLE IV

TYPE AND KIND OF COTTON FIBER TEST OWNED AND USED, BY VOLUME OF
COTTON HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Type of test	Ownership, instrument and use of test	Bales of cotton handled				All shippers
		Under 30,000 30,000	30,000-99,999	100,000-249,999	250,000 and above	
(Number of shippers reporting)						
Fineness	Owning: Micronaire	4	16	4	3	27
	Micronaire & Port-Ar	-	1	1	2	4
	Use of fee lab: Only	8	6	1	-	15
	Partly	2	12	3	4	21
	Total for fineness	12	23	6	5	46
Strength	Owning: Pressley	-	-	-	3	3
	Pressley & Stelometer	-	-	-	1	1
	Use of fee lab: Only	8	17	6	1	32
	Partly	-	-	-	4	4
	Total for strength	8	17	6	5	36
Length and length uniformity	Owning: Fibrograph	-	-	-	2	2
	Suter-Webb Sorter	-	-	-	1	1
	Use of fee lab: Only	-	2	1	1	4
	Partly	-	-	-	1	1
	Total for length	-	2	1	4	7
Maturity	Use of fee lab only	-	1	-	2	3
Nonlint content	Use of fee lab only	-	1	-	2	3
Color	Use of fee lab only	-	-	-	2	2
Nep count	Use of fee lab only	-	-	-	1	1
Total shippers		12	23	6	5	46
Cotton handled: Total bales		234800	1171179	886084	2814542	5106605
Per shipper, average		19567	50921	147680	562908	111013

Type and Kind of Test

Many shippers, regardless of ownership of instruments, made use of commercial fee laboratories for the measurement of fiber "character." One firm reported using the instruments of a competitor. While commercial laboratories were the exclusive source of tests for some shippers, especially the smaller ones, most of the firms having instruments tested some cotton commercially as a check on their own instruments and to fulfill special contract obligations.

The forty-six Memphis shippers had instruments or made use of fee laboratories for the measurement of seven different fiber properties (Table IV). All of them used tests for fineness; thirty-six used tests for strength; seven used tests for length and length uniformity; three used tests for fiber maturity; three used tests for nonlint content; two used tests for color; and one used a test for nep count.

Thirty-six shippers used commercial laboratories for securing fineness information. Fifteen used them exclusively and the remaining twenty-one used laboratory reports to supplement their own instrument findings.

There were also thirty-six firms who used fee laboratories for obtaining strength data. Only four of these shippers, all of them handling over 250,000 bales, owned instruments for testing strength.

Of the seven shippers making tests for length and length uniformity, five used the services of commercial laboratories. Only one of the five owned an instrument for measuring this quality.

The use of commercial facilities was the only method used by shippers for testing fiber maturity, nonlint content, color, and nep

count. All shippers making these tests, except one, handled over 250,000 bales annually.

There was some relationship between the size of the shipper and the number of firms testing cotton. With the exception of the fineness test, a higher proportion of the largest shippers tested cotton for the various fiber characteristics (Table IV).

Length of Usage of Fiber Tests

Facilities for testing raw cotton for various fiber properties have been available in Memphis since 1947. One commercial laboratory was established in 1947 and another in 1949. Both laboratories were equipped for making fiber tests for fineness, strength, length and length uniformity, elongation, maturity, nonlint content, color, and other specialized tests for nep count, moisture, sugar or wax content, damage by oxidation, and extraction methods for measuring pH value (acidity or alkalinity). Although these facilities have been available to farmers, seed breeders, ginners, and cotton mill operators, the cotton merchants have been the more important users.

Thirty-one shippers owned Micronaires which have been in use from one to ten years (Table V). Seventeen firms purchased these in the last three years, eleven in the last four to six years, and only three had them seven or more years ago. Two of these three were in the largest shipper group.

The four shippers owning Port-Ars have had them from one to three years. The Pressleys, owned by three of the four firms, had been purchased

TABLE V

LENGTH OF USAGE OF FIBER TESTING DEVICES OWNED, BY VOLUME OF COTTON
HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Type of test	Instrument used	Years in service	Sales of cotton handled				All shippers
			Under 30,000	30,000-99,999	100,000-249,999	250,000 and over	
(Number of shippers reporting)							
Fineness	Micronaire	1 - 3	4	9	3	1	17
		4 - 6	-	7	2	2	11
		7 -10	-	1	-	2	3
Strength	Port-Ar Pressley	1 - 3	-	1	1	2	4
		1 - 3	-	-	-	1	1
		7 -10	-	-	-	3	3
Length	Stelometer Fibrograph Sater-Webb Sorter	1 - 3	-	-	-	1	1
		1 - 3	-	-	-	2	2
		1 - 3	-	-	-	1	1
Total shippers			12	23	6	5	46

from seven to ten years ago. The firms owning the Stelometers, Fibrographs, and Suter-Webb Sorter had purchased them in the last one to three years.

The increased number of firms purchasing fiber testing instruments in the last one to three years gives some indication of the growing reliance of the shippers on fiber test information as a supplement to grade and staple.

Volume of Cotton Purchased and Sold on Fiber Tests

Table VI illustrated the relative importance of fiber testing by showing the volume of purchases and sales on the basis of fiber tests by the forty-six Memphis shippers. It may be summarized as follows:

Fineness

About 27 percent of shipper purchases were tested for fineness on a sample basis prior to being bought. After purchase, 77 percent of the bales were individually tested. Shippers' sales had fineness specifications on nearly 77 percent of their volume.

Strength

About 13.5 percent of the cotton was tested for strength on a sample basis prior to purchase, and 3.6 percent individually tested after purchase. Nearly 24 percent of the shippers' sales were based on strength specifications.

TABLE VI

VOLUME OF COTTON PURCHASED AND SOLD ON TEST SPECIFICATIONS,
46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Extent of cotton fiber testing	Bales of cotton handled				
	Under 30,000 30,000 99,999	100,000- 249,999	250,000 and over	All shippers	
Number of shippers	12	23	6	5	46
	(Bales)	(Bales)	(Bales)	(Bales)	(Bales)
Total cotton purchased	234800	1171179	886084	2814542	5106605
Cotton tested for -					
Fineness: before purchase ^a	41577	316913	62295	969473	1390258
after purchase	63156	688996	375379	2819660	3947191
Strength: before purchase ^a	20480	3205	11075	653595	688355
after purchase	13091	34873	17796	117691	183451
Length: after purchase	-	675	64	2000	2739
Maturity: after purchase	-	6	-	500	506
Nonlint					
content: after purchase	-	4	-	500	504
Color: after purchase	-	-	-	1000	1000
Nep count: after purchase	-	-	-	2000	2000
Cotton sold on test specifications for -					
Fineness:	156107	940293	655481	2174057	3925938
Strength:	39830	356224	220786	599629	1216469
Length:	-	-	-	8000	8000
Maturity:	-	-	-	7500	7500
Nonlint					
content:	-	-	-	1500	1500
Color:	-	-	-	1000	1000
Nep count:	-	-	-	2000	2000

^aData based on several different methods of sampling.

Length, Maturity, Nonlint Content, Color, and Nep Count

Only 6,749 bales or 0.1 percent of shipper purchases were tested for these fiber characteristics. Shipper sales on these specifications were 20,000 bales or 0.4 percent.

A large proportion of purchases and sales of shippers handling less than 240,000 bales were for fineness and strength. However, only a few bales in this group were tested for other fiber characteristics. No bales in this volume group were sold on the basis of fiber tests other than fineness and strength.

More cotton was sold than purchased on test specifications for strength, length, maturity, and nonlint content. This situation occurred since in many cases a sample of cotton was used for establishing sales specifications.

Reasons for Using Fiber Tests

The forty-six Memphis cotton shippers were asked to indicate the primary and secondary factors affecting their decision to use fiber tests. Regardless of the volume of cotton handled, the most important of these factors was the demand by mill customers for cotton testing services (Table VII). Forty-two of the forty-six shippers gave this reason. Reasons of secondary importance given for using fiber tests were: to provide improved quality evaluation, to better evaluate the cotton market, to avoid buying culls, and to do a better job of merchandising.

The above findings tie in closely with the increased reliance that mills have placed on laboratory tests in recent years as a means

TABLE VII

RELATIVE IMPORTANCE OF REASONS FOR USING COTTON FIBER TESTS, BY VOLUME
OF COTTON HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Reason for using test	Importance of reason	Sales of cotton handled ^a				All shippers
		Under 30,000	30,000-99,999	100,000-249,999	250,000 and over	
(Number of shippers reporting)						
1. Demand by mill customers for testing service	1st	12	22	5	3	42
	2nd	-	-	1	-	1
2. Provides improved quality evaluation	1st	-	1	1	1	3
	2nd	1	1	1	-	3
3. Obtain better evaluation of cotton market	1st	-	-	-	1	1
	2nd	-	-	-	-	-
4. Necessary to avoid buying culls	1st	-	-	-	-	-
	2nd	2	1	1	-	4
5. Do a better job of cotton merchandising	1st	-	-	-	-	-
	2nd	-	-	-	1	1
All shippers	-	12	23	6	5	46

^aSales of cotton handled on the Memphis market.

TABLE VIII

PROPORTION OF TENNESSEE AND U. S. COTTON MILLS PURCHASING COTTON
PARTLY ON THE BASIS OF FIBER TESTS, BY TYPE OF TEST,
1944-45 AND 1957-58^a

Type of test	Tennessee		United States	
	1944-45	1957-58	1944-45	1957-58
(Percent of mills using tests)				
Fineness	6	61	10	65
Strength	11	44	16	42
Length and length uniformity	11	39	12	29
Maturity	-	22	6	15
Nonlint content	-	11	1	14
Color	-	22	-	4

^aSource: U. S. Department of Agriculture, Practices of Textile Manufacturers in the Purchase of Cotton, Processed Report, Cotton Branch (Washington: Government Printing Office, February, 1952) and a 1958 study of fiber testing by cotton mills in the United States by the Tennessee Agricultural Experiment Station in cooperation with ten other states and the Agricultural Marketing Service, (unpublished to date).

TABLE IX

CONSIDERATIONS IN PURCHASING COTTON WITHOUT THE USE OF
FIBER TESTS, 10 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Considerations in purchasing cotton without fiber tests	Size of shipper				Total
	Under 30,000- 30,000	100,000- 99,999	250,000- 249,999	and above shippers	
	(Number of shippers reporting)				
Experience	4	4	2	-	10
No character problems in ten	-	-	-	-	-
Immediate tests of purchases	3	2	2	-	7
Closer appraisal sufficient	1	2	-	-	3
Use of public available reports	-	-	-	-	-
Total shippers	4 ^a	4 ^a	2 ^a	-	10 ^a

^aThe ten shippers gave two considerations each.

them sufficient information. No shipper handling over 250,000 bales annually bought cotton without obtaining some data as to its fiber characteristics other than grade and staple length.

CHAPTER III

PRACTICES USED IN TESTING

The forty-six shippers made fiber tests on their own instruments and through commercial laboratories. The following is a summary of the practices used by shippers on their own instruments, and those used by fee laboratories.

Method of Sampling

Regardless of who tested the cotton, several different methods were employed by the forty-six shippers in testing cotton fiber properties before and after purchase of cotton. These were: (1) testing every bale of particular lots for one or more properties; (2) testing every bale of particular lots for some properties, and a sample of the lot for other properties; (3) testing a fixed proportion of all purchases for one or more properties; (4) testing for one or more properties from bales sampled throughout the season; (5) testing cotton purchased from certain territories only; and (6) a combination of two or more of the above methods.

Operating Practices With Shipper Owned Instruments

Fineness

All thirty-one of the shippers owning instruments for performing fiber fineness tests made one determination per test sample (Table I). Twenty-one of these included cotton from both sides of the bale in the

TABLE X

PRACTICES USED IN TESTING COTTON ON SHIPPER-OWNED INSTRUMENTS BY
VOLUME OF COTTON HANDLED, 31 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Practices	Bales of cotton handled				
	250,000				All shippers
	Under 30,000- 30,000 99,999	100,000- 249,999	and above		
	(Number of shippers reporting)				
	(4)	(17)	(5)	(5)	(31)
1. <u>Fineness test</u>					
One determination per test sample	4	17	5	5	31
2. Test sample included cotton from:					
One side of bale	1	6	1	2	10
Both sides of bale	3	11	4	3	21
3. Operator knew if bale were plated	1	4	2	-	7
4. Operator knew class at time of testing	1	4	-	-	5
5. Testing: Average of 2 sides	2	9	4	2	17
Test only low grade and staple side	1	4	1	-	6
6. No special handling	1	4	-	3	8
				(4)	-
1. <u>Strength test</u>	-	-	-	4	4
2. Using zero-guage setting	-	-	-		
Number of breaks per sample:					
1	-	-	-	1	1
2 - 6	-	-	-	1	1
3 - 6	-	-	-	1	1
6	-	-	-	1	1
<u>Length and length uniformity test</u>	-	-	-	(3)	-
1. Two or more determinations per test sample	-	-	-	3	3
2. Test sample include cotton from both sides of bale	-	-	-	3	3
3. Operator knew class at time of testing	-	-	-	3	3
4. Operator knew if bales were plated	-	-	-	3	3
5. Testing average of both sides of bale	-	-	-	3	3

sample. The remaining ten used cotton from one side only. There appeared to be no relationship between the size of the shipper and the above two practices.

For twenty-six of the shippers, the fiber test operator did not know the bale classification as to grade and staple. The five operators who knew this information were employed by shippers handling less than 100,000 bales annually.

If a bale had been classed as "two sided,"¹ seven of the operators were given this information. Only two of the operators employed by shippers handling over 100,000 bales were given these data.

In testing these "two-sided" bales, seventeen shippers tested both sides and used an average of the two readings. Six tested the low grade and staple side only, and eight said they gave these bales no special handling. There appeared to be no relationship between the volume of the shipper and the testing procedure used for the bales except the similarity between shippers in the lower volume groups, and the dissimilarity between shippers in the two larger ones. None of the shippers handling over 250,000 bales took a reading from the low grade and staple sides only.

Strength

All four of the shippers owning Pressley testers used the zero-gauge setting. The number of breaks per sample ranged from one to six. Two firms would use two and three breaks when the sample was a blend of

¹Bales where the grade and/or staple length for each side differs materially. They are also known as "plated" bales.

ten bales, and six breaks when the test was on an individual bale. The shipper making only one break used an unblended sample. The shipper making six breaks took them from six positions on the sample. Whether this sample was a blend was unknown.

Length and Length Uniformity

All three of the firms owning instruments for this test made two or more determinations per sample. Each test sample included cotton from both sides of the bale and the operators knew if the bales were "plated."

Operating Practices of Commercial Testing Laboratories

The fiber testing practices of the two commercial laboratories in Memphis were very similar and governed to some extent by the requests of their patrons. Neither firm's operators knew the classification of the cotton from which the samples were taken and, consequently, did not know if the bales were "plated." Whether the sample consisted of cotton from both sides of the bale depended upon the sample submitted.

Fineness

Thirty-six of the forty-six shippers used these agencies for testing fiber fineness. One laboratory employed one and two determinations per test sample in about equal proportion, and the other usually made two determinations.

Strength

Thirty-six firms used commercial facilities for this test. One laboratory made at least two breaks per sample and the other made an average of four breaks.

Length and Length Uniformity

Two shippers used commercial facilities for this test. Two determinations per test sample were made on all cotton submitted to the fee laboratories.

Maturity, Nonlint Content, Color, and Nap Count

Five firms used fee laboratories for the above tests. The number of determinations made per test sample varied depending upon the request of the shipper.

Shippers' Checking of Own Instruments

Twenty-seven of the thirty-one shippers owning fiber testing instruments used calibration samples for checking instruments (Table XI). The number of shippers checking, by volume groups, ranged from all of the five largest shippers to three of the four smallest ones owning testing devices for fineness.

For the twenty-seven shippers purchasing calibration samples for their fineness tests, the frequency of checks on their instruments ranged from every hour to once per day for sixteen firms, to three times weekly for four others. Three shippers tested instruments every time used, and three varied the time between checks. In addition, one of the

TABLE XI

USE OF CALIBRATION SAMPLES ON SHIPPER OWNED INSTRUMENTS
 BY VOLUME GROUP, 27 SHIPPERS, MEMPHIS, TENNESSEE,
 AUGUST 1, 1956 TO JULY 31, 1957

Use of calibration or check test samples	Number of bales handled				Total shippers
	Under 30,000- 30,000 99,999	100,000- 249,999	250,000 and above		
	(4)	(17)	(5)	(5)	(31)
1. Did you buy calibration samples?	3	15	4	5	27
2. Fineness instruments calibrated:					
a. Every hour to once per day	3	7	2	4	16
b. Three times weekly to once per week	-	3	1	-	4
c. Every time machine used	-	2	1	-	3
d. Varies	-	2	-	1	3
e. Unknown	-	1	-	-	1
3. Strength instruments cali- brated:					
a. Six times daily	-	-	-	1	1
b. After each lot	-	-	-	1	1
c. Varies	-	-	-	2	2

larger shippers reported cross-checking between its four Micronaires six times daily. There appeared to be no relationship between the frequency of the check and the volume handled by the firm.

Four of the above shippers testing for fineness also owned instruments for testing fiber strength. Two of the shippers checked their Pressley machines with the same frequency as their Micronaires. The shipper making six checks daily required the three breaks of each check to be within a certain plus or minus standard deviation of the calibration sample.

Instrument Check by Commercial Laboratories

Both commercial laboratories used calibration samples to test the accuracy of their machines. One laboratory made a check before testing every lot of cotton. The other laboratory made a daily calibration check and also ran several interchecks during the day between its two Micronaires and two Pressleys. One firm rechecked every test finding before it was released. The operators of one laboratory were checked daily for the quality of their work.

Location of Fiber Testing Instruments

Instruments owned by shippers were operated in various parts of their establishment under a variety of conditions (Table XII). Those shippers operating fiber tests under controlled atmospheric conditions maintained a constant temperature of around 68 degrees Fahrenheit and a

TABLE XII

LOCATION OF SHIPPER-OWNED FIBER TESTING INSTRUMENTS BY VOLUME OF
COTTON HANDLED, 31 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Location and type of instrument	Sales of cotton handled				Total shippers
	Under 30,000	30,000- 99,999	100,000- 249,999	250,000 and above	
	(Number of shippers owning instruments reporting)				
<u>Micronaire</u>	(4)	(17)	(5)	(5)	(31)
1. Cotton room	1	3	-	1	5
2. Glassing room	3	6	4	3 ^a	16
3. Separate room	-	1	1	-	2
4. Laboratory	-	2	-	1 ^b	3
5. Office	-	5	-	-	5
<u>Port-Ar</u>	-	(1)	(1)	(2)	(4)
1. With man in field	-	1	1	-	2
2. Cotton room	-	-	-	1	1
3. Glassing room	-	-	-	1	1
<u>Pressley</u>	-	-	-	(4)	(4)
1. Cotton room	-	-	-	1	1
2. Laboratory	-	-	-	3 ^b	3
<u>Stelenster</u>	-	-	-	(1)	(1)
1. Laboratory	-	-	-	1 ^b	1 ^b
<u>Fibrograph</u>	-	-	-	(2)	(2)
1. Cotton room	-	-	-	1	1
2. Glassing room	-	-	-	1	1
<u>Suter-Webb Sorter</u>	-	-	-	(1)	(1)
1. Laboratory	-	-	-	1	1

^aTwo of the three shippers have controlled temperature and humidity.

^bControl both humidity and temperature.

relative humidity of 65 percent. All tests conducted by the commercial laboratories were conducted under controlled atmospheric conditions.

Location of Shipper Owned Instruments

Micronaire. Sixteen of the thirty-one shippers kept this instrument in their classing room (Table XII). Four of these shippers, all handling over 250,000 bales annually, operated their machines under controlled atmospheric conditions. Other shippers had Micronaires in their cotton room, separate unconditioned rooms, and in their business offices.

Port-Ar. Two of these firms had their Port-Ars with their field men and these were probably used under varied atmospheric conditions. The other two shippers owning this machine kept it in their cotton and classing rooms, both unconditioned for temperature and humidity.

Pressley. Three of the four shippers owning Pressleys operated them in their fiber testing laboratories under controlled atmospheric conditions. The fourth kept his in an unconditioned cotton room.

Stelometer and Suter-Webb Sorter. Both firms owning these instruments kept them in testing laboratories under controlled atmospheric conditions.

Fibrograph. Both shippers using the Fibrograph did so under uncontrolled atmospheric conditions.

Location of Commercial Laboratory Instruments

The two laboratories operated their instruments under controlled humidity and temperature. One laboratory kept the temperature at 70 degrees Fahrenheit and the other at 75 degrees. Both maintained relative humidity at 65 percent. Tolerances from these specifications were limited

to 2 degrees Fahrenheit and 2 percent relative humidity. Both firms issued official test reports only after the cotton had been conditioned for a minimum of four hours. Some samples were not conditioned due to the necessity of speed in returning the sample to the customer while some were conditioned for twenty-four hours.

CHAPTER IV

USE OF FIBER TESTS IN BUYING COTTON

The demand by mills for cotton meeting fineness and strength specifications encouraged the shippers to make extensive use of these two tests (Tables IV and VI). The amount sold to mills on other test specifications was much less, consequently these other characteristics were of less importance to shippers in their purchasing and assembling operations.

Source and Origin of Open-Market Purchased Cotton

Of the 5,106,605 bales of cotton handled by the forty-six Memphis shippers, 2,742,774 bales were purchased in the open market. Of the open-market purchases, 61 percent were bought directly from the interior, 38 percent through brokers, and about 1 percent from other shippers (Table XIII). The larger shippers purchased most of their cotton from the interior. For those handling less than 100,000 bales annually, brokers were the most important source. Eighty-eight percent of the cotton purchased from the Western and Southwestern states was from the interior compared with 53 percent from the South Central and Southeastern sections (Table XIV).

Cotton from fourteen states and Mexico was purchased by the shippers in their Memphis operations. Mississippi, Arkansas, and Missouri were the more important sources, supplying 23, 20, and 11 percent respectively. Tennessee supplied slightly over 9 percent. The least

TABLE XIII

TYPE OF MARKET SOURCE OF OPEN-MARKET PURCHASED BALES BY SIZE
OF SHIPPER, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Source of cotton	Bales of cotton handled by shippers, by volume groups									
	Under 30,000	30,000- 99,999	100,000- 249,999	250,000 and above	Total shippers					
	Number	Per- cent	Number	Per- cent	Number	Per- cent	Number	Per- cent	Number	Per- cent
Interior	50889	26.7	392745	46.5	327534	59.1	904901	78.4	1676069	61.1
Brokers	139011	72.8	449877	53.3	226241	40.9	234605	20.3	1049734	38.3
Shippers	1000	0.5	1100	0.1	-	-	14871	1.3	16971	0.6
Total	190900	100.0	843722	100.0	553775	100.0	1154377	100.0	2742774	100.0

TABLE XIV

TYPE OF OPEN-MARKET SOURCE BY GEOGRAPHICAL ORIGIN OF
COTTON, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Geographical origin of cotton	Source of purchase			Total purchases
	Interior	Broker	Shipper	
		(Number of bales)		
Southeast	91245	44632	1369	137246
South Central	986385	910040	4381	1900806
Southwest	225149	49772	5630	280551
West	352990	45290	5591	403871
Mexico	20300	-	-	20300
Total	1676069	1049734	16971	2742774

important suppliers, in descending order were New Mexico, South Carolina, and Oklahoma with two-tenths of a percent each.

Tennessee shippers form an important market for the cotton crop of several states. The proportion of different states' cotton production bought through the open-market operations of the Memphis shippers gives some measure of their importance to a region as a customer for their cotton. These figures for the 1956-57 cotton crop are as follows:

<u>State</u>	<u>Percent of crop purchased</u>
Missouri	66
Tennessee	49
Mississippi	41
Arkansas	38
Louisiana	30
Arizona	19
California	17
Alabama	12
Texas	8
Georgia	6
North Carolina	2
New Mexico	2
South Carolina	1
Mexico	1
Oklahoma	1

This measure is far from complete as it does not reflect the 2,363,831 bales indirectly purchased from these states through the shippers' acquisitions of Commodity Credit Corporation stocks.

Use of the Fineness Test in Open-Market Purchases

Fiber fineness is an important fiber characteristic used to supplement grade and staple. Shippers, through the use of various sampling techniques, secured fineness data on 1,390,258 of the 2,742,774 bales of cotton purchased in the open market, and individually tested 1,930,390

bales after purchase. This duplication of testing for fineness was largely for checking on the accuracy of their sampling procedure, for concentrating cotton of various qualities, and for the purpose of meeting cotton mill contract specifications.

Fineness information was secured through the use of one of three sampling procedures on 67 percent of the 1,676,069 bales purchased from the interior (Table IV). The most important was the taking of random pre-buying tests in the territory and this was the basis for purchasing 886,222 bales. Shippers would make fiber tests at specified points in the territory and if the cotton met the necessary requirements, the firm would then buy cotton in that area. The shippers handling over 250,000 bales tested 88 percent of their interior purchases in this manner while the other three groups used it for an average of 12 percent.

The proportion of cotton tested by this method ranged by origin between 79 percent from the Southeast to 42 percent from the South Central section (Table XVI).

The fineness specifications on 171,049 interior purchased bales were obtained by making spot checks of actual samples from the different lots of cotton (Table IV). Tests would be taken on 5 to 10 percent of the order and the results taken as being representative of the entire lot. The highest proportion of cotton tested by this means originated in the South Central territory and Mexico (Table XVI). Shippers handling less than 100,000 bales tested a greater percentage of their interior purchases this way than the larger shippers (Table IV).

Almost 61,000 bales were individually tested prior to purchase at the expense of either the buyer or seller (Table XVI). This method was

TABLE IV

USE OF THE FINENESS TEST FOR INTERIOR PURCHASES BY SIZE OF SHIPPER
AND METHOD OF SAMPLING, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper (bales)	Total interior purchases	Method of sampling cotton for fineness tests							
		Random pre-		Prior spot		Individual bale test			
		buying tests in		check of ac-		at expense of:			
		the territory		tual sample		Buyer		Seller	
		Per-		Per-		Per-		Per-	
		Bales	cent	Bales	cent	Bales	cent	Bales	cent
Under 30,000	50889	4980	10	8100	16	-	-	-	-
30,000- 99,999	392745	56824	14	119917	31	14603	4	13150	3
100,000- 249,999	327534	29691	9	9501	3	7870	2	7870	2
250,000 and above	904901	794727	88	33531	4	17477	2	-	-
Total	1676069	886222	53	171049	10	39950	2	21020	1

TABLE XVI

USE OF THE FINENESS TEST FOR INTERIOR PURCHASES BY ORIGIN OF COTTON
AND METHOD OF SAMPLING, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Origin of cotton	Total interior purchases (bales)	Method of sampling cotton for fineness test							
		Random pre-		Prior spot		Individual bale test			
		buying tests		check of ac-		at expense of:			
		in territory		tual sample		Buyer		Seller	
		Per-	Per-	Per-	Per-	Per-	Per-	Per-	Per-
		Bales	cent	Bales	cent	Bales	cent	Bales	cent
Western	352990	230053	65	6375	2	16505	5	8325	2
Southwestern	225149	158355	70	13533	6	7504	3	7400	3
South Central	986385	412743	42	148541	15	13766	1	5295	0.5
Southeastern	91245	72471	79	-	-	2175	2	-	-
Mexico	20300	12600	62	2600	13	-	-	-	-
Total	1676069	886222	53	171049	10	39950	2	21020	1

used more for cotton purchased from the Western States and was not used by shippers in the smallest volume classification (Table IV and XVI).

The 1,049,734 bales purchased through brokers had fineness data on 25 percent of them (Table XVII). Two methods were used to secure this information. The most important was the spot check of actual samples by which 184,786 bales were tested. The other was to test each individual bale in a given lot of cotton. Over 81,000 bales were checked in this manner. The broker or seller paid for 86 percent of these tests.

Thirty-three percent of the 16,971 bales purchased through other shippers was on the basis of guaranteed terms as to fineness (Table XVIII). Ninety-nine percent of these guaranteed bales went to shippers handling over 250,000 bales.

Ninety-four percent of the 1,930,390 open-market purchased bales tested after purchase were tested by shippers using their own instruments (Table XIX). The largest shippers tested all of their cotton after purchase on their own instruments and had 5,118 bales retested by fee laboratories. The shippers handling less than 30,000 bales tested 15 percent of this cotton on their own instruments and proportionally were the biggest users of the fee laboratories which tested 13 percent of their cotton after purchase. The shippers handling between 30,000 and 249,000 bales tested 46 percent of their bales on their own instruments and had 6 percent of it tested by fee laboratories.

The variation of the amount of cotton tested after purchase by origin ranged from 11 percent of that from Louisiana to two-tenths of 1 percent from Oklahoma.¹

¹Data from tables not included in this study.

TABLE XVII

IMPORTANCE OF THE FINENESS AND STRENGTH TEST FOR PURCHASES
THROUGH BROKERS, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper and type of test	Number of bales by sampling method			Total purchases through brokers
	After individual bale		After spot check by buyer or seller	
	test at expense of:			
	Buyer	Seller		
Under 30,000				139011
Fineness	8434	3200	16810	
Strength	700	-	7000	
30,000-99,999				449877
Fineness	208	17675	94523	
Strength	-	-	8221	
100,000-249,999				226251
Fineness	2782	3451	1130	
Strength	-	3001	-	
250,000 and over				234005
Fineness	-	45742	72323	
Strength	-	35990	71927	
Total				1049734
Fineness	11424	70068	184786	
Strength	700	38991	81148	

TABLE XVIII

IMPORTANCE OF THE FINENESS AND STRENGTH TEST FOR PURCHASES FROM
OTHER SHIPPERS, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper	Total purchases from shippers	Number of bales on guaranteed terms as to:	
		Fineness	Strength
Under 30,000	1000	53	-
30,000-99,999	1100	13	-
100,000-249,999	-	-	-
250,000 and over	14871	5673	5674
46 shippers	16971	5739	5674

TABLE XIX

NUMBER OF BALES TESTED AFTER PURCHASE FROM THE OPEN MARKET AND
C.C.C. ON SHIPPER OWNED INSTRUMENTS AND BY FEE LABORATORIES,
46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper and cotton origin	Number of bales tested for:				Total purchases
	Fineness		Strength		
	Shipper instrument	Fee lab	Shipper instrument	Fee lab	
<u>Open market</u>					
Under 30,000	29370	25361	-	9303	190900
30,000-99,999	472840	25523	-	25462	843722
100,000-249,999	163706	54095	-	6939	553775
250,000 and over	1154377	5118	50677	4645	1154377
Total open market	1820293	110097	50677	46349	2742774
<u>C.C.C. stocks</u>					
Under 30,000	3500	4925	-	3788	43900
30,000-99,999	169577	21056	-	9411	327457
100,000-249,999	113203	44375	-	10857	332309
250,000 and above	1649013	11152	55567	6802	1660165
Total C.C.C.	1935293	81508	55567	30858	2363831
Total open market and C.C.C.	3755586	191605	106244	77207	5106605
	3947191		183451		

Use of the Fineness Test in Commodity Credit Corporation Purchases

Shippers purchased 2,363,831 bales from the C.C.C. and tested 85 percent for fineness (Table XX). The main purpose of these tests was in sorting and concentrating bales for shipment. They were of no use as a buying guide since all were made after purchase of the cotton. The largest shippers tested all of their purchases while those handling less than 30,000 bales tested only 19 percent. Over 95 percent of the cotton tested was checked on shipper owned instruments. Only the shippers handling less than 30,000 bales had the majority of their tests made by a fee laboratory (Table XIX).

Fineness of Purchases of 1956 Cotton Crop

The forty-six Memphis shippers purchased cotton in all fineness categories (Table XXI). Sixty-three percent of the cotton was in the average fineness range, and only 4 percent fell above five, and 8 percent below three. Forty-seven percent of the total purchases were between 4.0 and 4.4. For all firms, regardless of size, more cotton fell into this range than in any other class. Shippers handling less than 30,000 bales had the highest proportion of purchases in the very fine category.

Pricing of Purchases on Basis of Fineness Test

The total number of bales purchased on the basis of sample pre-purchase fineness tests by the forty-six shippers was 1,247,796. Sixteen of the firms buying this cotton discounted purchases they considered

TABLE XX

THE NUMBER OF BALES TESTED BEFORE AND AFTER PURCHASE FROM THE C.C.C.
AND OPEN MARKET FOR FINENESS AND STRENGTH, 46 SHIPPERS
MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper	Total purchases		Fineness			Strength		
			After purchase			After purchase		
	Open market	C.C.C.	Prior to purchase	Open market	C.C.C. ^a	Prior to purchase	Open market	C.C.C. ^a
Under 30,000	190900	43900	41577	54731	8425	20480	9303	3788
30,000-99,999	843722	327457	316913	498363	190633	3205	25462	9411
100,000-249,999	553775	332309	62295	217801	157578	11075	6939	10857
250,000 and above	1154377	1660165	969473	1159495	1660165	653595	55322	62369
Total 46 shippers	2742774	2363831	1390258	1930390	2016801	688355	97026	86425
	5106605			3947191			183451	
				5337449			871806	

^aAll tests on C.C.C. bales were made after purchase.

TABLE XXI

THE PROPORTION OF SHIPPER PURCHASES OF THE 1956 COTTON CROP FALLING IN VARIOUS FINENESS RANGES, BY SIZE OF SHIPPER, 46 SHIPPERS, MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper	Number and percent of purchases in fineness ranges										Total purchases		
	Coarse		Average		Fine		Very fine		Total purchases				
	5.0-up	4.5-4.9	4.0-4.4	3.5-3.9	3.0-3.4	2.9-lower							
							Number	%		Number		%	Number
Under 30,000	8521	4	33354	14	87087	37	66093	28	26118	11	13627	6	234800
30,000-99,999	85758	7	272403	23	411299	35	310267	26	76614	7	14838	1	1171179
100,000-249,999	28339	3	164962	19	395211	45	226884	26	58686	7	12002	1	886084
250,000 and over	101041	4	331478	12	1523630	54	637356	23	156125	6	64912	2	2814542
Total shippers	223659	4	802197	16	2417227	47	1240600	24	317543	6	105379	2	5106605

to be excessively fine. The average reading at which shippers started discounting cotton was 3.4 Micronaire units, with a range of 3.0 to 4.0. These interfirm differences of discount rates were caused largely by the varying demands of the shippers' customers for different cotton characteristics.

Three methods of discounting cotton for fineness were reported (Table XXII). Five of the shippers discounted all cotton equally that was below a specified minimum, and five others varied the discount rate with the time of purchase and the fineness of the cotton. Six shippers used specified discounts within different ranges of fiber fineness.

There was a wide variation of discounts taken for cotton having similar fineness characteristics. For instance, the range of discounts for cotton testing under 3.0 for fineness was from 50 to 500 points per pound (Table XXII). Three minimums between 3.0 and 3.5, and four ranges starting between these limits, had discounts from 30 to 200 points. Minimums above 3.5 or ranges starting in this area had discounts from 25 to 100 points. There was a relationship between the fineness of the cotton and the discount taken by the shipper.² The average of the discounts taken on cotton under fineness readings of 3.0 was 228 points per pound. The average discount for minimums and ranges whose upper limit varied from 3.2 through 3.5 was ninety-four points, and the average of all firm discounts for cotton above 3.5 was seventy points per pound.

A total of 80,327 bales were discounted for the amount of \$334,389. This averaged \$4.16 per bale. The average bale discount by fineness

²The correlation between the cotton fineness and the discount taken was $r = .846$ and $r^2 = .72$.

TABLE XXII

DISCOUNTS OF EXCESSIVELY FINE COTTON BY FINENESS READING OF FIBER
BOUGHT ON SAMPLE PRE-PURCHASE FINENESS RESULTS,
16 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Firm number	Fineness specifications (Micronaire readings)	Discount per pound (points)	Average firm discount	Bales discounted (number)	Monetary value of discounts
2	2.5 & below	350		276	\$ 4830
6	3.0-2.5	150		951	7133
2	3.0-2.5	150		2762	20715
10	Under 3.0	50-150		720	3600
38	Under 3.0	50-200	228	400	2500
12	Under 3.0	200		-	-
32	Under 3.0	250		3900	48750
37	Under 3.0	500		1	25
25	Under 3.0	Varies		-	-
45	3.2-2.6	200		7500	75000
1	3.2-2.9	100		1482	7410
30	3.3	50		619	1548
12	3.4-3.0	100		52	260
18	3.4-3.0	100		500	2500
30	3.4	35	94	619	1083
17	3.4-2.4	40 per .01 Micronaire reading		1158	11580
6	3.5-3.0	50		8559	21398
2	3.5-3.0	50		27625	69238
11	3.5-3.0 & below	50		440	1100
45	3.7-3.3	100		3750	18750
1	3.7-3.3	50		8890	22225
7	3.7-3.0 & below	0-250	70	353	2206
12	3.8-3.4	50		260	650
46	3.8-3.0 & below	Varies		-	-
6	4.0-3.5	25		9510	11888
16 firms				80327	334389

reading ranged from \$9.72 per bale for 9,010 bales under 3.0, to \$2.45 per bale for the 22,763 bales whose discounts started above fineness 3.5. Assuming the average bale was worth \$150, 6 percent of the bales purchased on the basis of sample pre-purchase fineness tests were discounted for 3 percent of their value.

Thirteen other shippers who bought cotton on pre-purchase fineness results had no discount system. They simply refused to buy cotton that did not meet the desired specifications.

The forty-six shippers purchased 142,462 bales on the basis of individual tests for fineness. Eleven firms discounted cotton for being too fine and three firms paid premiums for specified fineness readings.

Information was obtained on one of the shippers paying premiums for fineness. He paid \$3,342 on 7,290 bales. This averaged 46 cents per bale for cotton above fineness 4.0 (Table XXIII).

The same methods of discounting based on minimums, ranges, and time of purchase were present here. Also, as before, there was a wide variation between firm discount rates for cotton of similar fineness. For minimum fineness between 3.0 and 3.5, and two ranges starting between these limits, discounts ranged from 35 to 200 points per pound. For cotton being discounted above fineness 3.5, the range was at least 85 points per pound. There appeared to be a relationship between the firm discount rate and the fiber fineness, the discount averaging 263 points for cotton under fineness 3.0, 109 for that between 3.0 and 3.5, and around 55 points for cotton being discounted above 3.5 Micronaire units.³

³The correlation between the cotton fineness and the discount taken was $r = .583$ and $r^2 = .34$, however, this could not be proven to be significant to the 95 percent level of probability.

TABLE XXIII

IMPORTANCE OF PREMIUMS AND DISCOUNTS ON COTTON PURCHASED ON THE BASIS
OF INDIVIDUAL BALES TEST, 8 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Firm number	Fineness specifications in Micronaire readings	Discounts or premiums per pound (points)	Bales discounted or given premium (number)	Monetary value of discounts
		(PREMIUMS) ^a		
4	4.0-2.7	10	6075	\$ 304.00
4	4.8 & above	50	1215	3038.00
		(DISCOUNTS) ^b		
45	3.0 & below	400	-	-
38	3.0 & below	50-200	400	2500.00
4	3.2-3.0 & below	200	2430	\$24300.00
30	3.2	70	265	928.00
1	3.2-2.9	100	194	970.00
30	3.2-2.7	200	265	2650.00
30	3.3	50	265	663.00
30	3.4	35	265	464.00
11	2.5-4.5	Unknown	-	-
45	3.7-3.3	100	-	-
1	3.7-3.3	50	1164	2910.00
6	4.0-2.5	15	951	713.00
25	4.4-3.8	Varies	21335	Unknown
9 firms			27534	\$36098.00

^aThree other firms discounted cotton and two others paid premiums, but no information was obtained as to the amount of cotton discounted and the amount of the discounts.

^bAverage discount per bale figure disregarded 21,335 bales for which discount data unknown.

A total of 6,199 bales were discounted for a sum of \$36,098.⁴ This averages \$1.66 a bale higher than the discounts based on the sample fineness tests described previously. The average discount on cotton by fiber fineness also varied from those based on sampling techniques, being \$6.25 on cotton under fineness 3.0, \$8.14 on cotton between 3.0 and 3.5, and \$1.71 on cotton discounted above 3.5. Several factors could account for these differences, among them being the large influence of firm number four, the unknown influence of four other firms, or merely that these discounts were based on more precise information and more tests were taken on a per bale basis, thus entailing more total test cost.

Again, assuming the bale value at \$150, and the average discount of \$5.82 is correct, 19 percent of the purchases based on individual bale fineness tests were discounted for 4 percent of their value.

Five other shippers, rather than set up a range of discounts, did not purchase cotton below a specified fineness reading.

Combining the previous two tables, 8 percent of the bales tested for fineness prior to purchase were discounted. If the average discounts are correct, then at least 107,861 bales were discounted for \$494,657 or 3 percent of their value.

The discounting of cotton for being overly coarse was not widely practiced. While there were 223,659 bales purchased with a fineness value over 5.0, only four shippers discounted 2,130 bales, and another

⁴The 21,335 bales for which no discount data was known, was subtracted from total bales and the result divided into \$36,098 to secure average bale discount.

discounted an unknown quantity. There was no information on the amount of discount, but the fineness readings at which discounts were made varied (Table XXIV). One firm discounted 1,875 bales above fineness 4.9, while another discounted seventy-five bales that fell above 3.0. There were five shippers who knowingly did not buy cotton designated as too coarse, one of them not buying cotton over 5.0 in fineness reading.

Use of the Strength Test in Open-Market Purchases

The strength of the cotton fiber was second in importance to fineness as a supplement to grade and staple from the standpoint of volume tested for these fiber qualities. Shippers, through the same sampling techniques used to secure fineness data, tested 25 percent of their open-market cotton prior to purchase and 3.5 percent after its acquisition (Table XI).

Strength information was available on 34 percent of purchases from the interior (Table XXV). Again, the sampling procedure most extensively employed was the taking of random pre-buying tests in the territory. This provided the basis for purchase of 515,785 bales. The largest shippers tested 56 percent of their interior purchases in this manner while the other three groups used it for an average of 2 percent. The use of the random sample technique for determining strength in cotton, originating in different territories, ranged from 62 percent of the purchases from Mexico to 21 percent from the Southeastern area (Table XXVI).

TABLE XXIV

THE IMPORTANCE OF DISCOUNTS ON PURCHASES FOR BEING OVERLY
COARSE, 5 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957^a

Firm number	Fineness specification in Micronaire readings	Number of bales discounted
4	Unknown	Unknown
30	Unknown	884-maximum
34	Above 3.0	75 bales
43	Unknown	180 bales
45	Above 5.0	1875
5 shippers		Unknown

^aFive shippers refused to purchase cotton above a specified maximum reading.

TABLE XXV

USE OF THE STRENGTH TEST FOR INTERIOR PURCHASES BY SIZE OF SHIPPER
AND METHOD OF SAMPLING, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper	Total interior purchases	Number of purchased bales by sampling procedure						
		Random pre-		Prior spot		Individual bale test		
		buying test		check of ac-		at expense of:		
		in territory		tual sample		Bayer		Seller
Under 30,000	50889	4980	10%	7800	15%	-	-	-
30,000- 99,999	392745	353	.1%	453	.1%	178	.04%	-
100,000- 249,999	327534	7123	2%	951	.3%	-	-	-
250,000 and over	909901	503329	56%	19198	2%	17477	2%	-
Total	1676069	515785	31%	28402	2%	17655	1%	-

TABLE XXVI

USE OF THE STRENGTH TEST FOR INTERIOR PURCHASES BY ORIGIN OF COTTON
AND METHOD OF SAMPLING, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Origin of cotton	Total interior purchases	Number of purchased bales by sampling procedure						
		Random pre-		Prior spot		Individual bale test		
		buying test		check of ac-		at expense of:		
		in territory		tual sample		Buyer	Seller	
Western	352990	104682	30%	6375	2%	7544	2%	-
Southwestern	225149	90816	40%	13524	6%	2945	1%	-
South Central	986385	288116	29%	5903	.6%	4991	.5%	-
Southeastern	91245	19571	21%	-	-	2175	2%	-
Mexico	20300	12600	62%	2600	13%	-	-	-
Total	1676069	515785	31%	28402	2%	17655	1%	-

Two percent of the interior purchases were based on spot checks of actual samples. The method was proportionally the most important to shippers handling less than 30,000 bales who tested 15 percent of their interior cotton in this manner (Table XIV). Spot checking was the most important procedure for testing cotton from Mexico and was not used for purchases from the Southeastern section (Table XXVI).

Only 1 percent of the interior purchases were individually tested and the testing cost was borne by the buyer. The maximum proportion of cotton from any section tested in this manner was 2 percent and no bales from Mexico were individually tested (Table XXVI).

Strength test information was available on 120,839 of the bales purchased through brokers (Table XVII). Of these, 39,691 were individually tested and all but 700 bales handled by the smallest shippers were at the expense of the seller. The range of this procedure among origins of cotton varied from 34 percent of the cotton from Oklahoma to 2 percent of the cotton from Mississippi.⁵ Cotton purchased on the basis of a spot check at the expense of the buyer or seller was 81,148 bales (Table XVII). Thirty-one percent of the largest shippers' purchases through brokers were tested in this manner compared with an average of 1 percent for the other three groups.

Thirty-three percent of the cotton purchased from other shippers was bought on guaranteed terms as to strength (Table XVIII). All of this guaranteed test cotton went to shippers handling over 250,000 bales. This ranged by origin of cotton from 70 percent of that from the Southwest

⁵Information from table not included in this publication.

to 10 percent from the Southeast with no bales being purchased through shippers from Mexico.⁶

Fifty-two percent of the 97,026 open-market purchased bales tested after purchase were checked by the largest shippers on their own instruments (Table XIX). The remaining 46,349 bales were tested by commercial laboratories. The laboratories were most important to shippers handling less than 30,000 bales who tested 5 percent of their purchases there, and least important to the largest shippers who tested only 0.4 percent of their cotton in this manner. The variation in the amount of cotton tested for strength after purchases ranged from 5.5 percent of that from Oklahoma to 0.5 percent from Alabama with the average for all states being 3.5 percent.⁶

Use of the Strength Test in Commodity Credit Corporation Purchases

Strength test data was obtained on 86,425 bales bought from the C.C.C. (Table XIX). Sixty-four percent of these bales were tested by the largest shippers on their own instruments. All remaining bales were tested by commercial laboratories which were the only source of strength tests for the other groups. The largest and the smallest shippers tested 0.4 percent and 9 percent of their C.C.C. purchases respectively, and the average for the two middle volume groups was 3 percent (Table XIX).

⁶Information from table not included in this study.

Pricing of Purchases on Basis of Strength Test

Only seven firms considered strength in the pricing of cotton purchases. Five of them were shippers handling over 100,000 bales annually and the others more than 30,000.

Six shippers gave premiums on the basis of fiber strength specifications (Table XXVII). At least four shippers varied the minimum strength point at which premiums started. Two of these had no set rate, but the other two paid specified premiums for cotton falling within certain strength limits. One paid twenty and the other 100 points for each 5000 pounds per square inch reading above a specified minimum. Another firm paid fifty points per pound for all cotton above some stated minimum.

The four shippers who varied their minimum for basis of premiums also varied it for discount purposes (Table XXVII). They used the same method for computing the number of discount points as used in arriving at premium payments. The one shipper who did not give premiums discounted all cotton with a tensile strength below 75,000 pounds per square inch by 200 to 300 points per pound.

Use of Other Fiber Tests in Purchasing Cotton

Only 6,749 bales were tested for the characteristics of length, maturity, nonlint content, color, or nep count, and shippers handling over 250,000 bales tested 89 percent of these (Table VI). All checks were made after purchase and the tests for length and nep count were the most numerous. None of these tests were made by shippers handling under

TABLE XXVII

IMPORTANCE OF PREMIUMS AND DISCOUNTS ON COTTON BASED ON STRENGTH
SPECIFICATIONS, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Firm number	Strength min- imums in Pres- sley reading	Points per pound	Strength min- imums in Pres- sley reading	Points per pound
1	Varied	Varied	Varied	Varied
2	Varied	20 points for 5000 psi above a specified minimum	Varied	20 points for each 5000 be- low a specified minimum
6	Varied	Varied	Varied	Varied
7	Unknown	Unknown	Unknown	Unknown
11	Unknown	50	--	--
30	Varied	100 points for each 5000 psi above minimum	Varied	100 points for each 5000 psi below minimum
45	--	--	75000 psi	200-300 points for all cotton under 75000
7 firms				

30,000 bales annually. No data are available on the origin of the cotton tested and some bales were tested for research purposes alone by the large shippers on their own instruments.



CHAPTER V

USE OF COTTON FIBER TESTS IN SELLING COTTON

Of the 5,106,605 bales sold by the forty-six Tennessee shippers, 2,864,360 went to the domestic market and 2,242,245 to foreign outlets (Table XXVIII). The five shippers handling over 250,000 bales sold 64 percent of all exports, and these foreign sales accounted for 51 percent of their sales. Domestic sales for these same five firms was 1,384,881 bales, making their total sales equal to 55 percent of those of the forty-six shippers. The domestic market was the most important outlet for each of the other three groups, with exports being only 35.4 percent of their combined sales. There were some differences between the origin of cotton and the proportion exported with the latter increasing as origin shifted from East to West. The range of proportion exported by origin of cotton was from 3 percent of the Southeastern cotton to 71 percent from the West. Fifty-seven percent of the C.C.C. cotton and 65 percent of that from Mexico were also exported.

Use of the Fineness Test in Domestic and Foreign Sales

Sales on fiber fineness were based on either a fineness minimum or a fineness range. On the former, all cotton above a specified fineness reading would be accepted regardless of its coarseness. When a fineness range was employed, the upper as well as the lower limit of acceptable cotton was specified.

TABLE XXVIII

MAJOR SALES OUTLETS BY SIZE OF SHIPPER AND ORIGIN OF COTTON,
46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper and sales outlet	Origin or area of purchase						Total
	South- eastern	South Central	South- western	Western	Mexico	C.C.C.	
	(Sales of cotton)						
Under 30,000							
Domestic	3780	158808	1860	1060	-	15320	180828
Foreign	420	17092	4240	2440	1200	28580	53972
30,000-99,999							
Domestic	5539	462382	33732	37964	-	157657	697274
Foreign	3326	245239	20035	35505	-	169800	473905
100,000-249,999							
Domestic	-	332579	20690	41200	-	206908	601377
Foreign	-	107996	11410	34800	5100	125401	284707
250,000 and over							
Domestic	123931	501228	86266	34709	7000	631747	1384881
Foreign	250	75482	102318	216193	7000	1028418	1429661
Total							
Domestic	133250	1454997	142548	114933	7000	1011632	2864360
Foreign	3996	445809	138003	288938	13300	1352199	2242245
Total sales	137246	1900806	280551	403871	20300	2363831	5106605

A total of 3,925,938 bales out of the 5,106,605 sold were based on fineness (Table XXIX). This total was made up of 2,348,611 bales from the domestic market and 1,577,327 from foreign outlets. Sixty-six percent of these bales were sold on a range specification and the remainder on a fineness minimum.

The proportion of bales tested for fineness decreased as the origin of cotton shifted from the eastern to the western United States, ranging from 91.2 percent of that from the Southeast to 70 percent from the West (Table XXX). Eighty-one percent of the Mexican cotton was tested along with 75.5 percent of that from the C.C.C.

The proportion of cotton tested by size of shipper ranged from 66.5 percent for the twelve smallest shippers to 80.3 percent for those handling between 30,000 and 99,999 bales annually. All shippers, regardless of size, sold more cotton on a fineness range than on a fineness minimum.

Domestic Sales

Of the 2,864,360 bales sold in the domestic market, 2,358,611 included fineness specifications (Table XXIX). About 70 percent of these were on a fineness range and the remainder on a minimum. All shippers, regardless of volume, sold more on a range than on a minimum basis. The proportion of cotton tested by size of shipper ranged from 86 percent for the five largest shippers to 67 percent for the twelve handling less than 30,000 annually.

There was a differentiation between the geographical origin of cotton and the proportion tested, with the latter decreasing as the

TABLE XXI

NUMBER OF OPEN-MARKET AND C.C.C. PURCHASED BALES SOLD ON SPECIFICATIONS
OF FINENESS IN THE DOMESTIC AND EXPORT MARKET BY ORIGIN OF
COTTON, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Origin of cotton	Domestic sales			Export sales			Total	
	Total sales	Range	Minimum	Total sales	Range	Minimum	sales on fineness	Total sales
(Bales of cotton)								
South- eastern	133250	73460	48277	3996	1813	1647	125197	137246
South Central	1454997	841126	336402	445809	197430	121095	1496053	1900806
South- western	142548	39200	72313	138003	66226	41745	219484	280551
Western	114933	50866	24400	288938	130309	77840	283415	403871
Mexico	7000	350	3850	13300	6880	5400	16480	20300
C.C.C.	1011632	638877	219490	1352199	528039	398903	1785309	2363831
All origins	2864360	1643879	704732	2242245	930697	646630	3925938	5106605

origin moved from east to west (Table XX). The percentage ranged from 91 percent of that from the Southeast to 65 percent from the West. About 60 percent of the Mexican cotton was tested along with 85 percent from the C.C.C. Only on cotton originating from Mexico and the Southwest was the fineness minimum used more than the range as a basis for domestic sales.

Export Sales

Of the 2,242,245 bales sold in the export market, 1,577,327 were sold on fineness specifications (Table XXIX). About 59 percent were on a fineness range and 41 percent on a minimum. Only the twelve shippers handling less than 30,000 bales annually sold more on a minimum than on a range specification. The proportion of cotton tested by size of shipper varied from 65 percent for the twelve smallest to 77 percent for the six shippers handling between 100,000 and 249,999 bales annually.

There was no significant relationship between the origin of cotton and the proportion of export bales tested (Table XII). The proportion tested ranged from 87 percent of that from the Southeast to 71 percent from the South Central section. About 69 percent of the C.C.C. cotton was tested along with 92 percent of that from Mexico. More cotton exported, regardless of origin, was sold on a fineness range rather than on a fineness minimum.

Use of the Strength Test in Domestic and Export Sales

Sales on fiber strength were based on a minimum reading. A range was not used since the cotton processing was not adversely affected

by cotton that was "too strong," but by the weak fibers.

A total of 1,216,469 out of the 5,106,605 bales were sold on strength specifications (Table XXXI). This total was made up of 708,143 bales going to the domestic market and 508,236 to the export market. Unlike the test for fineness, there appeared to be no relationship between the origin of the cotton and the proportion tested for strength (Table XXXII). The proportion tested ranged from 15 percent from the Southeast and Southwest sections to 26 percent from the South Central. Sales of Mexican cotton was tested for 9 percent of its total and 24 percent of the total sales of C.C.C. cotton was tested.

There also appeared little relation between the proportion of total sales tested and volume handled by the shipper. This proportion varied from 17 percent of the twelve smallest shippers' sales to 30 percent of sales by those handling between 30,000 and 99,999 bales annually.

Domestic Sales

Of the 2,864,360 bales sold in the domestic market, 708,143 were sold on strength specifications (Table XXXI). The proportion tested was the smallest for those firms handling less than 30,000 bales and largest for the six firms handling between 100,000 and 249,999 annually.

There was no significant relationship between the origin of the cotton and the percentage of domestic sales on strength. This proportion ranged from 24 percent of that from the South Central to 11 percent of the cotton originating from the Southwest (Table XXXII). The highest proportion of all domestic sales on strength was for cotton purchased

TABLE XXXI

NUMBER OF OPEN-MARKET AND C.C.C. PURCHASED BALES SOLD ON STRENGTH
SPECIFICATIONS BY SIZE OF SHIPPER IN THE DOMESTIC AND
EXPORT MARKET, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Size of shipper	Domestic market		Export market		Total sales on strength	Total sales
	Total sales	Minimum	Total sales	Minimum		
(Sales of cotton)						
Under 30,000	180828	13170	53972	26660	39830	234000
30,000-99,999	697274	183382	473905	172842	356224	1171179
100,000-249,999	601377	174111	284707	46675	220786	886084
250,000 and above	1384881	337480	1429661	262149	599629	2814542
Total	2864360	708143	2242245	508326	1216469	5106605

TABLE XXXII

NUMBER OF OPEN-MARKET AND C.C.C. PURCHASED BALES SOLD ON STRENGTH
 SPECIFICATIONS BY ORIGIN OF COTTON IN THE DOMESTIC AND
 EXPORT MARKET, 46 SHIPPERS, MEMPHIS, TENNESSEE,
 AUGUST 1, 1956 TO JULY 31, 1957

Origin of cotton	Domestic market		Export market		Total sales on strength	Total sales
	Total sales	Minimum	Total sales	Minimum		
(Bales of cotton)						
Southeastern	133250	18494	3996	2357	20851	137246
South Central	1454997	351209	445809	152395	503604	1900806
Southwestern	142548	15152	138003	26764	41916	280551
Western	114933	17195	288938	63908	81103	403871
Mexico	7000	350	13300	1550	1900	20300
C.C.C.	1011632	305743	1352199	261352	567095	2363831
Total	2864360	708143	2242245	508326	1216469	5106605

from the C.C.C. (30 percent). Domestic sales of Mexican cotton were tested for 5 percent of their total.

Export Sales

Of the 2,242,245 bales exported, 508,326 were sold on strength specifications (Table XXXI). Unlike the import market, the smallest shippers tested the greatest proportion of their sales for strength with those handling less than 30,000 testing 49 percent of their sales. Shippers in the largest and second largest categories tested 18 and 16 percent of their sales respectively.

A greater proportion of the cotton from the Southeastern and South Central sections was sold on strength specifications (34 percent) than that from the Western and Southwestern sections (21 percent). Export sales of Mexican cotton were sold on strength requirements for 12 percent of their total, and 19 percent of the C.C.C. cotton exported was tested.

Use of Other Fiber Tests in Selling Cotton

The 20,000 bales sold through consideration of other fiber characteristics were handled by shippers handling over 250,000 bales (Table VI). This amounted to 0.7 percent of their total sales. The two tests most extensively used were length and length uniformity which accounted for 8,000 bales, and the maturity test for 7,500 bales. The remaining 4,500 bales were tested for nep count, nonlint content, and color in order of volume tested.

Of the total bales tested, 10,500 were exported (Table XXXIII). All tests, except that for color were present in both domestic and export sales. No cotton originating from the Southeast was tested, and 73 percent of the cotton tested was from the South Central section.

Fineness Minimums and Ranges Used in Sales to Cotton Mills

Sales contracts which incorporated fineness requirements, specified them as to a minimum or a range. Some shippers had sales based exclusively on a minimum and others only on a range. Many firms sold cotton both ways.

Fineness Minimums Specified on Sales

Twenty-nine shippers sold 1,351,362 bales of cotton on which fineness minimums were specified (Table XXXIV). Domestic mills accounted for 704,732 bales and 646,630 went to foreign firms. More bales were sold on the minimums of 3.8 and 3.5 Micronaire units than on any of the others. These two accounted for 295,362 bales and 194,178 respectively. Stated minimums ranged from below 3.0 to 4.5 with the majority of them varying between 3.5 and 3.8 inclusive.

Fineness minimums on domestic sales. Of the 704,732 bales sold domestically on a minimum basis, the most specified minimum was 3.5 Micronaire units. Twenty-five percent of the bales were sold on this (Table XXXIV). There was some variation in its importance and the volume handled by the shipper. For shippers in the smallest and second smallest categories, 52 and 36 percent, respectively, were sold on 3.5 fineness reading. No sales were made on this minimum by shippers handling

TABLE XXXIII

NUMBER OF BALES SOLD ON THE BASIS OF OTHER TESTS BY TYPE OF TEST
AND ORIGIN OF COTTON, FIVE SHIPPERS HANDLING OVER
250,000 BALES, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Type of test	Bales sold by origin of cotton and sales outlet							
	South Central		Southwest		West		Total	
	Domestic	Export	Domestic	Export	Domestic	Export	Domestic	Export
Length and length uniformity	3000	4000	-	1000	-	-	3000	5000
Nonlint content	-	500	1000	-	-	-	1000	500
Nep count	-	-	500	1500	-	-	500	1500
Maturity	3000	3500	1000	-	-	-	4000	3500
Color	600	-	-	-	400	-	1000	-
Total	6600	8000	2500	2500	400	-	9500	10500

TABLE XXXIV

THE VOLUME OF COTTON SOLD ON VARIOUS SPECIFIED FINENESS MINIMUMS IN
THE DOMESTIC AND EXPORT MARKET BY VOLUME OF COTTON HANDLED,
46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Fineness minimum and market outlet	Sales of cotton handled								Total sales sold on fine- ness minimum	
	Under 30,000		30,000- 99,999		100,000- 249,999		250,000 and over			
	Per-		Per-		Per-		Per-			
	Number	cent	Number	cent	Number	cent	Number	cent		
Total sales on minimum	70061	100	290769	100	75983	100	914549	100	1351362	100
Domestic	36696	100	146061	100	26999	100	494976	100	704732	100
Export	33365	100	144708	100	48984	100	419573	100	646630	100
Under 3.0	-	-	1445	0.5	-	-	-	-	1445	0.11
Domestic	-	-	738	0.5	-	-	-	-	738	0.10
Export	-	-	707	0.5	-	-	-	-	707	0.11
3.0	-	-	2154	0.7	-	-	-	-	2145	0.16
Domestic	-	-	1181	0.8	-	-	-	-	1181	0.17
Export	-	-	973	0.7	-	-	-	-	973	0.15
3.2	-	-	-	-	-	-	54524	6.0	54524	4.0
Domestic	-	-	-	-	-	-	-	-	-	-
Export	-	-	-	-	-	-	54524	13.0	54524	8.4
3.4	-	-	-	-	-	-	51029	10.3	51029	3.8
Domestic	-	-	-	-	-	-	51029	5.6	51029	7.2
Export	-	-	-	-	-	-	-	-	-	-
3.5	19217	27.4	69148	23.8	-	-	105813	11.6	194178	14.4
Domestic	19217	52.4	53044	36.3	-	-	105813	21.4	178074	25.3
Export	-	-	16104	11.1	-	-	-	-	16104	2.5
3.6	12364	17.7	7542	2.6	-	-	65007	7.1	84913	6.3
Domestic	12364	33.7	42	.03	-	-	65007	13.1	77413	11.0
Export	-	-	7500	5.2	-	-	-	-	7500	1.2
3.7	9800	14.0	16541	5.7	-	-	107192	11.7	133533	9.9
Domestic	800	2.1	3652	2.5	-	-	52650	10.6	57102	8.1
Export	9000	27.0	12899	8.9	-	-	54542	13.0	76441	11.8
3.8	18600	26.3	47637	16.4	4500	5.9	224625	24.6	295362	21.9
Domestic	300	0.8	27593	18.9	4050	15.0	96254	19.4	128197	18.2
Export	18300	54.8	20044	13.8	450	0.9	128371	30.6	167165	25.9
3.9	-	-	-	-	8100	10.7	-	-	8100	0.6
Domestic	-	-	-	-	-	-	-	-	-	-
Export	-	-	-	-	8100	16.5	-	-	8100	1.3
4.0	50	0.07	51779	17.8	12062	15.9	28887	3.2	92778	6.9
Domestic	50	0.15	6768	4.6	-	-	3264	0.7	10082	1.4
Export	-	-	45011	31.1	12062	24.6	25623	6.1	82696	12.8
4.2	-	-	1806	0.6	-	-	-	-	1806	0.13
Domestic	-	-	-	-	-	-	-	-	-	-
Export	-	-	1806	1.2	-	-	-	-	1806	0.28
4.5	-	-	4551	1.6	-	-	-	-	4551	0.34
Domestic	-	-	3973	2.7	-	-	-	-	3973	0.56
Export	-	-	578	0.4	-	-	-	-	578	0.09

between 100,000 and 249,999 bales. While 3.5 was the most important single minimum for the five largest shippers, it accounted for only 21 percent of their domestic minimum sales.

While 3.5 was the most used minimum in domestic sales by volume, it was second in importance by number of shippers specifying it as the minimum most used. Eight shippers named 3.5 and eleven shippers 3.8 as being the most common minimum specified.

Fineness minimums on export sales. Of the 646,630 bales exported on a minimum basis, the one most specified was 3.8 which accounted for 167,165 bales (Table XXXIV). For all shippers, except those six handling between 100,000 and 249,999 bales annually, the minimum of 3.8 was the one most used. For those shippers in the latter group, a fineness minimum of 4.0 was the most important.

Of the twenty-eight firms exporting cotton on a minimum basis, twelve specified a minimum of 3.8 as being the one most used. The second most used minimum was 4.0 which was the most important to six firms and accounted for 82,696 bales.

Fineness Ranges Specified on Sales

Thirty-nine shippers sold 2,574,576 bales on the basis of a fineness range (Table XXX). Twenty-eight of the thirty-five shippers handling less than 100,000 bales annually and all of those handling more than this number sold cotton on a range basis. These firms were asked to identify the range most used in domestic and foreign sales along with other ranges commonly specified. The volume sold on these ranges was obtained.

There were twenty-three separate ranges specified as being the one most used by the thirty-nine shippers. None of these ranges had a minimum of less than 3.5 or a maximum of more than 5.0 Micronaire units. The average length of these ranges was 0.97 with a variation from 0.4 to 1.5. The fineness range of 3.8 to 4.8 was mentioned as the most common by five of the shippers. The ranges of 3.8 to 5.0 and 3.8 to 4.5 were each specified the most frequently used range by four other shippers. Ranges with a minimum of 3.8 and with maximums varying between 4.2 and 5.0 were the most used ranges for nineteen shippers. The most important range by volume sold for each size group of shippers had a maximum of 5.0, with minimums varying from 3.5 through 3.8 (Table XXIV).

There were fifteen additional ranges listed as being in common use giving a total of thirty-eight ranges frequently used by the thirty-nine shippers (Table XXIV). More bales were sold in both the domestic and export market on the fineness range of 3.8 to 5.0 than any other. Only seven firms mentioned ranges whose minimums did not fall from 3.5 through 4.0, and just one shipper mentioned a range with a maximum above 5.0 Micronaire units.

The five ranges in which the most bales were sold in order of importance were as follows:

<u>Fineness range</u>	<u>Number of bales sold</u>
3.8-5.0	723,923
3.5-5.0	328,212
3.7-5.0	190,276
3.6-5.0	161,900
3.5-4.2	131,038
<u>Total</u>	<u>1,535,349</u>

The preceding mentioned ranges accounted for 61 percent of the bales sold on a range basis in the domestic market and 58 percent of the export market.

Limit At Which Cotton Became Too Coarse for General Demand

The forty-six shippers were asked at what limit cotton became too coarse for general demand. The range in answers was from 4.5 to 6.0 with eighteen shippers stating that cotton did not become "too coarse" for demand (Table XXXVI). These eighteen shippers purchased a greater proportion of cotton above 5.0 Micronaire units (5.6 percent) than the forty-six shippers considered as a group, whose purchases of cotton above 5.0 amounted to only 4 percent. The use of a coarseness maximum and its level on the fineness scale on purchase or sales contracts were probably determined by the demands of the shippers' customers.

The fineness limit mentioned by seventeen shippers was 5.0 Micronaire units. This is closely related to what was shown in the previous section which indicated that the most important ranges volume wise for all shippers had a maximum limit of 5.0. Only one shipper reported the use of a range maximum above 5.0 Micronaire units. This limit was the one most commonly specified by shippers in all size groups except those handling over 250,000 bales annually. Among the larger shippers, 4.8 was the limit most specified.

TABLE XXXVI

THE FINENESS LIMIT AT WHICH COTTON BECAME TOO COARSE FOR GENERAL
DEMAND, BY SIZE OF SHIPPER, 46 SHIPPERS, MEMPHIS, TENNESSEE,
AUGUST 1, 1956 TO JULY 31, 1957

Fineness limit	Number of bales handled								Total number of shippers	
	Under 30,000	30,000- 99,999	100,000- 249,999	250,000 and above						
	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent	Per- Number cent
(Number of shippers reporting)										
4.5	1	8.3	-	-	-	-	-	-	1	2.2
4.7	-	-	-	-	-	-	1	20	1	2.2
4.8	-	-	-	-	-	-	2	40	2	4.3
5.0	3	25.0	11	47.8	2	33.3	1	20	17	37.0
5.2	1	8.3	-	-	-	-	-	-	1	2.2
5.3	-	-	1	4.3	-	-	-	-	1	2.2
5.5	-	-	2	8.7	-	-	1	20	3	6.5
5.7	-	-	1	4.3	-	-	-	-	1	2.2
6.0	-	-	-	-	1	16.7	-	-	1	2.2
None	7	58.4	8	34.8	3	50.0	-	-	18	39.1
Total	12	100	23	100	6	100	5	100	46	100

Quality Determination of Sales to Domestic Mills

The quality of cotton specified in domestic sales was determined through three separate methods: submission of actual samples by the seller; private type samples submitted by the buyer to the seller; and sales on description. Most shippers made sales on all three methods.

In sales on actual sample, the seller took a sample from a given lot of cotton and submitted it to the buyer for examination. The private type sample was submitted by the buyer to the seller showing him the quality of cotton desired. Sales on description were just what the name implies: written or oral requirements as to grade, staple length, and in many cases other fiber characteristics such as fineness and strength are submitted to the seller to see if he can meet them. The seller may or may not send an "approval sample" to the buyer showing the cotton that he feels would meet the descriptive requirements.

Of the 2,864,360 bales sold domestically, 869,655 were on actual sample, 599,817 on private type, and 1,394,888 on description (Table XXXVII). More sales were based on description for all size classifications of shippers except those handling less than 30,000 bales annually. For these twelve, most sales were on actual samples submitted by them to the buyer. Regardless of the type of quality determination used, the majority of sales using all three of these methods were made on fiber test terms.

Sales on Actual Sample

Sixty-seven percent of the 869,655 bales sold on actual samples submitted by the seller were made on test terms (Table XXXVII). The

TABLE XXVII

METHODS OF QUALITY DETERMINATION ON SALES TO DOMESTIC MILLS BY SIZE OF SHIPPER,
46 SHIPPERS, MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Method of determination	Number of bales handled						Total bales sold	
	Under 30,000		30,000- 99,999		100,000- 249,999		250,000 and above	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Actual sample	90714	50.2	248229	35.6	217152	36.1	313560	22.6
Without test	26390	29.1	82179	33.1	138538	63.8	37260	11.9
With test	64324	70.9	166050	66.9	78614	36.2	276300	88.1
Private type	27520	15.2	110688	15.9	133546	22.2	328063	23.7
Without test	17393	63.2	35632	32.2	18544	13.9	39751	12.1
With test	10127	36.8	75056	67.8	115002	86.1	288312	87.9
Description	62594	34.6	338357	48.5	250679	41.7	743258	53.7
Without test	28587	45.7	45146	13.4	102277	40.8	120295	16.2
With test	34007	54.3	293211	86.6	148402	59.2	622963	83.8
Approval samples submitted on descrip- tion sales:								
Without test terms	6169	21.6	10646	23.6	21316	20.8	51988	43.2
On test terms	17727	52.1	121117	41.3	88736	59.4	244456	39.2
Total domestic sales	180828	100.0	697274	100.0	601377	100.0	1384881	100.0
							2864360	100.0

48.7
21.2
78.8

30.4
43.0
100.0

majority of sales by shippers in all size classifications except those six handling between 100,000 and 249,999 bales annually were on test terms. The highest percentage of domestic sales on actual samples tested were by the five shippers handling over 250,000 bales annually. The variation in proportion tested by size of shipper ranged from 36 to 88 percent.

Sales on Private Type

Of the 599,817 bales sold on the submission of private type samples to the seller, 81 percent were on fineness test terms. Only the twelve shippers handling less than 30,000 bales annually did not have the majority of their sales on this method tested. The variation in amount tested ranged from 37 percent for these twelve to 88 percent for those shippers handling over 250,000 bales annually.

Sales on Description

Of the 1,098,583 bales sold on description, 79 percent were on fineness test terms. All size groups of shippers had the majority of their descriptive sales tested. The variation in proportion tested ranged from 54 percent for those in the smallest size category to 84 percent for those five shippers handling over 250,000 bales annually. Approval samples were submitted on 30 percent of the sales not on fineness test terms, and 43 percent of those on fineness test values. The proportion of approval samples submitted on descriptive sales of tested cotton was higher than on those not tested for all shippers except those in the over 250,000 bales category.

CHAPTER VI

THE COST OF COTTON FIBER TESTING

The forty-six shippers were asked if they knew the cost of cotton fiber testing per bale, and if they did, what was this cost. Only nineteen could answer this question and there was a wide variation in their estimates, ranging from one cent to \$1.00 per bale, or from a negligible figure to twenty points per pound.¹ This was expected because of the many factors which could vary the cost between firms. Some of the more important variables associated with differences in cost of fiber testing included: ownership or non-ownership of instrument, kind of instrument, type of test, number of determinations per test sample, number of test samples or volume tested, labor costs per hour, testing facilities, frequency of testing instruments and checking operators, requirements of customers, and proportion of sales in domestic and export market.

The average cost of all types of tests for the nineteen shippers was \$.1854 per bale or 3.7 points per pound. By volume groups, five shippers handling less than 30,000 bales annually reported the highest average of \$.3071 per bale. Two shippers from the largest volume group had the second highest average cost of \$.2050 per bale. The lowest average cost per bale was \$.035 reported by two shippers in the 100,000 to 249,999 annual bale category. The ten shippers reporting from the 30,000 to 99,999 bale category had the second lowest cost of \$.12 per

¹One hundred points are equal in value to \$.01.

bale. The relative high cost of the smallest shippers was probably due to the low volume tested and its result of not being able to take advantage of quantity discounts.² The cost of the largest shippers being higher than those of the two middle volume groups was probably caused by their more extensive use of tests other than that for fineness which were more expensive.

Major Cost Categories

In merchandising cotton on fiber test terms, shippers were faced with several types of both direct and indirect costs. Some of the major ones were: (1) actual cost of testing, (2) increased cost of selective buying in high cost territories where cotton was suitable for needs, (3) discounts on sales of stocks with unpopular fiber test values, (4) cost of increased claims or disputes, (5) added cost of carrying, assembling and concentrating cotton, and (6) added cost of fill-ins. Each firm was asked to estimate which of the above cost items was the highest with regard to fiber testing. If more than one was important, they were to list them and give their relative rank.

Actual Cost of Fiber Testing

This cost was felt to be the most important by thirteen shippers, twelve of which handled less than 100,000 bales annually. No shipper handling over 250,000 bales considered this cost as either first or second in importance (Table XXXVIII). Only five of the above thirteen

²See page 106 for charges by commercial fee laboratories in Memphis.

TABLE XXVIII

RELATIVE IMPORTANCE TO SHIPPERS OF MAJOR COSTS ASSOCIATED WITH MERCHANDISING COTTON
ON THE BASIS OF FIBER TEST RESULTS BY SIZE OF SHIPPER, 46 SHIPPERS,
MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Major cost categories	Number of bales handled						All shippers
	Under 30,000	30,000- 99,999	100,000- 249,999	250,000 and above			
	Rank of importance of cost items						
	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	
	(Number of shippers)						
Actual cost of testing	7 2 1 - -	5 3 2 - 1	1 1 3 - -	- - 1 1 -	13	6 7 1 1	
Increased cost of selective buying	1 - - - -	7 2 - - -	3 - - - -	2 2 - - -	13	4 - - -	
Discounts on sales with un- desirable test values	1 - - - -	5 2 1 - -	1 4 - - -	3 - - - -	10	6 1 - -	
Cost of increased claims and disputes	- 1 - - -	2 2 2 - 1	1 - - - -	- - 1 - -	3	3 3 - 1	
Added costs of carrying, as- sembling and concentrating	3 1 2 - -	4 4 4 1 -	- 3 - - -	- 2 1 - -	7	10 7 1 -	
Added cost of shipping sub- stitute bales	- 1 - - -	- 2 - 1 -	- - - - -	- - - - -	-	3 - 1 -	

shippers owned fiber testing instruments. This meant that only 16 percent of the thirty-one shippers owning instruments compared with 53 percent of the fifteen shippers not owning instruments felt that the actual cost of testing was the greatest cost.

Increased Cost of Selective Buying

Thirteen shippers listed this as their greatest expense associated with fiber testing, five of which handled over 100,000 bales annually (Table XXXVIII). Only one shipper of the twelve handling less than 30,000 bales considered this cost as being significant. Two of the five largest shippers felt it was the most important cost.

Discounts on Sales

Ten of the forty-six shippers listed this as their primary cost associated with fiber testing. Three of the five largest shippers listed this in first place. While this cost was relatively unimportant to those shippers handling less than 100,000 bales annually, five out of the six shippers handling between 100,000 and 249,999 bales listed it as either of primary or secondary importance.

Cost of Increased Claims and Disputes

Only three shippers listed this as their primary cost and these were located in the two middle volume groups. Only one shipper each in the largest and smallest volume group even considered this cost significant and listed it third and second, respectively.

Added Costs of Carrying, Assembling, and Concentrating

All seven of the shippers listing this as their most important cost associated with fiber testing handled less than 100,000 bales

annually. Three shippers in each of the larger volume groups did consider it second or third in significance.

Added Cost of Fill-Ins

The least important cost was that of shipping substitute bales for cotton not meeting mill fiber test requirements. Only four shippers, and these handling less than 100,000 bales annually even considered it significant. None of them said it was their primary cost.

Claims Resulting From Sales on Fiber Test Values

Fineness

Proportion of sales disputed. Of the 2,401,639 bales sold on the basis of fineness, 47,814 were subject to dispute or claim (Table XXXIX). This total consisted of 36,579 bales or 3 percent of domestic sales on fineness plus 11,235 bales or 1 percent of the export fineness sales. All shippers except those handling over 250,000 bales annually had the largest proportion of fineness sales disputed in the domestic market. Shippers handling between 30,000 and 99,999 bales had 7 percent of their bales sold on fineness subject to dispute. This was higher than that encountered by any other volume group. The lowest proportion disputed was 0.1 percent of those six shippers handling between 100,000 and 249,999 bales annually.

Methods of settlement of claims. When disputes were encountered, they were settled by one of three methods: substitution of other bales; a cash settlement; or the shipper's test values being accepted (Table XXXIX).

TABLE XXXIX

THE NUMBER OF DISPUTES, THEIR METHOD OF SETTLEMENT AND COST RESULTING FROM COTTON SALES ON FINESSNESS,
46 SHIPPERS, MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Number, settlement, and cost of claims in the domestic and export market	Number of bales handled										Total shippers
	Under 30,000		30,000- 99,999		100,000- 249,999		250,000 and above		Per- cent	Number	
	Per- cent	Number	Per- cent	Number	Per- cent	Number	Per- cent	Number			
Proportion of sales on fineness subject to claim											
Domestic	.94	858	6.7	28230	.1	320	1.2	18406	2.0	47814	47814
Export	1.8	622	12.6	26103	.14	233	1.2	9621	2.9	36579	36579
What proportion settled by:	.26	236	.96	2127	.06	87	1.2	8785	1.0	11235	11235
Substitution of other bales											
Domestic	60.7	521	67.6	19086	57.8	185	26.6	4885	51.6	24677	24677
Export	47.1	293	69.6	18174	79.4	185	26.0	2526	57.9	21178	21178
Cash settlement	96.6	228	42.9	912	-	-	26.9	2359	31.1	3499	3499
Domestic	18.9	162	16.4	4638	30.0	96	57.1	10519	32.2	15415	15415
Export	26.0	162	13.6	3547	3.9	9	57.2	5502	25.2	9220	9220
Shipper test values being accepted	-	-	51.3	1091	100	87	57.1	5017	55.0	6195	6195
Domestic	18.9	175	16.0	4506	12.2	39	16.3	3002	16.2	7722	7722
Export	26.8	167	16.8	4382	16.7	39	16.5	1593	16.9	6181	6181
Proportion of disputes unofficially arbitrated	3.4	8	5.9	124	-	39	16.0	1409	13.7	1541	1541
Domestic	47.2	405	50.7	14304	72.8	233	99.0	18215	69.3	33157	33157
Export	65.1	405	50.8	13265	100	233	99.0	9521	64.0	23424	23424
Amount of claims paid (\$)	-	-	48.8	1039	-	-	99.0	8694	86.6	9733	9733
Domestic	-	500.00	-	900.50	-	150.00	-	138.75	-	1689.25	1689.25
Export	-	500.00	-	450.00	-	-	-	46.25	-	996.25	996.25
Total cost of all claims, disputes, and settlements (\$)	-	-	-	450.50	-	150.00	-	92.50	-	693.00	693.00
Domestic	-	700.00	-	900.50	-	750.00	-	14138.75	-	16489.25	16489.25
Export	-	700.00	-	450.00	-	600.00	-	7042.25	-	8796.25	8796.25
	-	-	-	450.50	-	150.00	-	7092.50	-	7693.00	7693.00

Fifty-two percent of the disputes or 24,677 bales were settled by the substitution of other bales. This was the principle method of settlement for all shippers except those five handling over 250,000 bales annually. The majority of domestic sales (58 percent) were settled in this manner. For export sales, it was second in importance, being used in 31 percent of the disputes.

A cash settlement ended the disputes over 15,415 bales or 32 percent of the claims. This was the method most used by the five largest shippers in both domestic and export sales. For the forty-six shippers collectively, it was the method most used for settling disputes in export sales, and second in importance for domestic settlements.

Sixteen percent of the disputes were ended by the shipper's test values finally being accepted. Collectively, this was the least used solution in both the domestic and export market. For domestic disputes, it was second in importance for all shippers handling less than 250,000 bales annually. Only the twelve smallest shippers placed it second in importance in the export market, being the solution for 3.4 percent of their disputes.

Proportion of disputes unofficially arbitrated. When a dispute of a mercantile nature arose, the parties concerned could arbitrate it officially through the seven-man Committee of Arbitration established by the Memphis Cotton Exchange. The other alternative was unofficial arbitration between only the buyer and seller. Using this method, many times they would employ the services of a commercial fee laboratory, accepting the test reading of samples as the official decision.

Of the 47,814 bales subject to dispute, agreement was reached on 33,157 through unofficial arbitration (Table XXXIX). Sixty-four percent of the domestic disputes and 87 percent of those in the export market were settled through this procedure. By volume groups, the proportion of disputes unofficially arbitrated decreased from 99 percent for the five shippers handling over 250,000 bales annually, to 47 percent for the twelve handling less than 30,000 bales. These latter twelve and the six handling between 100,000 and 249,999 annually did not settle any export disputes through the use of this procedure.

Cost of claims and disputes. Twenty-nine of the forty-six shippers were able to answer this question and they had a total cost from claims and disputes of \$16,489.25 (Table XXXIX). The two shippers reporting from the over 250,000 bale category accounted for \$14,138.75 of this total. The average expense to the twenty-seven shippers handling less than 250,000 bales was \$87.00 each. The average cost per bale handled and per bale tested by volume groups in the domestic and export market is shown below:³

<u>Number of bales handled</u>	<u>Average cost per bale (in points)</u>			
	<u>Handled</u>			<u>Tested</u>
	<u>Domestic</u>	<u>Export</u>	<u>Total</u>	
Under 30,000	67	-	51	77
30,000-99,999	11	16	13	9
100,000-249,999	9	5	8	11
<u>250,000 and above</u>	<u>127</u>	<u>124</u>	<u>125</u>	<u>163</u>
<u>Total</u>	<u>49</u>	<u>54</u>	<u>51</u>	<u>75</u>

Only those shippers handling 250,000 bales had a cost in excess of

³The proportion of shippers reporting in each volume group was used in securing the average for that group.

\$.01 per bale handled. This figure coincided closely with the findings in Table XXXVIII, which showed that only three of the forty-six shippers considered disputes as a primary cost of fiber testing. The average cost per bale sold on fineness was 75 points.

Other Fiber Tests

The forty-six shippers were asked to outline the nature, extent, method of settlement, and costs of disputes on cotton sold on other test values. Six shippers, two from each volume group except the 100,000 to 249,999 bale category, reported disputes on strength values. One of these shippers in the largest volume group also indicated a dispute relating to the test for nep count. Only the four shippers in the smaller volume groups knew the costs of these claims and they ranged from \$20 to \$1,000 with an average of \$580 per shipper. This gave an estimated average cost per bale handled of fifty-two points to the forty-six shippers' sales, and two hundred and nineteen points as the average cost per bale sold on strength.

The Cost of the Fiber Test

Few shippers had established adequate procedures to accurately compute the cost of the actual fiber test. Many variables were mentioned earlier in this chapter which might account for the variation in cost per bale. The more important were type of test, number of samples tested, and practices used in testing. The following cost analysis was an attempt to estimate the costs of a particular fiber test under the

separate conditions of ownership and non-ownership of the fiber testing instrument. The main value of this procedure is not to give an exact estimate of cost, but to illustrate the many variables involved in cost computation and their relative importance.

Costs of Ownership

When a shipper purchased an instrument, certain costs immediately became apparent. These costs were divided into the broad categories of fixed and variable.

Fixed costs. When a machine was purchased, the costs of depreciation, interest, repair, taxes, and insurance were sustained. One of the more important variables in determining their absolute and relative importance was the type of machine purchased. Table XL is a list of the testing instruments used in the Memphis market, their price, and the rates at which the various fixed costs were calculated.⁴

Another fixed cost would be involved if air conditioning and humidifying equipment were installed. The accuracy and dependability of some fiber testing instruments are increased by maintaining a relative humidity of 65 percent and a temperature of 68 degrees Fahrenheit. The equipment to control the atmospheric conditions of an area comprising around 5000 cubic feet would require an investment between \$2,000 and \$2,500. Depreciating this equipment over a five-year period, a shipper would have the following expenses:

<u>Depreciation</u>	<u>Interest</u>	<u>Repair</u>	<u>Taxes</u>	<u>Insurance</u>	<u>Total cost</u>
\$400.00	\$72.00	\$30.00	\$2.50	\$16.00	\$520.00

⁴The prices are from a 1959 price list.

TABLE XL

THE ESTIMATED FIXED COSTS INCURRED THROUGH THE OWNERSHIP OF COTTON
FIBER TESTING INSTRUMENTS, BY TYPE OF INSTRUMENT, 1959

Instrument	Price ^a	Annual depreciation		Annual interest ^b		Annual repair		Annual taxes ^c		Annual insured		Total annual fixed cost
		Rate	Amount	Rate	Amount	Rate	Amount	Rate	Amount	Rate	Amount	
Fibronaire	1000.00	20%	200.00	6%	36.00	1%	10.00	2.5%	12.50	.8%	8.00	266.50
Micronaire	800.00 ^e	20%	160.00	6%	28.40	1%	8.00	2.5%	10.00	.8%	6.40	212.80
Automated	1500.00 ^e	20%	300.00	6%	54.00	1%	15.00	2.5%	18.75	.8%	12.00	399.75
Port-Ar	685.00	20%	137.00	6%	24.66	1.2%	8.00	2.5%	8.56	.8%	5.48	183.70
Speedar	1237.00	20%	247.40	6%	44.53	.6%	8.00	2.5%	15.46	.8%	9.89	325.28
Areallometer	858.00	20%	171.60	6%	30.89	1.5%	12.87	2.5%	10.73	.8%	6.86	232.95
Pressley	465.00	20%	93.00	6%	16.74	1%	4.65	2.5%	5.81	.8%	3.72	123.92
Fibrograph	2380.00	20%	476.00	6%	85.68	6.3%	150.00	2.5%	29.75	.8%	19.04	760.47
Shirley Analyzer	3500.00 ^b	20%	700.00	6%	126.00	1.5%	52.50	2.5%	43.75	.8%	28.00	950.25
Colorimeter	2900.00	20%	580.00	6%	104.40	6.3%	182.70	2.5%	36.25	.8%	23.20	926.55
Stelometer	675.00	20%	135.00	6%	24.30	1.5%	10.13	2.5%	8.44	.8%	5.40	183.27

^aPrices are from 1959 price list.

^bCalculated by taking 6 percent of the average yearly investment.

^cTax rate based on rate of \$2.50 per \$100.00 of value.

^dInsurance rate based on \$8.00 per \$1,000.00 of value.

^eEstimated price of Micronaire plus Shadowgraph and Compressor.

Only three shippers operated their machines under controlled atmospheric conditions. Since tolerances or ranges were allowed on most sales, the need for exactness was lessened. Also, several types of machines do not require controlled atmospheric conditions for acceptable test results.

Variable cost. The largest cost in this category was the labor required to perform the tests. The larger shippers hired special operators for this task while to most of the smaller shippers it was another task assigned to present personnel. In the following cost model, it was assumed that a specialist was hired for this task for a period of six months out of the year. For those shippers not hiring special operators, labor cost could be computed on the basis of the number of hours spent by their personnel in machine operation.

The other important variable cost was electricity if the instruments were kept under controlled atmospheric conditions. Adequate conditioning equipment for a room of approximately 5,000 cubic feet would require one five-horsepower motor and two smaller ones of one-half horsepower each.⁵ A system of this type would use about 6,200 watts per hour. Only three of the forty-six shippers operated their machines under these conditions.⁶

Average cost per sample. The major factor that determined average cost per sample was the number of samples tested. This, in turn, was a

⁵Based on estimate from the U.S.D.A. Fiber Testing Laboratory, Knoxville, Tennessee.

⁶Based on calculations from the University of Tennessee Agricultural Engineering Department.

function of the volume of cotton handled and tested, type of instrument, number of operators, and number of determinations per test samples. In the following illustration, a non-automatic Micronaire was used to illustrate the derivation of average cost. This same method of analysis could be used in determining the cost of the other instruments. For the sake of simplicity, the following conditions were assumed:

1. Instrument operator works a forty-hour week, twenty-eight weeks per year, at a wage rate of \$1.50 per hour.
2. Air conditioning equipment, if used, runs one-third of the time for twenty-eight weeks at a rate of \$.015 per kilowatt.
3. One operator with one non-automatic Micronaire, making one determination per test sample turns out 240 samples per day.⁷
4. No extra space is rented for the fiber testing facility and no rent is charged against its use.

The average cost per sample was equal to the number of samples tested divided by total annual cost. The first step was to calculate total annual cost from previous given and assumed data.

<u>Annual cost</u>	<u>Without atmospheric control</u>	<u>With atmospheric control</u>
Variable	\$1,680.00	\$1,784.00
Fixed	212.80	520.50
<u>Total</u>	<u>\$1,892.80</u>	<u>\$2,304.50</u>

The variation in average cost per sample was then shown by altering the number of samples tested annually.

⁷Based on the results of tests conducted at the Institute of Textile Technology, Charlottesville, Virginia.

<u>Number of samples</u>	<u>Average cost per sample</u>	
	<u>Without</u> <u>atmospheric control</u>	<u>With</u> <u>atmospheric control</u>
500	\$3.766	\$4.609
1,000	1.893	2.305
3,000	.631	.768
5,000	.378	.461
10,000	.189	.230
20,000	.095	.115
30,000	.063	.077
35,000	.054	.066
40,000	.047	.058

By comparing the above table with one that gave the tariffs charged by two commercial fee laboratories, some conclusions were drawn as to the advisability of shipper purchases of fiber testing instruments.

Price schedules for two fiber test laboratories in Memphis, Tennessee

<u>Number of samples</u>	<u>Price per sample</u>	<u>Total samples tested</u>	<u>Average cost</u>
First 1,000	\$.20	1,000	\$.200
Next 4,000	.18	5,000	.184
Next 5,000	.17	10,000	.177
Next 20,000	.16	30,000	.166
Next 20,000	.15	50,000	.159
Next 50,000	.13	100,000	.145
Next 50,000	.11	150,000	.133
Next 50,000	.09	200,000	.122
For all over 200,000	.08	-	-

Excluding all other factors, and using the above cost calculations, it would have been cheaper for the shipper to purchase a Micronaire if the planned number of samples tested reached some point between 10,500 and 11,000 per year if purchase of air conditioner was not contemplated. If atmospheric conditions were to be controlled, the shipper would have had to tested between 13,000 and 13,500 samples to net a cheaper cost with a purchased instrument (Figure 1).

Other factors excluded above should be considered and their weights could alter the above mathematical model. They were:

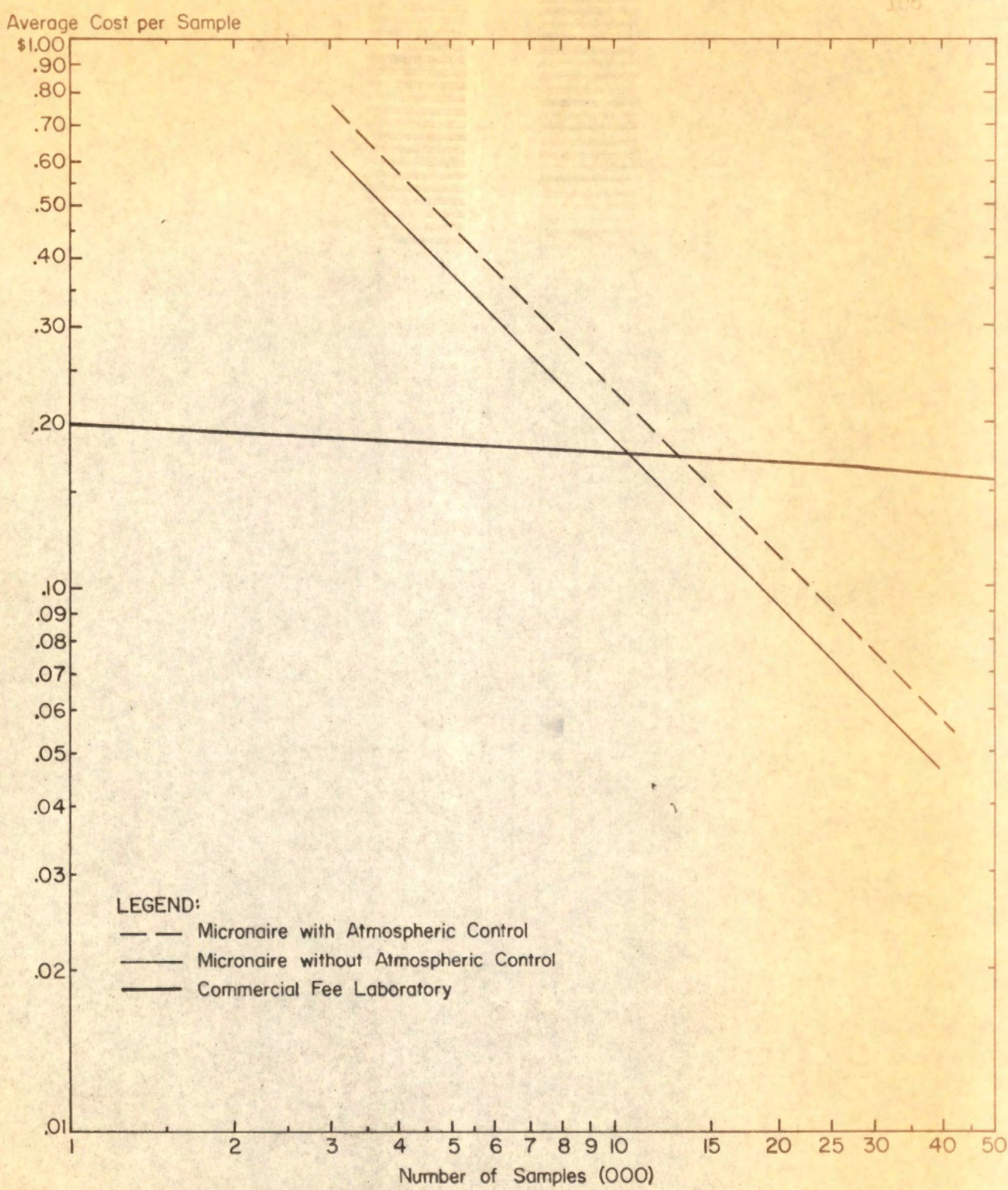


Figure 1. A comparison of the fineness cost per sample of testing cotton with a shipper-owned Micronaire (non-automatic) and the cost of having the test performed by a commercial fee laboratory.

1. Commercial laboratories usually run more than one determination per test sample.
2. Commercial fee laboratory technicians are trained specialists.
3. All tests at commercial fee laboratories are conducted under controlled atmospheric conditions.
4. There was probably less chance for mercantile disputes if commercial fee laboratories tested the cotton.
5. The commercial laboratories offered special discounts for an annual contract or volume commitment.
6. The importance of speed in determining the fiber tests of cotton.

No attempt was made here to weigh the above factors since their relative importance would vary between shippers, between transactions, and by type of test and instrument used.

As an aid in the calculation of cost of the other fiber tests, the estimated absolute and relative speed of various fiber instruments was shown. It was assumed that there was one operator per machine and this operator also prepared the sample for testing. The speed of the non-automatic Micronaire was given the value of 1.00 per hour.⁸

<u>Fiber testing instrument</u>	<u>Sample turnout per hour</u>	<u>Relative speed index</u>
Micronaire, non-automatic	30	1.00
Automatic Micronaire	40	1.33
Port-Ar	52.5	1.75
Speedar	137.5	4.58

⁸This estimation was based on test results from the Institute of Textile Technology, Charlottesville, Virginia, and estimates from the U.S.D.A. Fiber Testing Laboratory and Spinlab Inc., Knoxville, Tennessee.

<u>Fiber testing instrument</u> (Continued)	<u>Sample turnout per hour</u>	<u>Relative speed index</u>
Pressley	18	.60
Stelometer	16	.53
Fibrograph	20	.66
Arealometer	13	.43

There are two important shortcomings in the preceding table. The first is that it fails to show the effects of automation on the speed of testing. Anderson, Clayton, and Company reported that a team of one Shadowgraph and one Micronaire operator working together with an automatic conveyor belt would turn out 333 samples per hour.⁹ The second shortcoming was that while some instruments are slower than others, they may give additional information. For example, it requires less time to make a test for fineness with the Micronaire or Speedar than with the Arealometer. However, the Arealometer in addition to fineness also gives an indication of the fiber's maturity. Another example is that the Stelometer, while being slower than the Pressley in giving strength data, also shows the elongation of the fiber.

The Total Cost of Fiber Testing

The following was an attempt to calculate the total cost of fiber testing. The six major costs were those listed in Table XXXVIII. It was assumed that the total cost of fiber testing was equal to the sum of these six costs. The cost model operated under the following conditions:

⁹The Cotton Trade Journal, October 15, 1954, p. 4.

1. Two non-automatic Micronaires were used.
2. One operator per instrument, working forty hours per week, six months per year at a wage of \$1.50 per hour.
3. Each operator turned out thirty samples per hour.
4. The fixed and variable cost data derived from the previous cost model was used.
5. The shipper model was in the 30,000 to 99,999 bale volume group and tested 67,200 samples.
6. The cost of claims and disputes was \$87.00 as shown in Table XXXIX.

No information was obtained on the four other major costs listed in Table XXXVIII. The following method was used to convert their relative value to an absolute.

1. The average cost of the actual test was determined by dividing total annual fixed and variable cost by 67,200, the number of samples tested.
2. Table XXXVIII showed there were five shippers in the 30,000 to 99,999 volume group choosing the actual cost of the test as the primary cost.
3. The derivation of the other costs was made by dividing the figure five into the number of shippers choosing the cost as first in importance. If none placed it in first, the number listing it as second was divided by two and the resulting quotient divided by five. This percentage was then multiplied by the annual cost of the actual fiber test and the resulting product was given as the absolute value of the particular cost involved.

The cost calculations were as follows:

Annual cost of the fiber test		
Fixed	\$ 425.60	
Variable	3,360.00	\$ 3,785.60
Increased cost of selective buying in high-cost territories for suit- able cotton	$7/5 \times \$3,785.60$	5,299.84
Discounts on sales with undesirable test values	$5/5 \times \$3,785.60$	3,785.60
Cost of increased claims and disputes		87.00
Added costs of carrying, assembling and concentrating	$4/5 \times \$3,785.60$	3,028.48
Added cost of shipping substitute bales	$1/5 \times \$3,785.60$	<u>757.12</u>
Total cost		\$16,743.64

The total cost was then divided by the number of samples taken and the resulting quotient was a cost of 24.9 cents per sample. The cost per bale in the above model would have depended upon what percent sample was taken by the shipper. For example, if a 50 percent sample was taken, the per bale cost of those sold on fineness would have been 12.45 cents.

As in the previous model, the cost would also vary with the number of samples tested. The relative rank of the costs in different shipper groups would also affect a change in their absolute value.

CHAPTER VII

SHIPPER APPRAISAL OF COTTON FIBER TESTS

The Advantages and Disadvantages of Cotton Fiber Testing

The forty-six shippers were asked to list what they considered to be the principal advantages and disadvantages of cotton fiber testing. One main advantage given was that fiber testing permitted a more objective measurement of cotton quality. Some felt that the use of fiber testing would aid cotton in competition with the synthetic fabrics. The other advantage mentioned was that fiber tests were an aid in the buying and selling of cotton. In the latter case, some shippers stressed their use as a competitive weapon. Others felt their main contribution was their usefulness in sorting cotton into more even-running lots. Most shippers gave more than one reason.

Thirty-two shippers listed ten disadvantages of fiber testing. The principal complaint listed by sixteen was the added time, work, and cost involved. The majority of these shippers felt they bore the brunt of the costs and were not adequately compensated. Five shippers felt that fiber testing was being overemphasized. Three felt that the test demands by mills were unreasonable and three others criticized the inaccuracy of the tests. Two shippers each made the following complaints: (1) the standardization of the testing procedures and of the premium and discount rates were inadequate, (2) fiber testing was difficult to conduct at interior points, and (3) fiber testing made it more difficult for

the smaller shippers to compete due to their low volume and the high cost of testing instruments. Three other ideas presented were: (1) the government should do all of the testing, (2) the cotton mills should do all the testing, and (3) fiber testing made it more difficult to dispose of "cull" cotton. The majority of the above complaints came from the smaller shippers.

Shipper Use of Public Reports on Cotton Fiber Testing

Twenty-seven of the forty-six shippers received one or more published reports on the fiber testing of cotton. Ten of the eleven shippers handling over 100,000 bales annually received this information compared with only two of the twelve shippers handling less than 30,000 bales. The source of these reports and the number of shippers receiving them is as follows:

<u>Source of cotton quality report</u>	<u>Number of shippers receiving reports</u>
1. U.S.D.A.	22
2. University of Texas	13
3. Lubbock Cotton Exchange	2
4. Princeton (Textile Research Institute)	1
5. Pecos Valley Association	1
6. N. C. State Department of Agriculture	1
7. Mid South Cotton Grower Association	1

Fifteen of the twenty-seven shippers receiving these reports felt that they were helpful, while twelve found them of no value. Reports were received on the average of once per month and their primary use was as an aid in evaluating the quality of cotton from specific geographical areas.

Shipper Attitudes Toward Incorporating Fiber Fineness into the Smith-Doxey Classification

Eighteen of the forty-six shippers were for placing the fineness value on the Smith-Doxey Form "1" card along with the bale grade and staple length. Twenty-four shippers were against this action, three had no opinion, and one was to have the fineness value recorded on California cotton only. Nineteen of the twenty-four against this use of fiber testing handled less than 100,000 bales annually. The remaining five were from the eleven shippers handling over 100,000 bales.

The Trend in the Extent of Use of Fiber Testing

The proportion of sales on fineness and strength for three consecutive seasons is shown in Table XLI. The proportion of bales sold on fineness has increased at an increasing absolute rate for the entire period in both the domestic and export market. The percentage of sales on strength increased for all shippers in the domestic market over the three-year period, but decreased in the export market from the 1955-56 to the 1956-57 season for those shippers handling over 100,000 bales annually.

The shippers were asked if they felt that sales on test terms would increase again during the 1957-58 season. Their answers were recorded in Table XLII. The majority of shippers in all size categories except those handling between 100,000 and 249,999 bales annually, felt that sales on fiber test values would increase.

TABLE XLI

THE PROPORTION OF COTTON TESTED FOR FINENESS AND STRENGTH DURING THE 1954-55, 1955-56, AND 1956-57 SEASONS IN THE DOMESTIC AND EXPORT MARKET, BY VOLUME OF COTTON HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Date and type of sales	Proportion of sales on fineness by volume of cotton handled				Proportion of sales on strength by volume of cotton handled			
	Under 30,000-	100,000-	250,000		Under 30,000-	100,000-	250,000	
	30,000	99,999	249,999	& above	30,000	99,999	249,999	& above
	(Percent)				(Percent)			
<u>Domestic</u> <u>sales</u>								
1954-55	11.6	38.7	38.8	48.0	.42	4.5	10.3	14.6
1955-56	30.8	55.0	41.3	55.0	.83	7.1	12.0	12.0
1956-57	67.0	85.5	72.4	86.4	7.3	26.3	28.5	24.4
<u>Foreign</u> <u>sales</u>								
1954-55	4.6	20.0	45.5	39.6	1.7	5.1	35.0	12.4
1955-56	12.1	32.6	51.3	52.0	3.3	9.7	40.0	21.0
1956-57	64.8	72.6	77.3	68.4	49.4	36.5	16.4	18.3

TABLE XLII

NUMBER OF SHIPPERS BELIEVING THE PROPORTION OF SALES BASED ON FINENESS AND STRENGTH WOULD INCREASE OVER PREVIOUS SEASONS DURING THE 1957-58 SEASON BY VOLUME OF COTTON HANDLED, 46 SHIPPERS, MEMPHIS, TENNESSEE, AUGUST 1, 1956 TO JULY 31, 1957

Sales based on whether fine- ness and strength would increase or decrease	Volume of cotton handled				Total shippers
	Under 30,000	30,000- 99,999	100,000- 249,999	250,000 and above	
	(Number of shippers reporting)				
Increase	7	15	1	3	26
Decrease	5	8	5	2	20
Total shippers	12	23	6	5	46

CHAPTER VIII

THE USE OF COTTON FIBER TESTING BY MEMPHIS SHIPPERS COMPARED WITH THEIR USE BY COTTON SHIPPERS THROUGHOUT THE UNITED STATES

This chapter was an evaluation of the use made of cotton fiber tests by the forty-six Memphis shippers compared to their use by 186 shippers located throughout the United States. The data on shippers located outside of Memphis were secured from a recently published Southern Cooperative Series bulletin.¹

Ownership of Instruments

The following breakdown showed that the number and type of instrument owned was similar between Memphis shippers and those from the entire United States.

	<u>Proportion</u>	<u>Memphis</u>	<u>U. S.</u>
1. Proportion of shippers owning instruments		67%	65%
2. Proportion of owned instruments used for measuring fineness		78%	78%
3. Proportion of owned instruments used for measuring strength		17%	14%
4. Proportion of owned instruments used for measuring length and length uniformity		5%	5%

The number of instruments per shipper owning instruments was 1.9 in Memphis, compared with 2.5 for those from the entire United States. On a per shipper basis, it was 1.3 and 1.6, respectively.

¹Southern Cooperative Series Bulletin 62, Use of Cotton Fiber Tests by United States Shippers, Fayetteville: Arkansas Agricultural Experiment Station, 1959.

Shipper Use of Commercial Fee Laboratories

Seventy-eight percent of the Memphis shippers used fee laboratories for the evaluation of fiber fineness compared with 38 percent of the total United States shippers. A greater percentage of the Memphis shippers also used fee laboratories for measuring strength, the proportion being 78 and 52 percent, respectively.

Practices Employed in Shipper Testing for Fineness

All tests for fineness on shipper-owned instruments in Memphis were made on the basis of one determination per test sample. For the United States as a whole, 90 percent took one determination with the remaining shippers taking more than one. A comparison between the methods used by the Memphis shippers and all United States shippers in determining the fineness of a two-sided bale is shown below.

<u>Procedure used for testing</u> <u>two-sided bale</u>	<u>Proportion of shippers using method</u>	
	<u>Memphis</u>	<u>U. S.</u>
1. Average of both sides of bale	55%	31%
2. Test low-grade and staple side only	19%	13%
3. Test both sides and record the lowest fineness	-	23%
4. Use a blended sample	-	5%
5. No special procedure used	26%	29%

Reasons for Using Fiber Tests

The most important reason for using fiber tests for 91 percent of the Memphis shippers and 80 percent of the total United States shippers

was that this service was demanded by their mill customers.

Seven percent of the Memphis shippers listed fiber testing's use in providing improved quality evaluation as the principal reason for their using them. Twelve percent of the total United States shippers listed this as their principal reason.

Volume of Cotton Purchased and Sold on Fiber Test Values

Purchases Based on Fineness

The Memphis shippers tested 85 percent of their Commodity Credit Corporation cotton after purchase, compared with 73 percent tested by the 186 United States shippers. The Memphis shippers tested a smaller proportion of the cotton purchased in the open market, prior to purchase, than those of the United States as a whole, being 51 and 61 percent, respectively.

Purchases Based on Strength

The Memphis shippers tested 3.7 percent of the Commodity Credit Corporation cotton for strength which was about the same proportion as the 3 percent tested by all United States shippers. In their testing of open-market purchased cotton, the Memphis shippers tested about twice as much as the total United States shippers, the proportions being 29 percent and 14 percent, respectively.

Sales Based on Fineness and Strength

Approximately 77 percent of the total sales of the 46 Memphis shippers were based on fineness. This compared with about 64 percent

for the 186 United States shippers. Memphis shippers also tested 24 percent of their sales for strength, compared with 8 percent for the total United States shippers.

Pricing of Purchases on the Basis of the Fineness Value

The 186 United States shippers discounted about 7 percent of their purchases, compared with 6 percent discounted by the shippers in Memphis. In both the Memphis and other national cotton markets there were wide differences in what constituted cotton that was too fine. There was also a wide variation in the rate of discount taken for cotton of identical fineness value in both markets. Rather than discount cotton for being too fine, many shippers simply refused to purchase the cotton.

Fineness Minimums and Ranges Specified on Sales

The readings of 3.5 and 3.8 Micronaire units were the most common fineness minimums specified on sales by both the Memphis shippers and shippers from the entire United States. The ranges most commonly specified for both groups had a minimum from 3.5 to 3.8 Micronaire units with 5.0 as the maximum.

Costs of Cotton Fiber Testing

A list of the principal costs associated with cotton fiber testing and the proportion of shippers considering each the most important is shown on the following page.

<u>Principal fiber testing costs</u>	<u>Proportion of shippers stating the most important cost</u>	
	<u>Memphis</u>	<u>United States</u>
1. The actual cost of testing	28.3%	34.0%
2. Increased cost of selective buying	28.3%	21.5%
3. Costs of increased sales and disputes	6.5%	2.1%
4. Discounts on undesirable stocks	21.7%	22.2%
5. Added costs of carrying, assembling, and concentrating bales	15.2%	16.0%
6. Added cost of shipping substitute bales	-	-

The Advantages and Disadvantages of Cotton Fiber Testing

The principal disadvantages mentioned by shippers in both groups were the added time, labor, and cost involved without adequate compensation. Connected closely with this was the second most important complaint from both groups of shippers. This was of the unreasonable demands for fiber test values by the cotton mills.

The main advantage listed by shippers in both categories was that testing enabled them to sort cotton into more even-running lots for sale. This in turn would aid spinners in securing greater efficiency which would help cotton to compete with the synthetic fibers.

Sixty percent of the total United States shippers felt that the fineness value, in addition to grade and staple length, should be recorded on the Form "1" cards by government classing offices. Only 39 percent of the Memphis shippers were for this action.

The Trend in Cotton Fiber Testing

Testing for Fineness

For United States shippers as a whole, the proportion of cotton tested during the 1955-56 and 1956-57 season for fineness remained about

the same. However, this figure was approximately 20 percent higher than the proportion tested during the 1954-55 season.

The Memphis shippers showed an increase in the proportion tested during the entire period, averaging about an 11 percent increase in the testing of domestic sales and a 9.5 percent increase in export sales from the 1954-55 season to that of 1955-56. The increase in cotton tested from the 1955-56 season to that of 1956-57 was 32 percent in domestic sales and 34 percent in exports.

Testing for Strength

Shippers in both groups tested a greater percentage of their domestic sales for strength during the 1956-57 season than in the 1954-55 period. This was also true in exports except for the Memphis shippers handling between 100,000 and 249,999 bales annually which showed a slight decrease.

CHAPTER IX

SUMMARY AND CONCLUSIONS

Most modern cotton mill operations require that the fiber properties of cotton being processed be uniform in quality. Cotton spinners, like other users of raw materials, need to know these specifications to set the processing equipment properly and to estimate the material's effect upon end-product performance. Important quality differences are present in cotton of the same grade and staple length and instruments have been developed to measure these fiber properties objectively. The requirement of cotton mills for cotton with specific characteristics has forced other segments of the cotton industry to devote more attention to various aspects of cotton fiber testing.

The objective of this study was to determine the present and probable future effects of cotton fiber testing on the buying, assembling, and selling of cotton by shippers in the Memphis market. The shipper is concerned primarily with three aspects of fiber testing: (1) its cost, (2) its effect upon his volume, and (3) its effect upon the demand for his product or service. This chapter summarizes the results of this study and shows how these data may be used by shippers to reach decisions on the three questions concerning the use of fiber tests.

The data for this study were secured by personal interview from forty-six Memphis shippers from June through August, 1957. These firms marketed 5,106,605 bales of cotton during the season August 1, 1956 through July 31, 1957. This amount was almost 40 percent of United States' production in 1956.

The Extent and Use of Cotton Fiber Tests in the Memphis Market

Type and Number of Instruments Owned

The thirty-one of the forty-six shippers owning instruments had a total of fifty-nine cotton fiber testing machines. Seventy-eight percent of the instruments were used for measuring fiber fineness and 17 percent for fiber strength. All forty-six shippers, either through the use of their own instruments or through a commercial fee laboratory, tested some cotton for fineness. Through the same procedures, thirty-six shippers tested some cotton for strength. Some shippers had owned instruments for as long as ten years, but the majority of instruments had been purchased in the last three.

Volume of Cotton Purchased and Sold on the Basis of Fiber Tests

The forty-six Memphis shippers purchased and sold 5,106,605 bales during the 1956-57 season. Of this total, 51 percent of the open-market cotton was tested for fineness and 25 percent for strength prior to purchase. After purchase, 70 percent was tested for fineness and 3.5 percent for strength. About 0.1 percent of shipper purchases were tested for other fiber characteristics after purchase. About 85 percent of Commodity Credit Corporation cotton was tested after purchase for fineness and 3.7 percent for strength. About 77 percent of shipper sales were on the basis of fineness and about 24 percent on strength. Sales on other fiber characteristics were about 0.39 percent.

The extensive use of fiber testing, especially in regard to fineness and strength in the domestic and export market illustrated that the use of fiber tests has been accepted and are an important facet in the

merchandising of cotton. Memphis shippers were forced to utilize them because of the demands of their mill customers. During the period covered by this study, it was the larger shippers who made the most use of these tests; and the trend in fiber testing by all shippers appeared to be increasing in the Memphis market. If this trend continues, all shippers in the Memphis area will probably be forced to supply their customers with fiber test data in addition to grade and staple length. The majority of shippers in all volume categories felt that the use of cotton fiber testing would increase with the exception of six shippers handling between 100,000 and 249,999 bales annually.

Minimums and Ranges Most Common in Shipper Purchases and Sales

While the forty-six shippers purchased some cotton in all fineness categories, 63 percent of the purchases were in the average fineness range. Forty-seven percent of the total purchases fell between 4.0 and 4.4 Micronaire units.

The average fineness reading at which shippers started discounting cotton was 3.4 with a range of 3.0 to 4.0 Micronaire units. Three separate methods of discounting were used: (1) discount all cotton equally under a certain fineness minimum, (2) vary the discount with time of purchase and fineness of cotton, and (3) have specified discounts within different ranges of fiber fineness.

A wide range of discounts for cotton of the same fineness value existed among the different shippers. This was largely the result of the different demands of shippers' customers. This varying of discount rates led to confusion on the value of cotton since cotton of equal

quality characteristics sold for different prices. If a set discount rate could be established, the efficiency of marketing would be increased since cotton of equal quality would be of equal price and this should result in cotton with certain characteristics going to those customers whose products demanded them. This would probably result in a higher quality product. A standardization of premium and discount rates should be established by the cotton industry.

In the Memphis market there was a relationship between the fineness of the cotton and the discounts taken by the shipper. The average discount for cotton under 3.0 Micronaire units was 228 points per pound; on cotton between 3.2 and 3.5 the average discount was 94 points; and on all cotton over 3.5 that was discounted, the average rate was 70 points per pound.

On shipper domestic sales, fineness minimums between 3.5 and 3.8 Micronaire units were the ones most frequently specified. In the export market, the most common minimum was between 3.8 and 4.0 inclusive. Ranges with a minimum between 3.5 and 3.8 Micronaire units with a maximum of 5.0 were the ones most used. Shipper specifications and discounts on their purchases should adequately reflect those faced in their sales. If they do not, either the shipper or his supplier is receiving an unfair quality evaluation on their cotton. Only four shippers offered premiums on the basis of fineness.

Seven shippers discounted cotton on the basis of strength, and six offered premiums for cotton with specified strength minimums. No premiums and discounts were made on the basis of other fiber characteristics.

Quality Determination in Purchases and Sales

Several methods for determining the quality of purchases were used, the one chosen being dependent upon the variability of cotton character in the buying territory, the dependability and knowledge of the supplier, and the requirements of the customer.

In purchasing cotton from the interior, the random sample method was used, testing cotton at various points throughout the area and over the season. The number of tests varied widely among the shippers.

Two other methods used with interior purchases were the spot check of 5 to 10 percent of actual samples, and the checking of every bale in certain lots. Both of these methods were used in testing purchases from brokers. Purchases from other shippers were usually on a guarantee basis.

The quality of cotton specified in shippers' domestic sales was determined through three separate methods: (1) submission of actual samples by the shipper, (2) private type samples submitted by the buyer to the seller, and (3) sales based on description. Most shippers made some sales on all three methods. The most important by volume was the use of the actual sample.

Practices Used in Testing

All thirty-one of the shippers testing for fineness on their own instruments made one determination per test sample. Twenty-one of these included cotton from both sides of the bale. The majority of the instrument operators did not know the grade and staple of the cotton, or if

the bale was plated. Three methods were used to determine the fineness of plated bales: (1) take on average reading of both sides, (2) test only the low grade and staple side, and (3) give the bale no special handling.

All four of the shippers testing for strength used the zero gauge in testing. Their tests would show a higher correlation with yarn strength if they would shift to a one-eight inch gauge setting. Any shift, however, should be uniform among all of the shippers. The number of breaks per sample ranged from one to six and varied also with the type of sample used and in the number of places it was taken from the bale. A uniform testing procedure needs to be established in order to have an adequate standard of accuracy in the cotton industry. If this were done it probably would eliminate many of the contract disputes over the specifications of the cotton involved.

Shipper Checking of Own Instruments

Calibration samples were used by twenty-seven of the thirty-one shippers owning instruments but the frequency of the check varied widely. Another accuracy test was the cross-checking between machines.

Location of Fiber Testing Instruments

Shippers operated their instruments in various parts of their establishments: cotton room, classing room, laboratory, and office. Four of the shippers operating Micronaires under controlled conditions of temperature and humidity. Three of the four shippers owning Presleys, and all firms owning Stelometers, Suter-Webb Sorters, and Fibrographs operated them under controlled atmospheric conditions. All

tests by commercial fee laboratories were conducted under specific temperature and humidity readings.

The importance of controlled temperature and humidity varies with the type of test and instrument used. Many of the newer instruments on the market today do not require atmospheric control to give accurate results.

The Cost of Fiber Testing

Most shippers did not have a clear idea of the cost of fiber testing, however, from the small amount of data gathered it was known to vary widely among the shippers, being dependent upon the following variables: ownership and non-ownership of instruments, type of instrument, type of test, number of determinations per test sample, number of test samples or volume tested, labor costs per hour, testing facilities, frequency of testing instruments and operators, requirements of customers, and proportion of sales in the domestic and export market.

The above mentioned variables will determine the absolute and relative level of the following costs which combined should equal the total cost of fiber testing.

1. Actual cost of fiber testing.
2. Increased cost of selective buying.
3. Discounts of sale.
4. Costs of increased claims and disputes.
5. Added costs of carrying, assembling, and concentrating.
6. Added cost of fill-ins.

The procedure for calculating the actual cost of fiber testing and putting it on a bale basis is shown in Chapter VI. A comparison of the cost of using a shipper-owned instrument with the tariff charged by commercial fee laboratories will enable the shipper to determine whether it is cheaper to purchase his own instrument.

An estimate of the other costs is more difficult and can best be determined by individual experience. One rough figure estimated by shippers handling between 30,000 and 99,999 bales annually was that the cost of making the actual test was about 25 percent of the total cost with the remaining five direct and indirect costs making up the remaining 75 percent. This was based on the very limited information and varied greatly between the shippers.

Shippers' Appraisal of Cotton Fiber Tests

The principal advantages listed were: (1) fiber testing allowed a more objective evaluation of cotton quality which should aid in competing with the synthetic fabrics, and (2) they were an aid in buying and selling cotton through their use as a competitive weapon and in sorting cotton into more even-running lots for sale.

The major disadvantages listed centered around the increased time, labor, and cost involved for the shipper without adequate compensation. Coupled with this were criticisms of the lack of standards covering premiums and discounts and unreasonable demands by the cotton mills. If the cotton trade would establish a standard for premiums and discounts similar to that covering the pricing of cotton on grade and

staple length, the author feels that the above complaints would be alleviated. Buyers and sellers from the producer to the spinner would know the value of cotton with different characteristics and production and marketing would more adequately reflect the respective demands for these qualities. More research on the effects of these fiber characteristics on spinning efficiency and end-product performance should aid the industry in setting the premium and discount rates.

Shipper Use of Public Reports on Cotton Fiber Testing

Twenty-seven of the forty-six shippers received reports on fiber testing, the two principal sources being the United States Department of Agriculture and the University of Texas. Twelve of the shippers receiving these reports felt that they were of no value.

Shipper Opinion Toward Placing the Fineness Value on Form "1" Card

Only eighteen of the forty-six shippers were for placing the fineness value on the Smith-Doxey Form "1" card. Twenty-four were against this action, nineteen of them handling less than 100,000 bales annually. This appeared rather paradoxical since if the growing use of fiber testing is accepted, this action would be of greatest benefit to the small shipper who can least afford to purchase and use fiber test equipment.

Comparison of the Use of Fiber Testing Between the Memphis and the Entire United States Market

The proportion of Memphis shippers owning fiber testing instruments was 67 percent compared with 65 percent for all United States

shippers. For both groups of shippers, 78 percent of these instruments were used for measuring fineness. A greater proportion of shippers from the Memphis area used the services of commercial fee laboratories than did those from the rest of the country.

The practices employed in testing were similar for both groups with almost all shippers making one determination per test sample for fineness. In the testing of plated bales, Memphis shippers used an average of both sides of the bale to a greater extent than the entire United States shippers. The latter, however, employed two other procedures not used by the Memphis shippers.

The most important reason for using fiber tests for shippers in both categories was that this service was demanded of them by their mill customers.

The Memphis shippers tested a greater proportion of their Commodity Credit purchases for fineness than did the shippers from the entire United States, but the latter tested a greater proportion of their open-market cotton prior to purchase. The proportion of Commodity Credit Corporation cotton tested for strength was about equal between the two groups, but Memphis shippers tested about twice as much open-market cotton for strength than the United States shippers.

The shippers of Memphis tested a greater proportion of their sales for both fineness and strength than the shippers from the entire United States.

Both groups discounted about the same percentage of purchases, 6 and 7 percent, but there were wide variations in what was considered as cotton being too fine. In both cases, the amount of discounts for

cotton of equal quality varied widely. The most common minimums for both groups were between 3.5 and 3.8 Micronaire units. The most common ranges for cotton fineness in both categories had minimums from 3.5 to 3.8 with a maximum of 5.0 Micronaire units.

The actual cost of testing, the increased cost of selective buying, and discounts on undesirable stocks were the three major costs listed by shippers from the Memphis and entire United States area.

The principal disadvantage of fiber testing mentioned by shippers in both categories was the increased time, labor, and cost it involved. The main advantage was thought to be their aid in helping cotton to compete with the synthetic fibers.

Sixty percent of the shippers from the entire United States felt that fiber fineness should be recorded on the Form "1" cards. Only 39 percent of the Memphis shippers were for this action.

While shippers in both groups showed an increase in the use of testing for fineness from the 1954-55 season to that of 1956-57, the increase in the Memphis area was the greatest. The same was true in testing for strength.

The differences between the above two groups of shippers are probably due to the greater concentration of the larger shippers in the Memphis area.

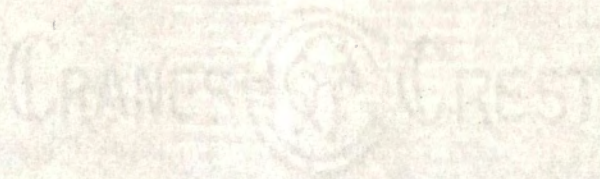
The Probable Effects of Fiber Testing on Cotton Marketing

The first effect is that fiber testing, by giving a more accurate measure of various important fiber qualities may have strengthened cotton's competitive position with the artificial fibers. If testing

allows cotton to maintain and/or expand its markets, the whole cotton industry could benefit. By lowering the production costs of spinners and giving them a more standardized product, cotton may regain some lost markets. How these benefits would be shared is unknown. Certain questions as to who gives premiums, how much should certain cotton be discounted, and should premiums and discounts both be given remain unknown at this study's completion. These problems must be solved by the cotton industry before the total benefits of fiber testing may be utilized.

Past history seems to indicate that the establishment of an adequate grading system requires cooperation on the national and international level between both industry and government. Until this happens an adequate system will probably not be developed. When such standards are developed, they will need to be altered due to new and changing uses of cotton. The important point is that uniformity of rates be established and that they accurately reflect the quality of the cotton.

The cotton shipper, to meet present and future competition, should accept the arrival of fiber testing. He must keep himself up to date on developments in this field and be in a position to compete with these new methods at his disposal.



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APPENDIX

APPENDIX A
FIELD SCHEDULE

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COTTON FIBER TESTING
SHIPPER SCHEDULE, 1956-57 SEASON

Name of firm _____
:
:
Town _____ State _____
:
:
Information collected by: _____ Date _____
:
:

1. Use of fiber tests: Did this firm use any actual fiber tests this season:
In buying? Yes ☐ No ☐ In selling? Yes ☐ No ☐
If no, do you plan to use fiber tests in 1957-58? Yes ☐ No ☐
If yes, list reasons for change: _____

2. Considerations in determining when and where to buy cotton without use of fiber tests: (a) Experience ☐ (b) No "character" problems in buying territories ☐ (c) Immediate tests of purchases ☐ (d) Classer appraisal is sufficient ☐ (e) Use of publicly available reports of test data ☐ (f) Other ☐ (Specify) _____

3. List any publicly available reports of fiber test results received by your firm:

Name of report	Source	Frequency

If any such reports were received regularly, were they helpful? Yes ☐
No ☐ If yes, in what way? _____

4. Do you favor recording fineness values on Form 1 cards? Yes ☐ No ☐
5. Practices in making all mill sales without use of fiber test specifications:
(a) Were most sales made to accounts of long standing? Yes ☐ No ☐
(b) Were advance samples of new crop cotton required by mill customers?
Yes ☐ No ☐
(c) Do you conduct a specialty business? Yes ☐ No ☐ If yes, specify:
(d) Proportion of domestic sales made according to: Private type _____ %
Actual samples _____ % Description _____ %
(e) On what proportion of sales on description were approval samples submitted prior to shipment _____ %
(f) Was cotton delivered against private types tested even though no test specifications were involved? Yes ☐ No ☐
6. Bales purchased for sale during 1956-57 season (U.S. upland only)
(a) Bought through C.C.C. Export Sales Program (April 24, 1956 to date, NOC8)
(b) All other purchases in 1956-57 _____

7. Origin and source of cotton purchases exclusive of C.C.C. stocks, 1956-57 season

Origin	Purchases by origin		Proportion of data by source for each origin					
	Bales*	%	Interior		Brokers		Shippers	
	Bales*	%	Bales*	%	Bales*	%	Bales*	%
California								
Arizona								
New Mexico								
Texas:								
El Paso								
Lubbock								
Other								
Oklahoma								
Missouri								
Arkansas								
Louisiana								
Mississippi								
Tennessee								
Alabama								
Georgia								
North Carolina								
South Carolina								
Other (list)								

*Data on bales to be calculated later in tabulating.

8. Sales outlets by origin of cotton including CCC stocks, 1956-57 season

Origin	Outlet by origin				Origin	Outlet by origin			
	Domestic		Export			Domestic		Export	
	Bales*	%	Bales*	%		Bales*	%	Bales*	%
California					Arkansas				
Arizona					Louisiana				
New Mexico					Mississippi				
Texas:					Tennessee				
El Paso					Alabama				
Lubbock					Georgia				
Other					North Carolina				
Oklahoma					South Carolina				
Missouri					C. C. C.				

*Data on bales to be calculated later in tabulating.

9. Fiber testing facilities and operations

A. Number and type of instruments at this office:

Instrument	Number	Season first used	Location	Instrument	Number	Season first used	Location
Micronaire							
Pressley							
Fibrograph							

B. Does this office have any branch buying offices? Yes ☐ No ☐
 If yes, number of offices _____ and number of instruments by types _____

C. Operating practices

(1) Tests for fineness: (a) Number of determinations per test sample ____.

In case of one, did test sample include cotton from each side of bale?

Yes ☐ No ☐. (b) Did operator know class of bale at time of test?

Yes ☐ No ☐.

If bale had been classed as 2-sided, did operator know this? Yes ☐ No ☐

In either case, indicate testing procedure: Average of two sides ☐

Test only low grade or staple side ☐ Test both sides and record lower fineness, if any ☐ No special handling ☐ Other ☐ (list) _____

(2) Tests for strength: (a) What gauge setting was used ____ (b) number of breaks per sample ____ (c) nature of test sample _____

(3) Do you buy calibration or check test samples? Yes ☐ No ☐ If yes, frequency of checks on instruments used in measuring fineness? _____ on instruments used in measuring strength? _____

11. Other tests used in buying:

State kind, extent, source of test, and origin of cotton

Kind of test	No. of tests	Source of test	Origins of cotton

12. Use of random pre-buying tests as a guide in buying (complete question if any cotton was bought on basis of random test data as listed in items 10 and 11):

Number of samples collected at random in buying territories and tested on own instruments as advance pre-buying information? For fineness _____, For strength _____, For _____, For _____.

13. Testing of purchases through CCC sales programs: Proportions of such individual bales tested for? Fineness ____% Strength ____% _____%

14. Use of fee tests:

Did you have any tests made on fee basis? Yes ☐ No ☐ If yes, complete the following:

Type of test	No. of bales tested	Purpose of test			
		As prepurchase buying guide		To test cotton after purchase	To check own instruments
		random test	spot check actual samples		
Fineness					
Strength					

15. Fineness of purchases of 1956 crop cotton (If more than 50% of individual bales were tested, list or estimate results):

Range in fineness	Percent of purchases
5.0 and higher	
4.5 to 4.9	
4.0 to 4.4	
3.5 to 3.9	
3.0 to 3.4	
2.9 and lower	
Total	

Were above figures based on estimate? ☐ Actual tabulation? ☐

16. Pricing of purchases in terms of test results:

- a. Was any cotton bought on prepurchase general fineness results, discounted for being excessively fine? Yes ☐ No ☐
If yes, list price discounts used at specified levels of fineness

Fineness range	Discount points	Proportion of total purchases made on prebuying information
to		
to		
to		

- b. If any cotton was bought for which individual bales fineness results were known at time of purchase, list scale, if any, of premiums and discounts paid by fineness groups

Fineness range	Proportion of total pur- chases made on individual bale fineness tests	Points per pound	
		Premium	Discount
to			
to			
to			

- c. If any, cotton was discounted for being overly coarse, explain circumstances and extent

- d. If strength tests were used as a guide in buying, were prices varied for strength differences alone? Yes ☐ No ☐ If yes, explain price variations in relation to strength fineness

17. Terms of sale according to test results by outlets:

- a. Fineness and strength tests

[illegible]

b. Nature and extent of sales on other test specifications

Kind of test	Origin of cotton	Outlet		No. of bales
		Domestic	Export	

18. Practices in selling to mills on fiber test terms:

a. Of sales to mills on minimum fineness, what fineness values were specified most commonly?

Domestic		Foreign	
Fineness minimum	Percent of total sales on fineness minimum	Fineness minimum	Percent of total sales on fineness minimum

b. Of sales on ranges of fineness, what ranges were specified most commonly?

Domestic		Foreign	
Fineness range	Percent of total sales on range of fineness	Fineness range	Percent of total sales on range of fineness
to		to	
to		to	
to		to	

c. Quality determination of all sales to domestic mills:

Method	Percent of total sales made	
	Without any test	On test terms
Actual samples		
Private type		
Description		

In sales on description, approval samples were submitted on _____ % of sales made without test values being specified and _____ % of sales made on test value terms.

d. At what limit did cotton seem to be too coarse for general demand? _____

19. In merchandising cotton on fiber test terms, shippers face several types of both direct and indirect costs. A. Check the estimated major cost category experienced by this firm in selling on fiber test specifications: If more than one, indicate relative importance by ranking 1, 2, 3, etc.

- | | |
|---|--|
| (1) Actual cost of testing..... ☐ | (4) Cost of increased claims or disputes..... ☐ |
| (2) Increased cost of selective buying in high cost territories where cotton was suitable for needs..... ☐ | (5) Added costs of carrying, assembling, and consolidating cotton for shipment..... ☐ |
| (3) Discounts on sales of stocks with unpopular fiber test values ☐ | (6) Added costs of fill-ins.... ☐ |
| | (7) Other ☐ |

- B. Do you know actual cost of fiber testing per bale? Yes ☐ No ☐
 If yes, how much does it cost you per bale? _____

20. Claims resulting from sales on fiber test values:

	<u>Domestic</u>	<u>Foreign</u>
A. Fineness		
a. Proportion of sales on fineness which were the subject of dispute or claim.....	_____	_____
Of such claims, what proportions were settled by:		
(1) Substitution of other bales.....	_____	_____
(2) Cash settlement.....	_____	_____
(3) Your test values finally being accepted	_____	_____
b. Proportion of disputes unofficially abri- trated	_____	_____
(1) Amount of claims paid (\$).....	_____	_____
(2) Total cost all claims, disputes, and settlements	_____	_____
B. Outline nature, extent, method of settlement, and costs of disputes for cotton sold on strength terms _____		
C. Outline difficulties encountered in sales on other test terms _____		

21. What proportion of sales was made on test terms in previous specified seasons?

Kind of test and season	Proportion of sales	
	Domestic	Foreign
A. Fineness		
(1) 1954-55		
(2) 1955-56		
B. Strength		
(1) 1954-55		
(2) 1955-56		

22. Do you estimate that sales on test terms in 1957-58 will increase proportionately to 1956-57 sales? Yes ☐ No ☐
23. Indicate the main factor in your decision to use fiber tests.
- A. Demand by mill customers for service ☐
- B. Necessary in buying to avoid getting the "culls" ☐
- C. Provides improved quality evaluation ☐
- D. Other ☐ Specify _____
24. Comments on disadvantages and advantages of marketing cotton on fiber test specifications _____
- _____
- _____
- _____