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New Mexico College of Agriculture
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- *Smith-Doxey Classification,*
- *Fiber Testing and*
- *Problems of the Cotton Trade*

May 1956



SUMMARY

Members of the Texas Cotton Association were either interviewed personally or were mailed a questionnaire in June 1955 and were asked the following questions:

1. To what extent are Texas cotton merchants buying cotton on the basis of Smith-Doxey classification and what are their chief criticisms of this classing service?
2. To what extent are Texas cotton merchants buying and selling cotton on the basis of laboratory testing of fibers?
3. What staple lengths are in greatest demand?
4. What specific problems associated with cotton need study and research?

Approximately 150 questionnaires were mailed to members of the Texas Cotton Association and 65 merchants answered the questions in sufficient detail to use their replies in tabulating results. These firms have an annual business of approximately 4,864,000 bales and represent shippers, f.o.b. merchants, spot brokers and mill buyers.

Of the 65 firms, 53 indicated they purchase some cotton on Smith-Doxey classification and about 38 percent of their total purchases were made on the basis of "green cards" in 1954. Thirty-two firms said the Smith-Doxey classification was satisfactory or at least partially so. Twenty firms were emphatic in saying the service was not satisfactory. Practically all made some criticism concerning Smith-Doxey classification.

Fifty-three firms stated they made some use of fiber testing. All 53 used the Micronaire tests for selling but only 27 reported they purchased cotton on such tests. Approximately 50 percent of the total 4,864,000 bales handled by all 65 firms was sold on the basis of Micronaire tests, but only 27 percent was purchased on this basis.

Thirty-five of the 65 firms sold cotton on fiber strength tests but only 11 firms purchased cotton on such tests. About 11 percent of all sales was made on fiber strength tests and less than 1 percent was purchased on such tests.

Very little use is made of the fibrograph or maturity tests.

Nearly half of the firms had their own Micronaire but only 7 had the Pressley tester. Many firms use commercial laboratories for testing fibers.

Although fiber testing affects the pricing of cotton, it still is too new to give a definite set of discounts and premiums like those given for staple and grade differences. Only a few firms have a clear-cut pricing system based on laboratory tests.

Most of the cotton merchants give 3.5 as the minimum for Micronaire readings based on demands from mills. Most of them said demand requires a Pressley test of 80,000 or more.

The majority think the greater demand is for staple lengths of 15/16 up to 1-3/32.

Problems suggested for study covered a large range. Better varieties, government programs, ginning and improvement in the character of cotton were most often mentioned as needing attention.

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Smith-Doxey Classification, Fiber Testing and Problems of the Cotton Trade

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COTTON MERCHANTS ARE IN A UNIQUE POSITION to observe the cotton economy as a whole. By their experience over the years, they have learned the mill requirements as to quality and quantity, and through them the mills have obtained the bulk of their raw cotton. They also are close enough to the cotton farmers to understand their problems and to have an intimate knowledge of the kind of cotton produced in the various areas of the Cotton Belt. They stand between the farmers and the mills, and knowledge of mill requirements is passed back to the local markets through them. They must be alert and sensitive to the changing needs of the mills and equally well informed on changes in production on the farms.

Cotton merchandising is a highly specialized business. To build an organization which can operate economically under normal conditions requires both technical knowledge of the many qualities of cotton produced and years of experience in matters of finance, storage, transportation and other services. The merchandising system, with buying and selling organizations in this country and throughout the main cotton consuming centers of the world, developed over many years. It provides a highly competitive market for the farmer at the crossroads as well as at the larger market centers. Prior to the entrance of the U. S. Government into the cotton business, cotton merchants carried the surplus cotton until it was needed by the mills here and abroad. It was their function to provide a continuous market for farmers at country points and to provide cotton to the mills for prompt shipment or for deferred deliveries, often extending for a year or more.

Recently the mills called on cotton shippers to add a new service, that of selling cotton on the basis of certain physical qualities, especially fineness, breaking strength, uniformity and maturity of fiber. This compels shippers to supplement the customary classing service with laboratory equipment. Although some buying is done on the basis of laboratory fiber tests, buying continues to be mostly an art. Until the cotton merchant can buy on the same basis as he must sell, he assumes significant risks.

To survey the practice of buying and selling on the basis of physical characteristics, a questionnaire was presented to 150 Texas cotton merchants for information on the following:

1. To what extent are Texas cotton merchants buying cotton on the basis of

Smith-Doxey classification and what are their chief criticisms of this classing service?

2. To what extent are Texas cotton merchants buying and selling cotton on the basis of laboratory testing of fibers?
 - a. Do they have their own laboratory equipment or do they use commercial laboratory facilities?
 - b. What is the additional cost of this service?
 - c. What do they find to be the minimum requirements for fineness and breaking strength and what range seems to be in greatest demand by mills?
3. What staple lengths are in greatest demand?
4. What specific problems associated with cotton does the cotton trade think the Texas Agricultural Experiment Station should help solve?

Sixty-five firms answered the questionnaire in sufficient detail to be used. The replies which answered only a part of the questions were disregarded.

The 65 firms whose answers were used have offices in Texas and handle an average of about 4,864,000 bales annually. Some of the firms do a considerable part of their business in other states, while others limit their purchases to Texas cotton. No attempt was made to determine what percentage of the total volume was exclusively Texas cotton. Of these 65 firms, 41 were cotton shippers, 16 were f.o.b. merchants, 5 were mill buyers and 3 were spot brokers. The volume handled annually by each firm ranged from 6,000 bales upward, with an average for all firms of 76,000 bales. These firms do business in all cotton producing areas of Texas and represent all major types of cotton merchants handling cotton in the State.

EVOLUTION OF STANDARDS FOR QUALITY

Ever since cotton has been grown and traded on a commercial scale, some kind of standard for quality has been used as a basis for trading. In the infancy of the cotton trade, cotton was bought and sold by actual inspection. A system of buying and selling by sample developed about 1800 in

Liverpool. Cotton was classified largely according to the names of the regions where the cotton was produced. The color names, white, yellow and gray, were not used as they are today. By 1803, Sea Island cotton was classified as fine, good, middling, ordinary and stained but upland cotton continued to be identified as to the country of origin until 1825. After 1825, upland cotton began to be classified as good and fine, good fair, fair, middling and ordinary. From this time on, Liverpool evolved definite standards for indicating the quality of cotton.

During the early development of cotton marketing in the United States, cotton was classified largely according to origin. Sea Island cotton, for example, was grouped into such terms as "Georgian," "Floridas" and "Island Crop Lots," while the uplands were known as "Benders," "River," "Peelers," "North Georgian," "Canebrakes" and "Texas Blacklands." For a long time American cotton was sold largely on the basis of two grades, "good" and "sorry."

Regional trade names have played an important part in the marketing of American cotton. Areas producing hard-bodied, strong cotton, areas with extra long staples, areas with favorable climate and good soils and areas producing inferior qualities, were recognized and the trade expressed its ideas of the qualities coming from each area by such terms as "Mississippi Deltas," "North Georgias" and "Red River Staples." Although cotton coming from a given area differed greatly in staple quality and character, the regional trade names conveyed to the experienced cotton merchant some general ideas as to the characteristics of the cotton.

New York was probably the first market in the United States to adopt cotton standards. The term "middling" appeared in New York price quotations as early as 1822. After 1855, New York used middling as a basis grade.

New Orleans cotton men used the term "middling" as early as 1828. Both New York and New Orleans eventually made their "middling" grade approximate the one used by Liverpool. One of the expressed purposes for organizing the New York Cotton Exchange (1870) and the New Orleans Cotton Exchange (1871) was to establish standards and classification for cotton.

Prior to 1874 each market had its own standards, which caused confusion and disputes between buyers and sellers. Misunderstandings were common so long as price quotations were made on the basis of different standards, and efforts were made from time to time to establish a common set of standards for the entire trade. A National Cotton Exchange was organized and a committee was appointed in 1874 to recommend uniform standards that were to be adopted by all the cotton exchanges. This committee made types for the following grades: good middling, middling, low middling, good ordinary and ordinary. Specimens of these types were sent to the various cotton

exchanges. Additions were made by some exchanges but middling was accepted as a basis.

This was a forward step, but the American standard classifications differed somewhat from Liverpool standards. The Liverpool Cotton Broker's Association sent a complete set of Liverpool standards to the American National Cotton Exchange in order to harmonize the two standards. These standards were received favorably and were adopted by most of the exchanges in the United States. The National Cotton Exchange was dissolved in 1878, however, and with it went the uniformity of standards that had been established.

In spite of the confusion existing in standards prior to 1909, the spot markets of the United States came to recognize in a general way the following grades:

<i>Fair</i>	<i>Strict low middling</i>
<i>Middling fair</i>	<i>Low middling</i>
<i>Strict middling fair</i>	<i>Strict good ordinary</i>
<i>Strict good middling</i>	<i>Good ordinary</i>
<i>Good middling</i>	<i>Strict ordinary</i>
<i>Strict middling</i>	<i>Ordinary</i>
<i>Middling</i>	

The grades designated as "strict" were known as half-grades and the others as full grades. These grades were for white cotton only. The terms "tinged" and "stained" were used with these grades to designate discolored cotton. "Middling" was an accepted basis grade by all markets as it is now.

Unfortunately, the acceptance of general grade names did not cause them to mean the same things. "Middling" might be a higher or lower quality in one market than in another. The two largest markets, New Orleans and New York, made up their standards independently of other exchanges. Innumerable disputes between buyers and sellers naturally resulted from such a multiplicity of standards and methods of doing business.

Recognizing the confusion resulting from the multiplicity of standards, Congress passed a bill in 1908 that authorized the Secretary of Agriculture to set up standard classifications for cotton. The Secretary called together a committee of prominent men in various phases of the cotton trade, and this committee selected a set of types that they thought were representative of nine grades. These were approved by the Secretary of Agriculture. The cotton trade in general was in favor of official standards, but strong opposition soon developed because of the fear that official standards would conflict with private types.

The adoption of the standards was made entirely permissive, that is, the trade could accept or reject them. The Secretary of Agriculture was not authorized to enforce their use. By 1911, most of the cotton exchanges had accepted the new standards. The Cotton Futures Act of 1914 made the use of the government standards com-

pulsory in futures trading. With the futures exchanges compelled to use the official standards, most of the spot exchanges accepted them voluntarily.

The government provided standards for staples in 1918. Investigations over several years indicated that farmers were not paid for their cotton on the basis of staple, and this created a fear that farmers would not try to improve staple.

After a number of years of negotiating with Liverpool and other European exchanges, universal standards for grades were established in 1924. However, because of different standards of measurement used by countries of the world, universal standards were not established for staple lengths.

From time to time the Secretary of Agriculture may make changes in grades and standards if such changes need to be made. At the present time, the official grades are:

WHITE	SPOTTED
<i>Good middling</i>	<i>Good middling</i>
<i>Strict middling</i>	<i>Strict middling</i>
<i>Middling</i>	<i>Middling</i>
<i>Strict low middling</i>	<i>Strict low middling</i>
<i>Low middling</i>	<i>Low middling</i>
<i>Strict good ordinary</i>	
<i>Good ordinary</i>	
TINGED	YELLOW STAINED
<i>Good middling</i>	<i>Good middling</i>
<i>Strict middling</i>	<i>Strict middling</i>
<i>Middling</i>	<i>Middling</i>
<i>Strict low middling</i>	
<i>Low middling</i>	
GRAY	
<i>Good middling</i>	
<i>Strict middling</i>	
<i>Middling</i>	
<i>Strict low middling</i>	

It took approximately 125 years to establish universal standards for grades of American cotton.

Factors Determining Grade

Grade is a term which embraces three factors—color, foreign material and preparation.

Color is one of the most important factors determining the grade of cotton. The major divisions of color in the present standards are white, spotted, tinged, yellow stained and gray. Minor variations occur within each of these general divisions. White, for example, is relative in its meaning and includes a range of light color. The higher white grades may be slightly creamy, bright or “bloomy” but free of discoloration. The lower white grades have less brightness and have some discoloration.

There are differences in the standard colors. The higher grades are rather bright and of lighter color, while the lower grades have a deeper and duller color. The 12 samples included in each official box prepared by the U. S. Government

illustrate the permissible range of color in the grade the box represents. There also are 2 to 4 samples or biscuits from each of the four major geographical sections of the Cotton Belt.

Foreign matter is a term for bits of the cotton plant such as broken leaves, burs and seed, and other material such as sand and dust, that normally get into cotton before or during harvesting and are not removed by the ginning process.

Preparation means the degree to which the normal length of the fibers is maintained, or the regularity with which the individual fibers are laid together in ginning, and the amount of nep-piness of the cotton. Poor preparation is evidenced by an appearance of roughness, stringiness or ropiness, and gin-cut fibers.

Determining Staple Lengths

Staple length is the measured length of a selected portion of the fibers. By custom, this measured length is assigned to a sample or bale as a whole. Cotton is stapled by gradations of 1/32 of an inch. Since there always is variability in the staple length of any sample, the modal length determines the length recorded.

SMITH-DOXEY CLASSIFICATION AND THE COTTON TRADE

One of the chief arguments for the establishment of official grade and staple standards for cotton was that the farmers would benefit from them. Theoretically, this was the case, but in practice the farmers did not derive the benefits anticipated. Unfortunately only a small percentage of the farmers ever acquired the skill necessary to grade and staple their own cotton. Consequently, when the farmer met the buyer in the local market to bargain for a price on the basis of quality, most of the knowledge of the grade and staple of the cotton in question was on the side of the buyer. The farmer had to rely on competition among the buyers to get fair bids for his cotton on the basis of quality. All of the information provided the farmer through newspapers, radios and government publications availed the farmer little if he could not distinguish between the qualities of cotton for which price quotations were given.

To overcome this lack of knowledge of quality by farmers, the Smith-Doxey Act was passed in 1937. Its purpose was to encourage improvement in quality and in local marketing conditions. This Act provides free classification service for farmers who join cotton improvement groups and make application for the classification service.

The Smith-Doxey Act provides for the taking of a sample from each bale of cotton at the gin by a bonded sampler or a warehouse that issues negotiable receipts. These samples are sent to a designated central office where grade and staple are determined under the supervision of the Federal Government. The farmer is sent a “green

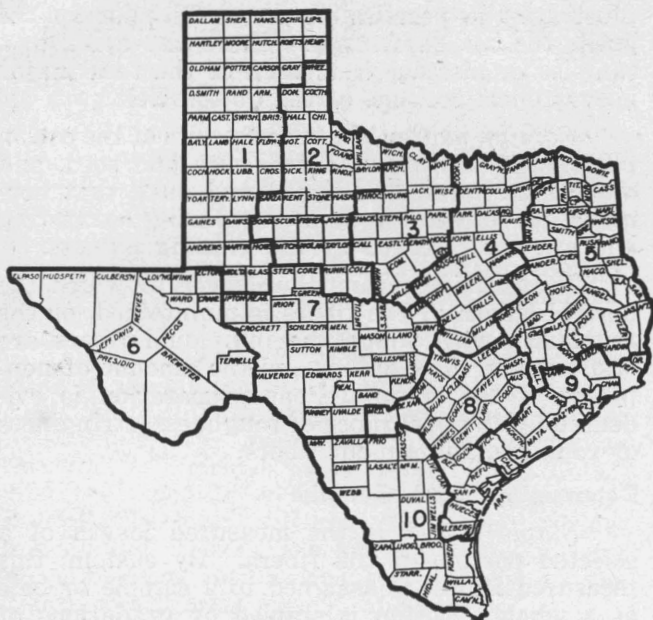


Figure 1. Texas districts for cotton quality reports.

card" giving him the grade and staple of his cotton along with the price information. This service has been available to the cotton farmer since 1938, and a large percentage of the crop is now graded and stapled by the government (See Table 1 and Figure 1). This service gives most farmers the opportunity for the first time to enter the market and bargain on near equal terms with the buyer in matters of grades and staples and price differentials. This doesn't mean that the buyer must accept the government classification, as often there is reason for honest differences of opinion. The government, however, accepts the classification for loan purposes.

Use of Smith-Doxey Classing

The survey of cotton buyers supplied information on the extent to which they are purchasing cotton on the basis of "green cards," that is, on the government classification, and

TABLE 1. SMITH-DOXEY PARTICIPATION IN TEXAS BY DISTRICTS, 1955 FISCAL YEAR (JULY 1, 1954 TO JUNE 30, 1955)¹

Districts ²	No. groups	No. members	Total acreage	Acreage of members in adapted varieties	Samples classed	Percent gin-ings classed
1	24	21,819	2,477,596	1,108,222	1,573,955	99.6
2	54	21,230	1,672,249	1,052,771	350,763	89.8
3	22	2,619	104,460	60,100	10,888	68.8
4	150	37,998	1,676,182	1,016,934	205,589	46.8
5	32	6,520	327,748	244,730	66,665	45.6
6	7	2,099	144,292	114,345	267,433	105.7 ³
7	9	1,603	148,750	103,915	8,384	41.7
8	69	9,612	574,017	375,333	268,317	76.7
9	24	4,240	218,281	183,981	62,693	34.5
10	116	7,301	592,957	438,391	202,974	43.4
Total	507	115,063	7,936,592	4,698,722	3,017,661	

¹USDA, AMS, Cotton Division.

²See Figure 1.

³1954 crop in Reeves county approximately 1,500 bales more than the census figure.

on the worth of such classification to the cotton buyer.

Fifty-three of the 65 firms answering the questionnaire indicated that they purchased some cotton on the Smith-Doxey classification. Taking the figures each firm gave as an estimate of such purchases, the total was 1,833,900 bales, or nearly 38 percent of the total volume of 4,864,000 bales. This percentage indicates a considerable degree of acceptance of Smith-Doxey classification by buyers.

Trade Appraisal of Smith-Doxey Classing

Thirty-two firms indicated Smith-Doxey classification was satisfactory, or at least partially so. A large percentage had some complaint about the accuracy of the classing. Twenty firms were emphatic in stating the classifications made by Smith-Doxey classers were unsatisfactory.

An attempt was made to determine the chief criticisms of Smith-Doxey classification from the viewpoint of cotton buyers. Fifty-two of the 65 firms questioned had some criticism. Since each firm wrote its criticisms in its own words, it is difficult to condense all the answers into a few lines. However, the criticisms tended to fall into the following categories:

1. Erratic, irregular and inaccurate.
2. Failure to be consistent throughout the season, that is, grade too hard in the early part but too easy in the latter part.
3. Other criticisms were poor sampling at the gins, samples not representing true quality of bale because of two-sided bales, failure to indicate character or variety, temporary classers, classing too rapidly and public pressures coming from farmers on one side and from the merchants on the other.

WHY GRADE AND STAPLE STANDARDS ARE INADEQUATE

Official standards for grades and staples have helped cotton trading and are a great improvement over the old unofficial standards. Nevertheless, they do not account properly for the character of cotton. The character of cotton is most important in finished goods. Many of the aspects of quality are not identified in the factors called grade and staple.

Some of the more important elements of character in which a spinner is interested are: uniformity of staple, length and diameter, tensile strength, fineness, cohesiveness, pliability and elasticity, porosity and capillarity, luster and durability. These elements are not included in grade and staple standards even though the real value of any fiber depends on its performance in spinning. Many of the elements of quality or character of cotton have been difficult for the classer to define exactly. Because of this diffi-

culty, technologists have been working for a long time to develop methods of measuring these qualities with greater exactness. So far, the technologists have developed practical apparatus for measuring four properties of cotton fibers in commercial laboratories—fineness, strength, length and maturity.

To find to what extent cotton firms in Texas are using fiber testing equipment in addition to cotton classing, they were asked what percentage of the cotton handled was purchased and sold on the basis of laboratory testing. The percentage of cotton firms with their own equipment for testing and the extent to which they used commercial laboratories also were considered.

USE OF FIBER TESTING BY TEXAS COTTON FIRMS

Fineness is the fiber property most commonly tested by the cotton firms interviewed. Although there are several instruments for determining fineness, Texas merchants use the Micronaire almost entirely. Of the 65 merchants answering the questionnaire, 31 had their own Micronaire. Fifty-three firms, or 81 percent, stated that they sold some cotton on the basis of Micronaire tests. Only 27, or 41 percent, reported that they purchased cotton on the basis of such tests. Approximately twice as many sold cotton on Micronaire tests as bought on that basis. These firms stated they sold about 2,437,950 bales on Micronaire tests but purchased only 1,827,225 bales on such tests.

Strength is one of the most popular of all fiber measurements but is more time-consuming and expensive than the Micronaire test for fineness. The Pressley strength tester is commonly used by the cotton trade. Spinners often relate yarn, cord and fabric strengths to fiber strength, and they need to know the strength of fibers before they purchase the raw cotton.

Only 35 cotton merchants reported that they sold some of their cotton on the basis of Pressley tests. Only 7 had their own equipment to make the tests, which means most of the firms have to rely on others for their tests. Eleven merchants stated they purchased cotton on the basis of Pressley tests.

In terms of bales, the 65 merchants reported they sell approximately 536,500 bales annually, or 11 percent of their total volume, on the basis of fiber strength test.

A much smaller amount was purchased on the basis of fiber strength tests, 34,800 bales, or less than 1 percent.

A great deal of spot checking is done, however, and the use of fiber strength testing is more important than the foregoing figures indicate. Spot checking gives a fairly good indication of the fiber strength coming from a given area for a given time, especially in one-variety communities.

Length of fiber also is of great importance to spinners, and cotton merchants often are called upon to make sales on the basis of length measurements. Laboratory length factors may be expressed in several ways, but the most common ones are: (1) mean or average length, (2) upper half mean length and (3) length uniformity or the uniformity ratio. These length factors usually are computed from measurements made with the Hertel Fibrograph.

Only a small percentage of the cotton is sold on the basis of the fibrograph test. Approximately 26,000 bales were sold in 1954-55 on this basis, or less than 1 percent. Only 5 firms interviewed indicated they had a fibrograph.

Maturity tests show the percentage of immature fibers in a sample although the word "maturity" is used to indicate the degree of immaturity. Maturity is measured by using a microscope to examine the fibers that have been swollen or mercerized in caustic soda. This makes it possible to see how big the lumen is and how thick the wall.

Only 2 firms said they had equipment to make maturity tests. Only 1 firm reported sales on the basis of such tests, and only 1 made purchases on such tests. Total sales and purchases on the basis of maturity tests were far too low to be of any significance.

Fiber Testing and Pricing

Undoubtedly the development of laboratory testing of cotton fibers is having considerable influence on the pricing of cotton by spinners and cotton merchants, but at the present time it is difficult to measure this influence. Only a very few cotton merchants have developed for their buyers a pricing system based on fiber testing comparable with the differentials they send out for grade and staple. Mills tend more and more to give minimum requirements for fineness and strength as they ask for offers from the cotton merchants. Such qualifications naturally influence the price of raw cotton, but it will be some time before a quotation service giving price differentials will be possible. Only a few cotton firms that are far in advance of the others have a clear-cut pricing system based on laboratory tests. A great many firms are not yet equipped to make such tests and have to use commercial laboratories or government testing as the necessity arises.

One f.o.b. cotton merchant expressed his opinion of the effects of fiber testing on price in these words:

"We are beginning to feel the effects of Micronaire demand by mills. The past two seasons have been pace setters. Because of our methods of merchandising cotton, (Smith-Doxey class) both mills and shippers require their buyers in our territory to constantly furnish them types from cotton grown in our area. As long as the cotton meets the Micronaire minimum, say 3.2,

there is no specific mention of Micronaire in our contracts. As the season progresses and the quality of the cotton becomes 'softer' the drop in Micronaire is usually reflected in the basis we are offered by the same firms."

Cost of Laboratory Testing of Fibers

The added cost of the Micronaire test for fineness and the Pressley test for fiber strength was considered, but the equipment was new to most firms and the majority had made no serious effort to determine the cost of these tests per bale. Employees, for example, who made the Micronaire tests might be used for other duties around the office, and no timetables were kept on the labor costs. Consequently, any attempt to estimate costs was abandoned. Perhaps the charges made by commercial laboratories are as good an estimate as possible. Following is the price list furnished by the United States Testing Company, Inc., Dallas, Texas:

PRICE LIST OF COTTON FIBER TESTS

No.	GROUP OR LOT SAMPLES SUBMITTED AT SAME TIME	5-49	50-500	Over 500
		samples per mo.	samples per mo.	samples per mo.
(1a)	Fiber strength, flat bundle, 2 breaks per sample, (Pressley) per sample	\$.70	\$.60	\$.50
(2a)	Fiber length and uniformity, 2 measurements (Fibrograph) per sample	.85	.75	.70
(3a)	Fiber fineness, 2 determinations (Micronaire) per sample	.35	.30	.25
(4a)	Combination tests (1a), (2a) and (3a) above per sample	1.75	1.50	1.40
(5a)	Maturity (Microscopic) per sample	4.00		
(6a)	Moisture content	.80	.70	.60
(7a)	Sugar content	.80	.70	.60
(8a)	Shirley Analyzer (non-line) per sample	2.50 under 10 bales 2.00 over 10 bales		

SPECIAL QUOTATIONS

No. of samples	FINENESS	Price per sample
30,000 or more		
in 6-month period	-----	\$.15
500 per month	-----	.20
Under 500 but		
in 100 bale lots	-----	.25
Under 500 but		
in small lots	-----	.30
Under 100	-----	.35

In addition to commercial laboratories, the U. S. Department of Agriculture has a testing laboratory at College Station, Texas. This laboratory tests fibers for breeders and others on a fee basis. The charges are somewhat higher, however, than the price list given for the private agency. Cotton firms frequently use the USDA laboratory to check the accuracy of their own laboratory tests.

Whatever the additional costs of laboratory tests, it appears certain that such tests are here to stay and any cotton firms merchandising raw cotton will have to have laboratory service of one kind or another. Some may find commercial laboratory prices less than the cost of putting in their own equipment, especially for certain tests. It seems certain that the larger firms will acquire their own equipment for testing fineness, but most of the smaller firms may find the cost and necessary skill for making the other tests too expensive to install their own equipment.

Relationship of Laboratory Testing of Fibers to Cotton Classing

The fiber laboratory will not replace the cotton classer, but will supplement his work. As now operated, the laboratory needs the classer. The classer, however, should become more skilled in his classing if he checks with the laboratory on results.

The cotton merchants were asked if they thought fiber testing helps their classers develop added skills. Of the 60 answers, 33 thought fiber testing helped their classers in detecting more accurately certain qualities of cotton, while 27 thought such tests did not help their classers. They also were asked if fiber testing affected their opinions about qualities of cotton coming from various areas and if such tests affected their appraisal of the numerous varieties. Of the 57 answering the first question, 37 said fiber testing had influenced their ideas about qualities of cotton produced in the various areas of the State, while 20 said such tests had not affected their opinions. Of 46 firms answering the question about qualities associated with various varieties, 25 said fiber testing had affected their opinion, while 21 said their opinion had not changed. Some thought their classers were good enough to detect most of the qualities by old methods of classing.

Each firm was asked if it thought Micronaire readings also should be added to the grade and staple classification given on the card sent to the farmer. Forty answered "yes," and 25 answered "no."

Apparently some shippers felt that if the Micronaire reading is added to the grade and staple classification, it might further encourage mills to go direct to local markets to purchase their supplies of cotton. This would cut down the volume handled by the cotton merchants, who through the years have assembled cotton, classed it in even running lots before selling to the mills.

TABLE 2. MINIMUM MICRONAIRE READING ESTIMATES OF 60 COTTON FIRMS

Minimum reading	No. of firms giving this minimum
3.0	1
3.2	2
3.5	15
3.6	4
3.8	14
4.0	24
Total	60

There already is a tendency on the part of some mills to purchase cotton on Smith-Doxey classification, and the addition of a Micronaire reading would make it more convenient to buy direct from farmers or local buyers.

FINENESS AND STRENGTH IN GREATEST DEMAND

It has long been the responsibility of the cotton merchant to study the needs of his customers and to concentrate cotton, equalize it in even running lots and disperse it according to his customers' needs. Since laboratory tests for fineness and for strength of fiber are used most commonly, the cotton merchants were asked to give their ideas on the range of these qualities in greatest demand and to state what they consider are the minimum requirements based on demand.

For fineness this question was asked, "What Micronaire reading do you find in greatest demand?" Sixty firms answered this question by giving the minimum requirements or a range. The answers are given in Table 2.

These answers indicate little demand for cotton with a Micronaire reading less than 3.5. Sixty-three percent stated the reading should be at least 3.8 or better.

Only 34 firms answered the question on the fiber strength tests. Their estimates are shown in Table 3.

Fewer firms expressed opinions on fiber strength than they did on fineness. This is to be expected since only 7 of the 65 firms reporting had equipment to test strength of fiber while 31 had Micronaires.

Table 3 shows that the mills are interested mostly in fibers that will test 80,000 or more.

TABLE 3. FIBER STRENGTH TESTS ESTIMATES OF 34 COTTON FIRMS

Readings of Pressley test	No. of firms
75,000	1
78,000	2
80,000	15
82,000	4
83,000	2
84,000	1
85,000	6
86,000	1
90,000	2
Total	34

STAPLE LENGTH IN GREATEST DEMAND

In view of a prevailing complaint about the quality of Texas cotton, especially its staple length, cotton firms were asked to give the staple lengths they found in greatest demand. Their answers were somewhat affected by the area in which they operate and the type of cotton they specialize in handling. Only 62 firms gave their opinions on this question, as shown in Table 4.

It is obvious the shorter staples of Texas cotton are not in great demand, yet the average staple length has been running about 15/16 for a number of years.

Production Trends in Staple Lengths

In order to dig deeper into the causes for the constant complaints about Texas producing so much short staple, the average staple lengths for all the cotton states were calculated for the 1928-30 and 1952-53 crops so that a comparison could be made as to the progress each state has made in increasing staple lengths between the two periods. In the fourth column of Table 5, the gains and losses in staple lengths are given for each state in terms of 32nds of an inch. All the states having short staple cotton as the dominant crop, except Texas and Oklahoma, have increased staple lengths since 1928-30 by 2/32 to 4/32 of an inch. Oklahoma actually has decreased its average staple length while Texas has made very little increase.

A large proportion of all cotton 7/8-inch and shorter grown in the United States has come from Texas in recent years. In 1952, for example, Texas produced 86.6 percent of all the 7/8-inch and shorter and 79.6 percent in 1953. It is obvious that most of the other states have abandoned the growing of the 7/8-inch staple and shorter. All states except Oklahoma and Texas

TABLE 4. STAPLE LENGTHS IN GREATEST DEMAND, SUMMER OF 1955

Staple lengths	No. of firms
7/8 - 15/16	1
29/32 - 31/32	1
29/32 - 15/16	1
29/32 - 1	1
15/16 -	2
15/16 - 31/32	1
15/16 - 1	2
15/16 - 1-1/32	3
15/16 - 1-1/16	2
15/16 - 1-3/32	1
31/32	1
31/32 up	1
31/32 - 1-1/32	1
31/32 - 1-1/16	1
1 up	14
1 - 1-1/32	1
1 - 1-1/16	6
1 - 1-3/32	1
1 - 1-1/32	3
1-1/32 - 1-1/16	13
1-1/32 - 1-3/32	3
1-1/16	1
1-1/8 - 1-5/32	1
Total	62

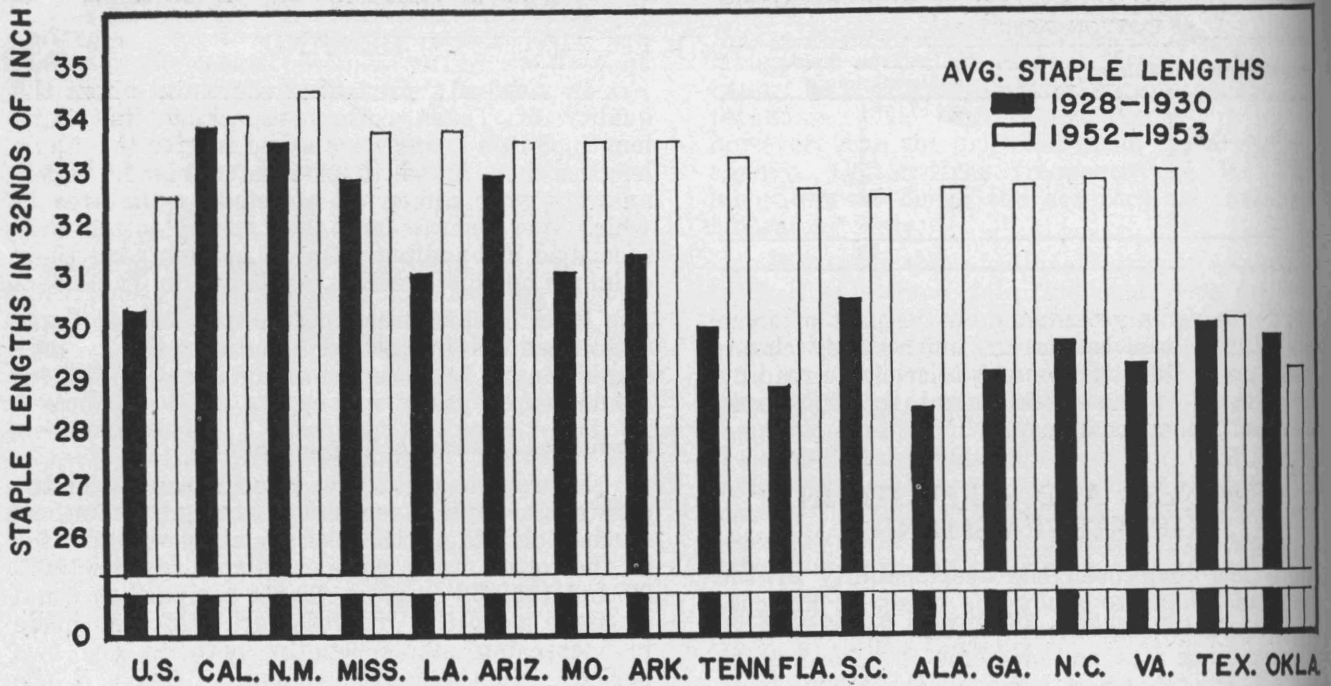


Figure 2. Average staple length of American upland cotton ginned in the United States, by states, crop 1928 and 1953.

are producing staples averaging 1 inch and better in recent years. (See Table 5 and Figure 2.)

Trends in Discounts and Premiums For Staple Lengths

As more and more of the cotton produced each year in the United States has averaged 1 inch and better, the trend for discounts for cotton below 15/16 inch and the trend of premiums for the inch and better staples are of interest. Premiums and discounts for 1-1/16 and 7/8-inch cotton are charted in Figure 3 from 1938 through 1954 along with the percentage of the total crop falling in these staples. The trend line for premiums for 1-1/16-inch cotton has been upward, although varying from year to year with the quantity of this staple produced. The trend

line of discounts for 7/8-inch staple and shorter also has been upward. These trends indicate there has been some shift in demand by mills from the short staples to the longer staples, and the price difference between shorter staples and inch and longer staples has been widening. Texas farmers have not shared extensively in the benefits of the increasing premiums but have shared largely in the increasing discounts because they have produced a large proportion of the shorter staples. Approximately 62 percent of the Texas

TABLE 5. A COMPARISON OF STAPLE LENGTHS GROWN IN 1928-30 AND 1952-53 BY STATES

State	Average staple lengths, 1928-30	Average staple lengths, 1952-53	Gain or loss in staple length from 1928-30 to 1952-53
----- 32nds of an inch -----			
Alabama	28.40	32.6	4.2
Arkansas	31.28	33.5	2.2
Florida	28.81	32.6	3.79
Georgia	29.05	32.35	3.30
Louisiana	31.03	33.75	2.70
Mississippi	32.82	33.7	0.88
Missouri	31.03	33.5	2.47
North Carolina	29.66	32.75	3.09
Oklahoma	29.74	29.1	-0.64
South Carolina	30.44	32.45	2.01
Tennessee	29.94	33.20	3.26
Texas	29.99	30.05	0.06
Virginia	29.24	32.9	3.66
California	33.82	34.0	0.42
Arizona	32.84	33.5	0.66
New Mexico	33.50	34.5	1.00
All states	30.34	32.45	2.11

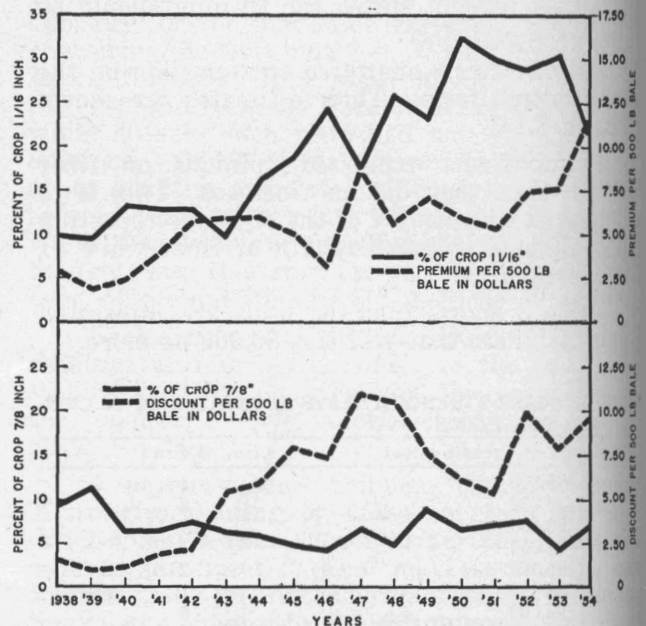


Figure 3. Percentage of total U. S. cotton crop 1-1/16 and 7/8 inch and premiums and discounts per 500-pound bale for these staple lengths, 1938 and 1954.

TABLE 6. PERCENTAGE OF VARIOUS STAPLE LENGTHS GROWN IN TEXAS BY DISTRICTS FOR COTTON QUALITY REPORTS, 1952-53 AND 1953-54¹

Staple lengths	Districts for cotton quality reports									
	1	2	3	4	5	6	7	8	9	10
13/16 & shorter	%	%	%	%	%	%	%	%	%	%
7/8	10	16	16	4	3	2	7	7	2	2
29/32	34	28	24	14	8	2	28	6	1	1
15/16	30	21	24	22	12	2	28	17	3	2
31/32	17	20	24	34	21	2	24	30	16	6
1	5	8	8	17	18	2	8	23	19	6
1-1/32	2	5	3	7	17	2	4	8	27	19
1-1/16	2	1	2	2	1	2	2	4	24	37
1-3/32	2	2	2	2	2	10	2	2	8	27
1-1/8	2	2	2	2	2	21	2	2	2	3
1-5/32	2	2	2	2	2	24	2	2	2	2
1-3/16	2	2	2	2	2	25	2	2	2	2
1-7/32	2	2	2	2	2	7	2	2	2	2
1-1/4 & longer ²						1				2
Average bales produced, 1952-53 and 1953-54	1,402,995	345,771	19,258	837,627	214,246	227,136	23,606	347,785	220,897	326,939

¹ Source: USDA, AMS, Cotton Division.

² Less than 1 percent.

1952 crop was 15/16 inch or less, and in 1953 this production rose to 71 percent.

In Table 6, a 2-year total production by "districts for cotton quality reports" was used to get the percentage of the various staple lengths grown in each district in Texas. By checking these districts against the map of Texas (Figure 1) it is easy to locate the areas producing both the shorter and the better staples.

In addition to the large percentage of cotton with shorter staples, certain areas also produce a great deal of cotton with a low Micronaire reading because of climatic conditions. Adding Micronaire readings to the Smith-Doxey classification for the cotton from some of the areas will be disappointing to a great many farmers, especially during years with short growing seasons. There is a tremendous problem still ahead for many of the Texas cotton farmers in improving both staple and character of cotton. Nearly all of the cotton firms contacted in the survey indicated one of the most important problems needing study was staple, varieties and character of Texas cotton.

Trends in Production and Carryover by Staple Lengths

Figure 3 shows that the trends for premium for the staple length of 1-1/16-inch cotton over middling 15/16-inch cotton have been upward since 1938 and the discounts for 7/8-inch staple also have increased over the same period, thus widening the difference between these two qualities of cotton. To determine whether more of the shorter staple cottons and less of the longer staple would enter the carryover each year, the carryover of 7/8 and 29/32, 15/16 and 31/32, 1 and 1-1/32, and 1-1/16 and 1-3/32-inch cotton was plotted against the annual productions of these staples from 1928 through 1954. Figures 4, 5, 6 and 7 show that the percentage of carryover of these various staple lengths closely parallels the per-

centage of the annual production of these staple lengths. In other words, as the percentage of the annual crop that is 7/8 and 29/32-inch has decreased over the years, the carryover of this kind of cotton also has decreased. As the percentage of 1, 1-1/32, 1-1/16 and 1-3/32-inch staple has increased in production, the percentage of carryover of these staples has followed the same trends. Actually, on a percentage basis, there has been less of the shorter staples in the carryover and more of the longer staples of 1 to 1-3/32 inch.

In the light of the data on carryovers, why is there so much complaint heard about the excessive amount of short staple going into the government loan or into the carryover? Apparently, the main justification for the complaint is the fact that Texas produces approximately 80 percent or more of the total crop of 7/8-inch staple cotton. The 7/8-inch staple cotton going into the government loan or into the carryover each year is largely Texas cotton.

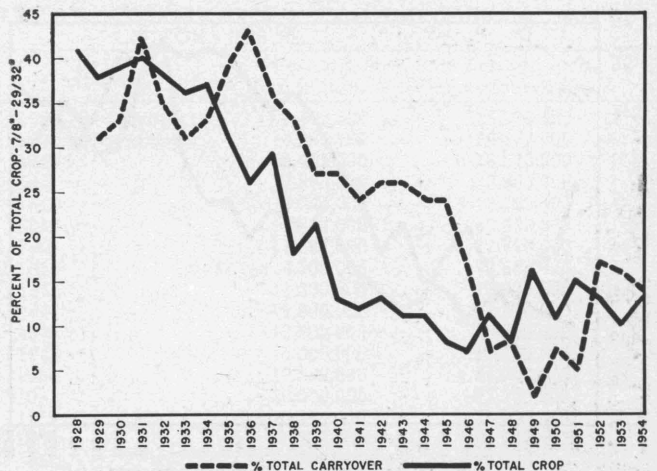


Figure 4. Trends in production and carryover of 7/8 and 29/32-inch staple lengths U. S. upland cotton, 1928-54.

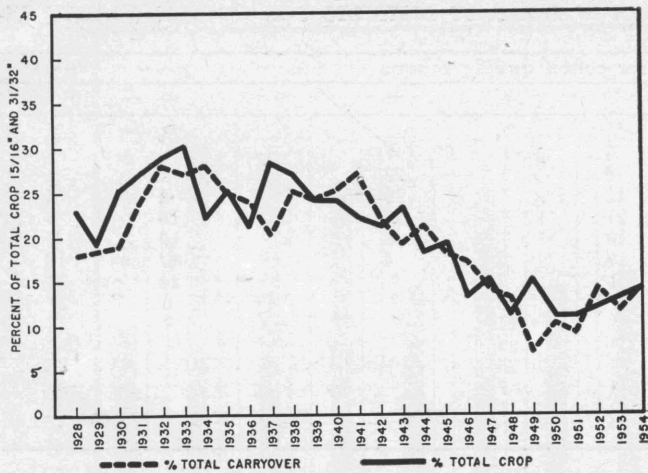


Figure 5. Trends in production and carryover of 15/16 and 31/32-inch staple lengths U. S. upland cotton, 1928-54.

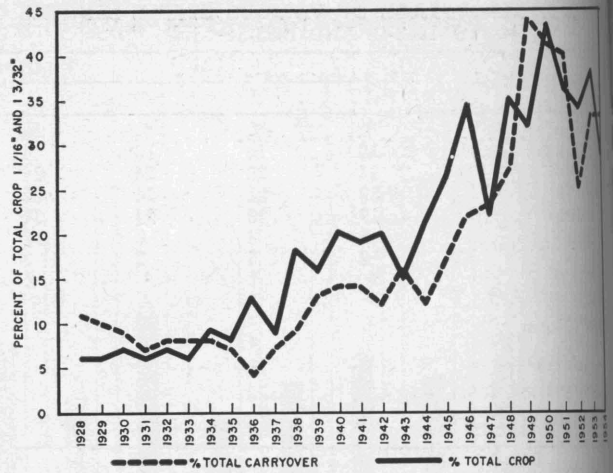


Figure 7. Trends in production and carryover of 1-1/16 and 1-1/32-inch staple lengths U. S. upland cotton, 1928-54.

SPECIFIC PROBLEMS NEEDING STUDY

There is perhaps no group of men in better position than the cotton merchants to point out the cotton problems needing study by an institution like the Texas Agricultural Experiment Station. They have an opportunity to learn all the complaints mills have about the quality of raw cotton, and it is through them that demand information about the quality of cotton reaches the producer. In other words, if a free market exists, the price differentials paid the farmer reflect the demand for the various qualities of cotton. The quality of cotton the farmer has to sell may be a result of seed selection, harvesting, ginning, packaging or country damage at the local cotton yards.

To get opinions about present day cotton problems from Texas cotton merchants, they were asked the following question:

“What specific studies or programs do you think the Texas A&M College System should undertake that would be of greatest service to the cotton business?”

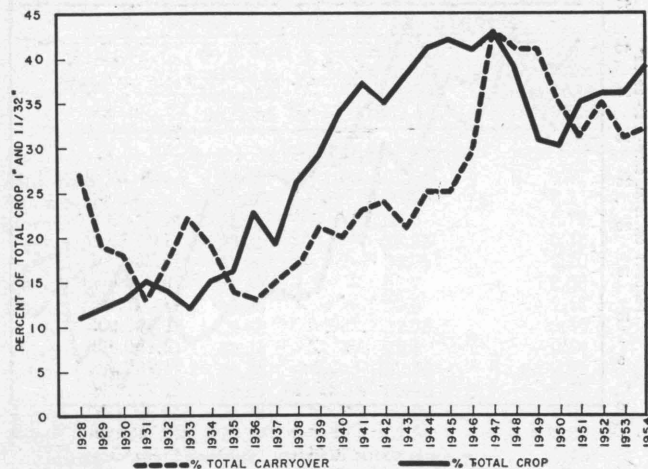


Figure 6. Trends in production and carryover of 1 and 1-1/32-inch staple lengths U. S. upland cotton, 1928-54.

A number of problems were cited, but most of them covered cotton varieties, government program, ginning, government classing and undesirable trade practices.

Staple of Texas cotton was the problem most often mentioned. Need for longer staple cotton with better character, elimination of some inferior varieties and selection of others for the various producing areas of the State constituted the major problems mentioned under variety. Merchants handling cotton on the High Plains are particularly anxious for varieties that will yield lint with higher Micronaire reading and will give greater maturity under climatic conditions in that area.

Ginning problems suggested for study were inefficient ginning, ginning too fast, using too much heat, using statifiers improperly, poor sampling, mixing cotton or permitting cotton from one farmer's truck to get into another's bale, and poor bagging.

The chief complaint about trade practices seems to be that some firms try to “pan off” cotton of poorer quality on the mills, especially foreign mills, than they promised to deliver. Some cotton merchants stated that this practice is hurting our foreign market and is encouraging domestic mills to do more direct buying.

Government classing was criticized by several merchants, both the Smith-Doxey classing and other classing done by the government classers. Most of these criticisms have been discussed earlier.

The two problems most bothersome to the cotton trade seem to be the quality of Texas cotton and governmental policies affecting the marketing of cotton. Staple length, which seems to be the greatest quality problem, already has been analyzed sufficiently to show its importance in the marketing of Texas cotton. An analysis of governmental policies affecting the marketing of cotton is given in the following section.

GOVERNMENTAL POLICIES AND COTTON MARKETING

Acresage control and price support are the problems most commonly discussed among cotton merchants. This is to be expected since these controls vitally affect their volume and methods of doing business. Most of them feel the interests of the farmers and the shippers are mutual, and that the present policies are hurting both groups. They point to the trends of exports as a good example of this position.

A large percentage of the Texas cotton of past years was exported. Many Texas cotton firms have grown up in the export business and have been dependent largely on this type of business. The trends of exports, as shown in Table 7, are discouraging to a great many of these merchants. The outlook for the export business is conditioned to a considerable extent by government pricing policies and by increasing production in foreign countries.

Table 8 gives the trends in the production of foreign cotton and in foreign mill consumption for 1920-55. Foreign cotton production in recent years has been approaching the foreign mill consumption. Foreign production in 1955 was only about 1.6 million bales under foreign mill consumption of 1954. This increase in foreign cotton production undoubtedly has been due in part to our aid to foreign countries and to keeping down our production and fixing the price for our cotton high enough to encourage increased production abroad. Our pricing system is such that foreign producers know what price they must ask to take over our markets. This puts our shippers at a disadvantage in competing with foreign cotton in foreign markets. Our seed and our technology have been exported to foreign countries for a long time and now much of the foreign growths are comparable in quality with our cotton.

An example of what happens when the government enters the merchandising business follows. With the increasing cotton carryover, it was natural that thought be given to means of disposing of it. Our foreign mill customers were equally concerned with the means we might use to get rid of the burdensome supply. In the summer of 1955, when Washington mentioned an export subsidy as a probable method of disposing of the surplus, foreign importers became reluctant to make forward purchases in this country because they did not want to get caught with an inventory of American cotton that might have its value depreciated by an export subsidy. Consequently many projected purchases were put off to see what would happen. A number of merchants believe that talk of an export subsidy cut foreign sales back as much as 1 million bales in the summer of 1955. One business man can anticipate what another business man might do under certain conditions, but the same considerations are not common to business and governmental agencies.

TABLE 7. EXPORTS OF UPLAND COTTON, AVERAGE 1935-39, 1945-49 AND 1950 TO DATE¹

Years	Bales
1935-39 average	5,297,200
1945-49 average	3,927,900
1950	4,117,000
1951	5,515,000
1952	3,048,000
1953	3,760,000
1954	3,446,600
1955 ²	2,800,000

¹ USDA, AMS, Cotton Situation, November 25, 1955.

² Preliminary, partially estimated.

Another disturbing factor in the cotton trade arises from the methods of determining parity and the fixed differences for grades and staples. The Cotton Futures Act of 1914 outlawed the fixed differences then used by the cotton exchanges, but now the government sets up price differentials for qualities of cotton based on differences in the previous year. If there were a fixed demand and a fixed supply of cotton, fixed differences might be justified, but there is a varying supply of different qualities of cotton from year to year and a changing demand price for a varying quantity of different qualities. So long as the cotton trade had the responsibility of handling all the cotton, each quality would find its own price level. A free market permits supply and demand forces to operate in a manner that will guide the farmers into producing the qualities in best demand. For years, efforts have been made to eliminate "hog round" buying and to get the trade to pay the farmer on the basis of quality. This is the main reason for the Smith-Doxey classification. It is debatable procedure to reverse this effort by setting up fixed differences based on last year's market reflections.

Governmental policies could affect the basis by creating a comparatively narrow spread between the loan level and the futures market. This may make it hazardous for merchants to make forward sales for deferred shipment. Nevertheless, it is difficult for cotton merchants to avoid some of this kind of business. If the futures markets

TABLE 8. FOREIGN PRODUCTION AND CONSUMPTION OF COTTON, 1920-55¹

Years	Foreign production	Foreign mill consumption
1920-29 average	9,452,500	16,396,900
1930-39 average	14,269,100	20,177,900
1940	16,405,000	16,873,000
1941	14,988,000	13,863,000
1942	13,048,000	13,193,000
1943	13,446,000	12,623,000
1944	11,637,000	12,636,000
1945	10,500,000	13,600,000
1946	11,300,000	16,300,000
1947	11,800,000	17,800,000
1948	12,800,000	18,900,000
1949	14,000,000	19,100,000
1950	17,500,000	21,700,000
1951	20,000,000	22,700,000
1952	20,500,000	23,900,000
1953	21,700,000	26,200,000
1954	23,700,000	26,600,000
1955 ²	25,000,000	

¹ USDA, AMS, Cotton Situation, November 25, 1955.

² Estimated.

fail to reflect spot values because of the competition offered by the government loan program, the risk involved in the basis is increased. As an illustration, in the early fall of 1954 it appeared that the cotton crop might be short, and there might be an acute shortage of the better grades and staples. There was a rush to buy the better cotton. It became evident later that the crop would be larger than early indications, and the futures market declined, although farmers maintained fixed ideas as to the physical price of the better types of cotton. Merchants who sold cotton for forward delivery were forced to cover their commitments at a constantly increasing basis. The hedge in futures was ineffective in the main since the prices of many qualities remained unchanged, and advanced in some instances.

Risks always have been present in the basis that hedges do not effectively eliminate, but governmental policies can add to these risks. To stay in business a cotton merchant must have a selling basis higher than his buying basis. In making forward commitments to mills either on "buyers call" or by fixing the full price, he must take a calculated risk on the basis. But if governmental policies interfere with the normal demand and supply forces affecting the relationship between spot and futures prices, these risks are increased.

The safety of hedging has been affected seriously by governmental action in recent years. Hedging has been practiced for a long time by both cotton merchants and cotton mills as a means of reducing price risks. When price risks are reduced, the margins for handling cotton are de-

creased, which could benefit both the producer and the consumer. Anything that affects the delicate balance between spot and futures prices increases the risks associated with handling cotton. Increased risks necessitate higher margins or greater assumption of risks by the handler than has been the custom.

No one has vested rights to handle a farm product just because he has learned the business or has capital invested. However, if existing merchandising agencies are doing a reasonably efficient job, careful consideration should be given to them when the effects of governmental farm programs are appraised. We should not upset our traditional marketing system until a better one is certain and ways have been sought to make the system function more efficiently.

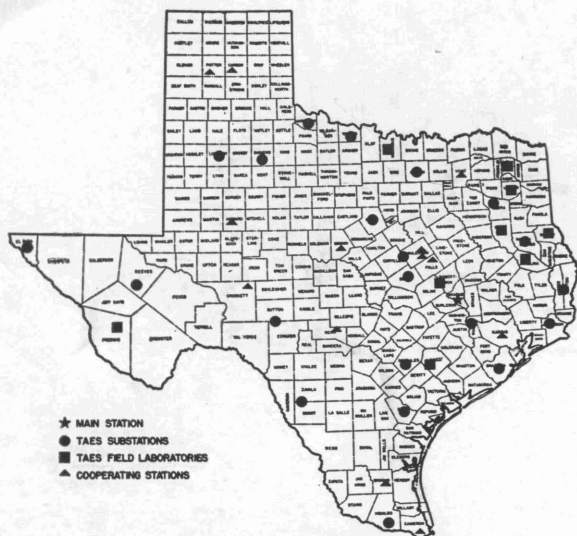
There are three major groups of people concerned with the prices of farm products—the producer, the middleman and the consumer—and each may have a special interest. The producer wants the highest prices possible, the consumer wants the lowest prices possible and the merchandiser wants the highest profits possible. It is not the merchandiser's responsibility to maintain either low or high prices. It is his job to get the products from the farm to the consumer just as efficiently as possible and at a reasonable profit. If freedom of action is left to the merchants, competition should keep excessive profits down. The cotton farmer and the cotton merchant have common interests in maintaining free enterprise. Neither will be helped in the long run by having the government hold an "umbrella" over foreign cotton producers and competitive fibers.

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State-wide Research



The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of nine parts of the Texas A&M College System



Location of field research units in Texas maintained by the Texas Agricultural Experiment Station and cooperating agencies

IN THE MAIN STATION, with headquarters at College Station, are 16 subject-matter departments, 2 service departments, 3 regulatory services and the administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies, including the Texas Forest Service, the Game and Fish Commission of Texas, Texas Prison System, the U. S. Department of Agriculture, University of Texas, Texas Technological College and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

RESearch BY THE TEXAS STATION is organized by programs and projects. A program of research represents a coordinated effort to solve the many problems relating to a common objective or situation. A research project represents the procedures for attacking a specific problem within a program.

THE TEXAS STATION is conducting about 350 active research projects, grouped in 25 programs which include all phases of agriculture in Texas. Among these are: conservation and improvement of soils; conservation and use of water in agriculture; grasses and legumes for pastures, ranges, hay, conservation and improvement of soils; grain crops; cotton and other fiber crops; vegetable crops; citrus and other subtropical fruits, fruits and nuts; oil seed crops—other than cotton; ornamental plants—including turf; brush and weeds; insects; plant diseases; beef cattle; dairy cattle; sheep and goats; swine; chickens and turkeys; animal diseases and parasites; fish and game on farms and ranches; farm and ranch engineering; farm and ranch business; marketing agricultural products; rural home economics; and rural agricultural economics. Two additional programs are maintenance and upkeep, and central services.

RESearch RESULTS are carried to Texas farm and ranch owners and homemakers by specialists and county agents of the Texas Agricultural Extension Service.