

Wool

Marketing Problems

In Texas



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Summary

Texas ranks first in the United States in sheep and wool production. Stock sheep amounted to 6,159,000 head in January 1961. These are mainly fine-wool types, but cross breeding is common and Texas wool varies in its physical characteristics.

Core sampling of 307 lots representing 2.75 million pounds of wool was carried out at three warehouses during 1957-59. Yield by lots varied from 32 to 57 percent and averaged 42 percent clean wool. Most Texas wools are considered fine; that is 64's or finer with an average fiber diameter of less than 22.0 microns. Of the wool sampled at the warehouses, 86.4 percent was finer than 22.0 microns, but individual lots ranged from 18.0 to 24.6 microns.

Proposed USDA standards for length classify lots with an average length of 2.75 inches or more as strictly staple and those having 2.0 to 2.75 inches as staple and good French. The average unstretched length of the wool sampled at the warehouses was 2.8 inches and individual lots ranged in average

length from 1.3 to 3.8 inches. On a clean basis, 57 percent of all wool sampled was strictly staple and 37 percent was classified staple and good French.

To get an average color rating, the whitest wools are given an "A" or 1.0 rating, less white wools "B" or 2.0 ratings and on down to "E" or 5.0 color ratings. Visual comparisons of the sampled wools for the 3 years brought an average color for all samples of 1.9 or approximately "B" color. Of all lots examined, 28 percent were "A" color, 59 percent were "B" color, 13 percent were "C" color and one lot was "D" color.

Crimp is the natural waviness or curl in the fibers of a lock of wool. The number of crimps per given length indicates the degree of fineness. The average crimp for all wool sampled was 15.5 per inch.

Variations by lots and by years for all physical characteristics show the problem of selling and buying wool in the original bag or by physical inspection alone.

Most wool is marketed in Texas by the traditional system. The wool is sheared mechanically by itinerant shearing crews working in an open pen on shearing boards. Each fleece is tied separately in one bundle with paper string and then placed in a bag with other fleeces. Carelessness in shearing and poor handling methods damage the wool through the quantities of dirt and vegetable matter picked up in shearing, discoloration of the fleece by the tags and mixing of wools of variable quality.

Most Texas wool is moved into local warehouses immediately after shearing. The bags are weighed, marked and stored until sold. Most sales are by private treaty or sealed bids to buyers who rely on a visual examination of samples to estimate clean yield and physical characteristics. The buyers often concentrate the bagged or loose wool in bales and it is usually trucked to the processing area.

After the raw wool reaches its destination, it must be sorted, blended and scoured before it is ready for carding. Wools that lack uniformity of preparation, which includes most Texas wools, are sorted on the basis of quality — fineness, length, soundness, color and amount of vegetable matter included.

Texas wools are well known to the wool trade. Approximately 1,600 wool handlers and manufacturers were contacted by questionnaire to determine their willingness to supply specific data about their experience with Texas wool. Seventy-five firms agreed to supply data and 39 firms finally did so. These firms in the previous year handled a volume of 46 million pounds of scoured wool and 16 million pounds of grease wool.

Recommendations were given by the firms on ways to improve Texas wools. Their suggestions covered all phases of the wool program; breeding for the best characteristics, shearing properly and grading and baling at the shearing pen, sorting at the warehouse and so on. The consensus of the firms was that Texas wool was equivalent to other domestic wools in physical characteristics, but inferior to Australian and South African wools in preparation.

Visits were made to worsted and woolen mills and one manufacturer of papermaker's felt to discuss the characteristics of the raw wool they purchased for their operations. They used Texas wools, other domestic wools and foreign wools. Factors which placed Texas wool at a disadvantage compared to other domestic wools were higher shrinkage, higher scouring cost, lack of fiber strength, felting properties for some fabrics and higher price.

Compared with foreign wools, Texas wools were said to be at a disadvantage because of incomplete classification, cost of conversion, more sorting required, short and irregular staple due to second cuts in shearing, black fibers and lack of strength.

Core samples taken at three warehouses during 1957-59 were used to determine the comparative accuracy of wool pricing at the warehouse level under existing conditions. After the samples had been analyzed for length, fineness, yield, color and crimp, the analyses were mailed to the grower and warehouse operator for their information. The wool was sold in the usual manner and the warehouse operator recorded the sale price, data and terms of sale.

Analysis of these data for pricing efficiency indicated that only 13 of 332 cored lots sold for a price reflecting its exact physical characteristics. Most lots, 186, varied 1 to 10 cents from the calculated price while 94 had a price variation of 10 cents or more and 22 of these exceeded a 20 cent differential. Of all lots varying from the calculated total, 61 percent sold too low and 39 percent sold too high. There was an average loss of 2.4 cents per pound on the entire amount, indicating the buying practice of undervaluing wools in order to provide a margin for error.

Wool at a given location tends to be sold on a lot price basis with little price variation on the basis of quality of individual lots. This offers no inducement to the producers to improve the quality and preparation of their wool. This problem is accentuated by the lack of accepted uniform standards to describe important quality elements of wool and by the absence of adequate classification and market information services.

The information required to improve Texas wool marketing is available but the incentives required for change are not offered. Sheep producers are not convinced that it is to their economic advantage to emphasize wool production over meat production. Only a small percent of sheepmen believe that it pays to do a better shearing job or to grade at the shearing pen. Many warehousemen see no advantage in a change from sale in the original bag to alternative systems of grading or sale on a description basis.

The current stalemate in wool marketing can be broken when important groups in the wool trade provide the necessary incentives. Some form of integration, cooperation or public control eventually will remove the inefficiencies of the Texas wool marketing system.

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Wool Marketing Problems in Texas

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The sheep industry ranks second in contribution to the total livestock production in Texas. Texas ranks first in the United States in lamb and wool production, and the United States ranks seventh in world production.

After the Civil War when the large expansion in sheep ranching began, the sheep population increased until 1943 when the peak in numbers was reached with 10,607,000 head of stock sheep.

Analysis of recorded data for the 50-year period, 1909-58, reveals that in the first decade the average population of stock sheep on Texas ranches was 2,161,000 head, Table 1. In the fourth decade when the peak was reached, the average was 9,580,900. In January, 1961 stock sheep on ranches were reported at 6,159,000 head.

The wool clips shorn increased in pounds of grease wool shorn from the low of 12,690,000 pounds in 1910 to 80,713,000 pounds in 1935. The poundage of grease wool shorn does not give a true picture of the yield as both number of head shorn and climatic conditions seriously affect the poundage of the grease wool clip. The heaviest clip of grease wool was shorn in the severe drouth year of 1935.

The value of the grease wool clip varied greatly for the 50-year period. The peak was reached in 1951 when grease wool was valued at 99 cents per pound.

There have been many different breeds of sheep introduced into Texas. Probably every breed which was introduced in the earlier periods made some contribution toward improving the native stock. These native sheep or Mexican Churras developed

from the flocks of the Christianized Indians and early Spanish settlers. The Churra sheep were small and sheared a light, inferior fleece of wool. These flocks were kept mainly as a source of fresh meat.

The Rambouillet breed was introduced direct from Rambouillet, France in 1853. This was the Spanish Merino that had been developed in France as a dual-purpose sheep. The Rambouillet was larger and more rugged than the Delaine, with longer and stronger legs. It developed into an ideal trail sheep. The Rambouillet breed produced a larger, stronger, quicker maturing lamb although the fleece was not quite as fine and heavy as the Delaine.

There are no records available which give an accurate population breakdown by breeds in the State, but breed popularity is indicated by the number of registered flocks in the State. In 1959, there were 335 Rambouillet, 182 Suffolk, 100 Delaine Merino, 39 Corriedale, 21 Columbia, 17 Hampshire, 11 Debouillet, 7 Shropshire, and a few Southdown and Panama breeders who submitted applications for registration. With few exceptions, the fine-wool type and the crossbred-wool type breeds are located in the fine-wool producing area. The Suffolk breeders are distributed all over the sheep-producing part of the State. The other registered flocks are concentrated in the Grand Prairies and adjacent farming areas.

The early sheep producers established many practices of production, management and marketing which prevail today. Over the long period of time some of these practices have become traditional in spite of their inefficiency. The producer was never informed of the importance of quality in his products since a wide void existed between him and the wool processor. Hence, the producer came to believe that weight was the most important factor and produced wool with little or no consideration of market demands. The markets have always taken the total production at some price.

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Characteristics of Texas Wool

Many Texas wool producers believe that their wools sell below true value as compared with foreign and other domestic wools. Wool value is determined by a combination of physical characteristics. Each wool clip differs in its particular combination of characteristics.

Information on the characteristics of Texas wools was obtained by sampling 307 lots representing 2.75 million pounds from three warehouses during 1957-59.

Coring of wool has increased in popularity with growers, warehouse operators and buyers, since about 1947, when the government cored a considerable quantity of grease wool on a loan program. The core test is a well recognized method for determining the clean fiber content of a particular lot of grease wool.

This sampling method by core test is the most accurate known means for laboratory determination of grease wool yield. The procedure has been accepted by the American Society for Testing Materials; United States Department of Agriculture; Bureau of Customs, Treasury Department; Wool Associates of the New York Cotton Exchange, Inc.; and by a large segment of the wool industry. Argentina requires that all wools exported to the United States be cored as a basis for sale. Other countries are considering adopting similar procedures.

Fineness, length of staple, crimp, color, strength and handle are evaluated almost entirely by visual estimation and inspection. However, the American Society for Testing Materials has approved standards for yield, fineness, length and strength. Methods for the determination of color and crimp have been developed by the USDA. None of the standards for length, fineness, color or crimp have been accepted to any degree by the textile industry. In recent years the commercial testing companies have started giving the fineness or grade of a lot from core analysis when requested.

Yield

Wool as it comes from the sheep contains various nonwool components, such as dirt and sand, grease, vegetable matter and moisture. The percentage of these impurities in any one fleece may range from 20 to 80 percent of the total weight. Actual percentages depend on the conditions under which the wool is grown, fineness, length of staple, weather conditions and other factors. The grease wool must be scoured and the impurities removed before it can be used in manufacturing. Its value depends largely

on the quantity of useable wool or clean yield after scouring.

The sample of grease wool from the three warehouses yielded, on the average, 42 percent clean wool in 1957; 48 percent in 1958 and 47 percent in 1959. Yield by lots ranged from 32 to 57 percent. These variations by lots and by years show the problem of selling and buying wool by physical inspection.

Fineness

The two most important quality characteristics that determine the usefulness of a particular wool lot are fineness or grade, and staple length. Most Texas wools generally are considered fine; that is, 64's or finer with an average fiber diameter of less than 22.0 microns, no more than 7 percent of the fibers exceeding 30.1 microns and 1 percent exceeding 40.1 microns (a micron is equal to about $1/25,000$ of an inch). Of the wool sampled at the warehouses, 86.4 percent was finer than 22.0 microns. The remaining 13.6 percent ranged in fineness from 22.1 to 24.6 microns in diameter, or using the English count system, 86.4 percent was 64's and finer and 13.6 percent was 60's and 62's. The average fineness of all wool sampled was 21.0 microns.

Wool produced in 1957 was finer than that for 1958 and 1959, averaging 20.2 microns as compared with 21.3 and 21.4. The fineness in 1957 may have been caused by poor range and feed conditions. Much wider variations occurred between lots ranging from 18.0 to 24.6 microns. This indicates the general fineness of Texas wools and the necessity for careful measurement of individual lots if price is to reflect quality precisely.

Length

Length is one of the major physical properties of the wool fiber. It is a basis for the classification and description of wool, whether marketed as grease wool or wool top. Longer wools of the same grade usually are worth more than shorter wools. However, staple length varies within a fleece and from fleece to fleece within a graded lot so it is impossible to classify wool for length with exactness. Reliable length estimations are made by measuring hook samples.

The average unstretched length of the wool sampled at the warehouses in the 3 years was 2.8 inches and the variation in average length from year to year was very small. On the other hand, individual lots ranged in average length from 1.3 to 3.8 inches.

According to the USDA's proposed standards for length, lots of wool which have an average length of 2.75 inches or more are classified as strictly staple, 2.0 to 2.75 inches are staple and good French; 1.5 to 2.0 inches are average and good French; and lots less than 1.5 inches are short French and clothing wools. On a clean basis, 57 percent of all wool sampled was strictly staple and 37 percent was classified staple and good French. Five percent was average and good French and 1 percent was clothing wool.

Color

Scoured wool tends to have a light ivory or light cream color. A yellowish cast is the most prevalent color in wools and true white is comparatively rare. The popularity of the light and pastel shades in wool textiles has made color in wool much more important. However, truly objective standards are not available for determining the color of wool.

Color of the sampled wools was determined by the method used by the USDA. Representative samples of colors were used, ranked from "A"—the whitest—through "E"—the creamiest or least desirable color. Individual lots were compared visually with the color samples.

Normally Texas wools are not the whitest wools produced in the United States. To get an average color rating, the whitest wool or "A" color was given a value of 1.0, "B," "C," "D," and "E" values of 2.0, 3.0, 4.0 and 5.0, respectively. Visual comparisons of the sampled wools for the 3 years brought an average color for all samples of 1.9 or approximately the "B"

TABLE 1. THE AVERAGE NUMBER OF SHEEP SHORN, GREASE WOOL PRODUCTION AND AVERAGE VALUE BY DECADES, TEXAS, 1909-58

Decade	Average number of sheep shorn	Grease wool production	Average value of grease wool
	Millions	Thousand pounds	Thousand dollars
1909-18	2,161	13,846	3,104
1919-28	3,617	26,722	9,052
1929-38	7,532	61,980	13,694
1939-48	9,581	73,541	28,944
1949-58	5,820	45,311	28,446

Source — Wool Statistics and Related Data, U. S. Department of Agriculture Statistical Bulletin No. 250, May 1959.

color. Wools produced in 1957 were considerably whiter than in either 1958 or 1959.

Of all lots examined, 28 percent were "A" color, 59 percent "B" color, 13 percent were "C" color and one lot was "D" color. Almost all of the lots with "A" color were from the 1957 samples.

Crimp

Crimp is the natural waviness or curl in the fibers of a lock of wool. The number of crimps per given length indicates the degree of fineness; the more crimps per inch, the finer the wool. The sampled wool was measured with a ruler and the crimp was determined by counting through a magnifying glass. Average crimp for all wool sampled was 15.5 per inch which may indicate the fineness of Texas wools. No measurements were made of the crimp depth.



A flock of Rambouillet ewes and lambs on an Edwards Plateau ranch. This is the predominant breed in Texas and the Edwards Plateau is the major producing area. Courtesy: *San Angelo Standard Times, San Angelo, Texas.*

Present Wool Marketing System

Some of the most difficult problems associated with Texas wools develop in the marketing system. They arise mainly from the producers' unwillingness to provide the extra work and management required to avoid the resulting problems. This is caused partly by the failure on the part of middlemen to reward properly the individuals who market most effectively. The trade has made no consistent effort to require improved marketing methods. The result is a continuation of the traditional system.

Shearing and Handling Wool at the Ranch

In Texas shearing is done primarily by itinerant shearing crews, that vary from 1 to 16 men. The apparatus used for shearing usually includes an old truck chassis with a line shaft arrangement from which a number of shearing drops are attached. The number of drops will vary from 1 to approximately 12 per machine. The newer apparatus sometimes includes an electric generator powered by a gasoline motor. Small electric motors in turn transmit the necessary power to the shearing clippers. The clipper is similar in principle and function to a barber's clipper.

A good sheep shearer is a highly skilled worker, who learns the trade by serving an apprenticeship. The rate of pay is comparable to the rate of pay found in other skilled trades such as carpentering, plumbing and bricklaying. A good shearer can average shearing more than 100 sheep per 8-hour day and collects 20 to 25 cents per head. However, his annual income usually is not large because of the seasonal nature of his work.

Texas ranchers have never adopted the custom, followed in some of the Western states, of driving their sheep to a central shearing location. Each rancher provides his own place for shearing. The manager of a shearing crew makes an oral agreement with each rancher as to the date and place of shearing.

It is important to discuss the facilities for shearing because here the wool starts its marketing journey, and many factors which affect the value of the wool are encountered in the shearing pen.

Since many ranchmen shear their flock only once each year, the facilities provided for shearing are frequently makeshift and inadequate for proper handling of the wool. The facilities vary from a permanent installation with sheltered concrete or wooden floors, to a corner cow-lot with a "pallet" or piece of canvas spread on the ground.

The typical shearing facility provided by Texas sheep producers consists of a set of "shearing boards" (two or more), which are made by nailing 1" x 6" or 1" x 8" planks to a 2" x 4" frame, creating a platform 4" high and 4' wide and as long as the shearing machine. In addition there might be a wooden table 3' x 5' in size, used for tying the wool, and a portable wool rack large enough to hold two wool sacks. The double wool rack is not used to allow the wool to be graded as might be supposed. It is used to permit continuous sacking of the wool; that is, while one full sack is being taken from its rack, sewed and a new sack put in its place, wool can be placed in the other sack.

The shearing crew, on arriving at the ranch, places the shearing machine in an open pen, places the shearing boards on both sides of the machine, and moves the wool rack and tying table into the pen; the shearing crew is ready to begin operations.

In a typical Texas operation, a flock of 50 sheep or more are turned into the pen with the shearers; western states have large permanent shearing sheds where the sheep are placed in small pens adjacent to the shearer. The loose sheep mill around in the open pen kicking up great quantities of dust and dirt, and often run across the shearing boards kicking partially sheared fleeces off the boards into the dirt and vegetable matter. The quality or value of the wool suffers as a result.

Most shearing crews furnish their own sackers and tiers. These workers are usually unskilled boys who pick up the fleece from the shearing boards, take it to the tying table, tie the fleece with a paper string and put it in the wool sack. The pickup boys usually become members of the shearing crew as older men retire or quit. It is common practice to tie the whole fleece into one bundle without segregating tags, clippings, or any off-sorts from the main part of the fleece. If the fleece includes an abnormal quantity of dung-matted stained locks and clippings, the shrinkage of the fleece will be higher and the value downgraded for this reason. More important, these tags and off-sorts may stain and permanently damage the main body of the fleece by discoloration.

During the shearing time, ranchmen feel pressed by other duties which take them away from the shearing pen. They are so busy gathering sheep from the range and taking care of other ranch obligations that they seldom take time to supervise closely the actual shearing operations. Many of them feel that it would be an unnecessary expense to hire a capable wool handler to prepare the wool for sacking since the shearing crew puts the wool into the sack in any case.

The use of improvised shearing facilities and poor handling methods damages the wool irreparably in three ways: (1) an additional quantity of dirt and vegetable matter is picked up from the shearing pen, (2) the main body of the fleece is discolored by the tags and (3) after the tags and clippings have been mixed with the main body of the fleece it is more difficult to segregate them, a job which should be done somewhere and at a greater expense, during the marketing process.

Warehousing the Wool

Most ranches in Texas do not have the facilities to store their wool clip for a long time. Consequently, the clip is moved into local warehouses immediately after shearing, either by the grower or by the local warehouse which furnishes a truck for this purpose.

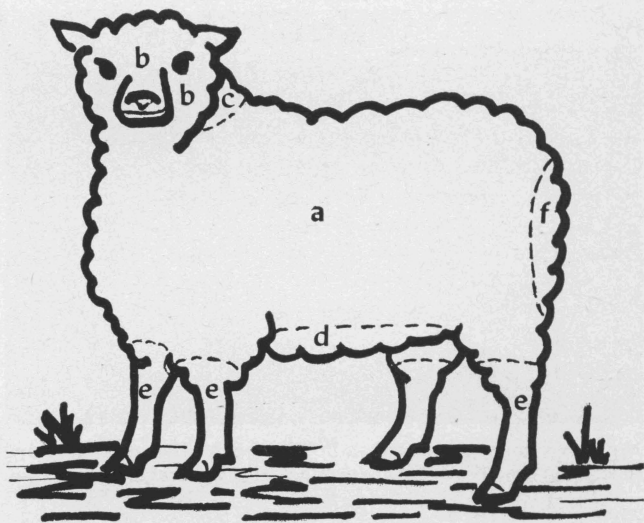
The clip is weighed when it enters the warehouse, and each bag is given a lot and bag number. The lot number is placed on the bag to identify the grower. The weight of each bag is entered in a ledger along with each bag number. These weights are not used as sale weights, but to credit each owner with the amount of wool delivered. The wool is reweighed when it is sold. Seldom are the two weights the same, because wool tends to gain or lose moisture, depending on atmospheric conditions. Wool shorn during damp weather and stored and sold during a dry period may lose several pounds per bag.

The bags are weighed and marked, then stacked by lots. Some warehousemen put small lots in one section of the warehouse, and others stack according to lot numbers, shrinkage, class, or length of wool. All warehousemen try to stack wool so that any desired lot is easily accessible.

About 95 percent of Texas wool is handled through the local warehouse. The principal purpose served by the wool warehouse in Texas is to provide a center to assemble wool. Safely stored and insured, it is available for inspection in sufficient quantity to attract buyers. It is possible thus to offer wool in carload lots, which is usually the minimum tonnage that buyers like to ship. Most wool growers in Texas produce less than a carload lot of wool annually; therefore, a buyer trying to make up a carload of similar types of wool would incur greater expense if he had to visit each ranch to inspect clips. If buyers are able to inspect and obtain wool from assembly points such as warehouses, the grower may receive a higher price for his wool.

Selling the Wool

Texas wool usually is sold by private treaty or through sealed bids. Though auctions have been



Wools from different parts of the sheep vary in their physical characteristics. *a. body wool; b. face wool; c. neck wool; d. belly wool; e. leg wool; f. breech wool.*

held in the State, they have never become popular, warehousemen believe that both auctions and sealed bid sales, because of their more competitive nature, result in higher prices, only when the demand is strong.

Private treaty, the term used to describe the most common method of selling wool, consists of a warehouseman and a buyer getting together on a price. When a buyer comes to the warehouse to buy wool, sample bags of the wool type in which he is interested are taken from each lot and opened for his inspection. From 5 to 10 percent of each lot is shown, but if a buyer cares to inspect the lot more thoroughly, it is his privilege to do so. Wool is commonly shown in "lines" arranged by the warehouseman. Some operators line up their wool according to shrinkage, but for the most part wool is lined according to fineness and staple length, with all lots of approximately the same length in the same group. These "lines" are made for sales convenience, since they make inspection easier. This practice permits a buyer to evaluate wool quickly as to whether it suits his purpose.

After he assures himself that the wool is of the fineness and length desired, the buyer is concerned mainly with the clean wool yield of the clip under examination. He is also concerned with the preparation, which he can see after he opens the bag. A properly prepared lot of wool requires less expense in handling by the mill than one which is poorly prepared.

Wool is bought in Texas by experienced buyers who estimate visually the clean wool yield. They base their estimations on experience gained through years of buying wool.



Sheep are concentrated in holding pens adjacent to shearing shed. Courtesy: *West Texas Livestock Weekly, San Angelo, Texas.*

After the warehouseman and the wool buyer have agreed upon a price, the warehouseman normally will have to contact at least some of the wool owners to get their consent to sell. Once the sale is made, all the growers are notified of the price received and each one is sent a check for his clip, less the marketing charges.

Transportation of Wool to Eastern Markets

Undoubtedly, one of the most significant recent changes in Texas marketing wool lies in the field of transportation. Before 1952, practically the entire clip moved to the eastern markets by rail, boat, and seatrains. Around 1953, wool was first transported from the State in trailer trucks to the Boston area. The first two years were largely experimental and resulted in small quantities being moved by this method. By 1955, a portable wool baler was designed and built by one of the leading truck lines. This invention greatly increased the trucking of wool. By 1956, almost all of the production in the State for that year was moved by truck.

The baling of wool in the bag, loose grease, or scoured, results in considerable space saving. Before baling a truck can haul about 21,000 pounds. After baling it can handle as much as 35,000 to 40,000 pounds. Thus, baling has almost doubled the wool-carrying capacity of trucks. Some warehouses have stationary balers to bale grease wool that has been graded or sorted and is not to be scoured locally.

There is no minimum restriction on the exact amount that must be shipped by truck, but an effort is made to load 30,000 to 35,000 pounds. This offers no special problem since the advent of the wool baler.

Wool is exempt from the regulations of the Interstate Commerce Commission and for this reason rates

may vary from time to time and from point to point within an area.

Processing Wool in Manufacturing Area

Raw wool must be sorted, blended and scoured after it reaches its destination before it is ready for carding. Wools that lack uniform preparation, which applies to most Texas wools, are sorted on the basis of quality—fineness, length, soundness, color and amount of vegetable matter included. All fibers with similar characteristics are placed in one group. Manufacturer's requirements are used as a sorting guide, and the higher the quality of the goods to be produced, the more carefully the sorting is done. Even well prepared wool must be inspected for uniform quality. Most Texas wools require much labor in sorting.

The degree of specialization in the wool industry may influence the agencies mainly concerned with the grower's wool preparation. If the manufacturing system were so integrated that firms buying raw wool from growers carried processing and manufacturing through to the finished fabrics, preparation by growers could be directed toward meeting the requirements of those who manufacture different types of fabrics. However, growers cannot fit their wool to the needs of individual manufacturers because individual manufacturers seldom buy directly from growers. This accounts for the specialization in the wool industry. Aside from growers themselves only intermediate handlers and processors of wool are primarily concerned with the grower's preparation. Under these conditions, firms that buy wool at any point after the scouring process are concerned very little with the suitability of grower preparation. Decisions concerning the suitability of grower preparation rest mainly with firms that control wool up to and through the scouring process.

Topmakers are specialized firms. They are concerned with grower preparation because they convert the wool from the raw to the finished state. They buy and prepare wool, then scour and comb it before selling it as top. Topmakers, therefore, are directly concerned with the suitability of grower preparation because they use the wool as it comes from the grower.

Many dealers who are not topmakers supply services similar to those of topmakers and play a similar role in the field of grower preparation. They buy the wool outright, remedy faulty preparation, provide a stock of grease and scoured wools for selection by manufacturers and assume the risk of price changes.

Problems Expressed by Wool Trade

The wool trade, especially the handlers and manufacturers, can be very influential in improving the quality of Texas wool. Each year, their buyers evaluate Texas wools in relation to other wools and establish a price presumed to reflect comparative value. During the past 5 years, this Texas wool price has averaged 1.4 cents above the U. S. price. This price difference varied from year to year as might be expected since laboratory tests indicate annual differences in the length, fineness, color and other characteristics of Texas wool.

Texas wool is well known to the trade. A preliminary questionnaire was mailed to approximately 1,600 wool handlers and manufacturers asking their cooperation in obtaining specific information about their experience with Texas wool. Favorable replies were received from 75 firms, which expressed an interest in the proposed research and designated an individual in the firm to contact for further information. A more detailed questionnaire was sent to these 75 firms.

Thirty-nine firms located in 15 states provided usable data. Most replies were prepared by presidents, vice presidents or wool buyers for these firms. They reported handling a volume of 46 million pounds of scoured wool and 16 million pounds of grease wool.

The cooperating firms engaged in one or more of the processes by which wool is converted from a raw material to a finished product. Number of firms engaged in each function were:

Grading	— 21	Carding	— 29
Sorting	— 23	Combing	— 12
Blending	— 32	Weaving	— 21
Scouring	— 24	Dyeing	— 21

Those firms which comb wool, but do not weave it are considered topmakers; there were seven of this type.

Evaluation of Texas Wool

Twenty-nine of the firms had used Texas wools during the preceding year and all but six reported it to be satisfactory. The approximate poundage of wool used by these firms during 1957 is shown in Table 2.

Most wool that was unsatisfactory was ungraded. However, more important, all Texas wool that was scoured was satisfactory. A total of 47 million pounds was represented, which accounts for a large percentage of all Texas wool. The fact that no Texas wool was

unsatisfactory after it was sorted points out the necessity for good preparation before marketing.

Improving Texas Wools

Representatives of these 29 firms were asked to comment on practices which might improve Texas wool quality. Their comments on breeding were specific.

“Breed to eliminate kemp, coarse and black hair.”

“Keep high natural quality with length 3”, fineness 64’s and 70’s.”

“Breed for wool instead of lamb, getting rid of old ewes.”

“Do not crossbreed; even a small percentage of low quality wool spoils the lot for use by a fine-wool mill.”

“Eliminate uneven length and grade.”

The shearing pen is the next point in the marketing process. Here the firm representatives were concerned with some practices which created problems and other proposed practices which might result in improvements:

“Carefully watch how sheep are paint branded and cuts are doctored. They slap the paint on too heavily and cover too great an area.”

“Eliminate all paint-tar-wound medicines not readily removed by commercial scouring.”

“Keep shearing areas free of straw and trash. Use clean tables.”



The shearing area tends to become cluttered and dirty unless boards are swept and tags picked up frequently.

**TABLE 2. APPROXIMATE VOLUME OF TEXAS WOOL
USED AND GRADED BY 29 WOOL HANDLERS
AND MANUFACTURERS DURING 1957**

Type	Firms	Approximate volume
	Number	Thousand pounds
Ungraded		
Satisfactory	7	4,239
Unsatisfactory	3	5,240
Graded		
Satisfactory	4	4,445
Unsatisfactory	2	795
Sorted		
Unsatisfactory	1	20
Blended		
Satisfactory	1	75
Scoured		
Satisfactory	11	47,168
Total	29	61,982

"In shearing take only one cut, to reduce excessive short fibers."

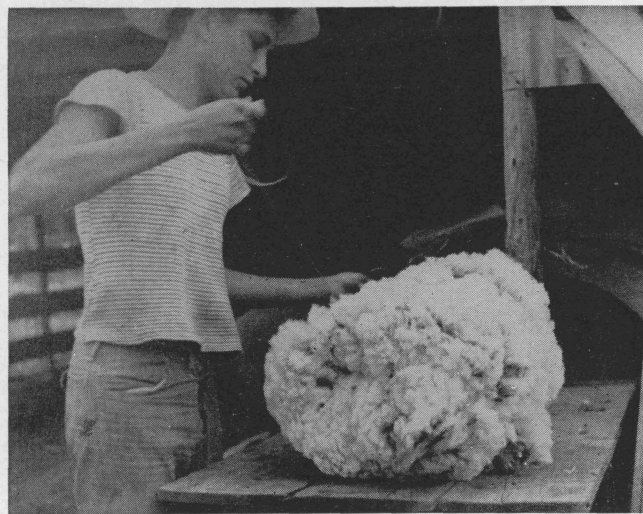
"Shear off shank and tags, in some cases perhaps belly wool, especially if it has bulk or defect."

"Skirt like Cape and Australian wool so that sorting can be eliminated."

"Be sure that all off-sorts such as black pieces, tags, bellies and locks are packed separately."

"Grading and baling at shearing pen is inexpensive and would greatly increase the value of Texas wool."

"Eliminate use of strings in tying fleeces—fleeces can be wrapped as in South America and other major wool countries."



The sheared fleece is tied with paper cord with the flesh side of the fleece exposed. This tying keeps the fleeces separate. Courtesy: *Sheep and Goat Raiser Magazine*.

Most specific recommendations applied to the activities at the shearing pens. However, some mentioned a few additional practices to be carried out at the warehouse:

"Sort out paint wool, skirtings, belly wool, tender wool, coarse wool, seedy, defective and lamb's wool."

"Grade wool by length and diameter."

"Pack in compressed bales."

A further question pertained to the scouring and blending of wool in Texas. They were asked if they preferred further processing:

"Scouring is O.K. We prefer to blend our own wool."

"Blending and scouring for short wools only."

"Manufacturer prefers to do own blending and scouring."

"Blending has no advantage as the end users prefer to do their own blending. Some mills like Texas scouring, some do not. It saves freight, however, going North or East."

Competitive Position of Texas Wool

A series of questions dealt with the comparison of Texas wools with other domestic or foreign wools. Since Texas wools are largely fine, it would seem that the average price of these wools should exceed the U.S. price by more than the usual amount. It is also felt that Texas wools should be able to compete successfully in price with the Australian or Cape wools. The first question in this series inquired if there had been any dissatisfaction with the 1957 Texas wool clip:

"1957 wool was very defective and had much yellow in it."

"Too much variation in length and strength of staple."

"Contained unscourable paint and tar."

"Poorly put up."

"Excessive burry bellies."

"In general, Texas wool is too soft for men's wear and too expensive."

"They do not remove buck's tags and defective fleeces."

"Fall Texas crop was defective. Did not purchase."

"Too mixed for grade — had to be handled."

"Quite a large percentage of poorly grown wools."

A second question asked how shorn Texas wool compared with wool graded, sorted and scoured elsewhere. The answers ranged from complete satisfac-



About 15 to 22 fleeces are packed in the average 6 foot wool bag. This bag is the basic unit for original bag wool. Courtesy: *Sheep and Goat Raiser Magazine.*

tion with Texas wool to a marked preference for other wool:

"Graded wool compared same as wool graded elsewhere."

"Superior to most other domestic wools."

"Equal except for colored fibers."

"Domestic wools are not as well prepared as foreign wools."

"Inferior to all wools except small clips in fleece states."

"South African far superior — also Australian."

"Not as good as Cape or Australian sold by description."

Some mills use Texas wools as a blend with other wools. Several reasons were given for this practice:

"We like the characteristics of Texas wools for so many fabrics — wonderful for use in flannels."

"Texas wool combed alone is not usually satisfactory for yarns of fabrics that our customers make."

"By blending we can maintain better uniformity. Texas wools are soft, mushy, weak, uneven. Must be blended with wools which have strength, guts and uniformity."

"Texas wool does not produce the handle we need in our goods — a small percent assists in fulling."

"Too soft for one product if used by itself."

"At times we blend Texas wool with foreign wools when economically advisable to do so. Foreign wools are usually put up better and contain less vegetable matter."

Since a large proportion of the Texas wools are sold in the original bag, there tends to be a consider-

able amount of variation in the wool as it reaches the processors. A question was asked as to the variations in Texas wools as compared with other domestic wools and the specific factors that might place Texas wools at a disadvantage:

"Too warm a climate to make quality wool."

"Growers are not selecting their sheep properly; too much attention to mutton characteristics in culling; not enough uniformity of grade and staple length and incidence of black hair."

"Uniform quality is advantageous but irregularity of length of combing wool is a disadvantage."

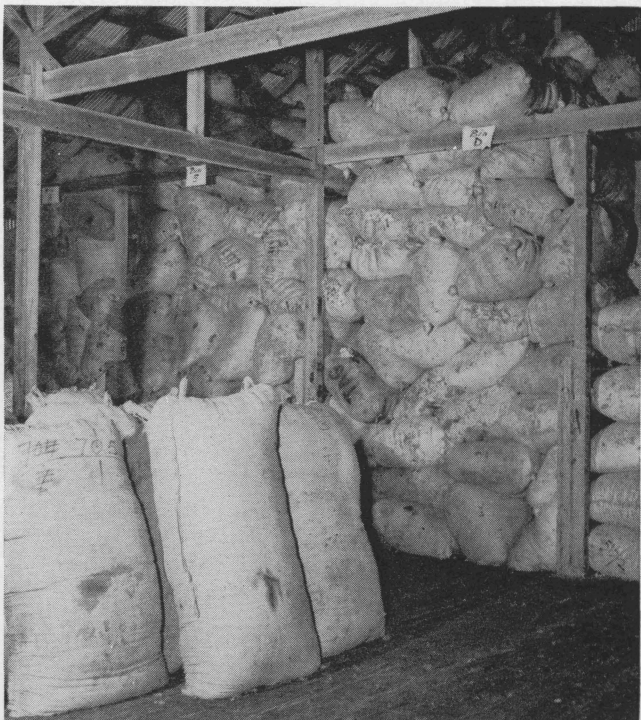
"When a man is buying fine wool he expects to receive fine wool. In recent years the trend toward the larger lamb for market has naturally resulted in some mixed clips."

"Foreign matter."

"Short fibers caused by second stroke of shears."

The concensus of the firm representatives was that Texas wool was equivalent to other domestic wools but inferior to Australian and South African wools in preparation. Most of the firms indicated that they used Texas wool in blend with other wools because of felting qualities or price.

Texas wool was considered too soft to use alone by some firms. However, it had the same or less variation than other domestic wools, with existing variation caused by management practices. Process-



Most Texas wool is stored in metal warehouses. The bags are stacked in piles by various systems. Courtesy: *Sheep and Goat Raiser Magazine.*

ing costs were estimated to be about the same as other Western and domestic wools with some mills estimating higher costs and some lower. But there was general agreement that foreign wools could be processed more cheaply. There was no clear cut preference expressed for Texas wools under existing methods of preparation.

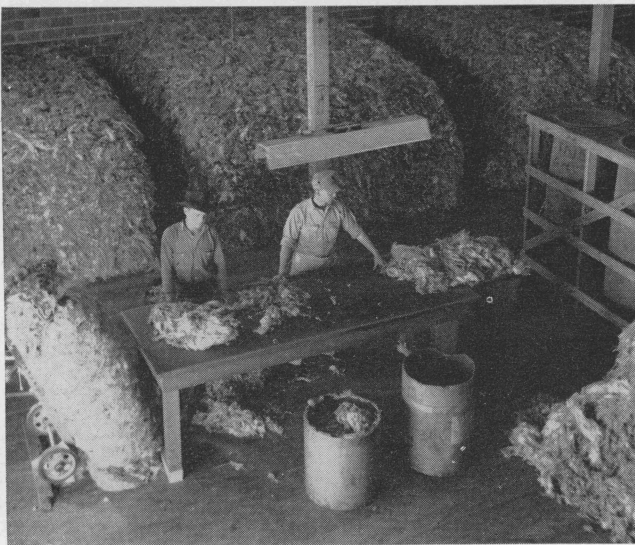
Preferred Manner of Buying

Approximately half of the manufacturers preferred to buy Texas wool by small samples and an almost equal number preferred to buy by lot examination. Only a small number preferred purchase by description alone. Those preferring a small sample would accept samples ranging from one-fourth pound to 10 pounds. The sample size depended on how reliable the manufacturer considered the source and thus how much wool he thought necessary to give a representative idea of the lot.

It is probable that the wool marketing system of the future will include a greater proportion of sales on a description basis. The firm representatives were asked to give their evaluation of the following description:

Lot 202; 44,275 pounds of grease wool; 225 bags.

- | | |
|--|--------------|
| 1. Fineness, Texas | 64's |
| Average fiber diameter | 20.7 microns |
| 2. Average staple length (unstretched) | 3.2 inches |
| Distribution percentage | |
| 2.75 inches and up | 90 |
| 2.0 - 2.75 inches | 8 |
| under 2 inches | 2 |
| 3. Clean yield percent (clean fiber present) | 47.14 |



A few warehouses grade wool prior to sale. This eliminates the identity of the original fleece and original bag. *Courtesy: Sheep and Goat Raiser Magazine.*

- | | |
|--|------|
| 4. Vegetable matter, percent | |
| Type — cocklebur | 0 |
| Bur clover | 2.1 |
| Grass bur | 1.4 |
| Chaff | 0.13 |
| 5. Number of black fibers present | free |
| 6. Color scoured | A |
| 7. Staple crimp, per inch $\frac{3}{4}$ | 16.8 |
| 8. Other: Branded with scourable paint; in paper lined bags and tied with paper twine; good strength; produced in the Sonora section of Texas; from Rambouillet sheep; cored and stapled by ACH. | |

Although most of the firms indicated that they did not prefer to buy Texas wools on description alone, they did give a favorable response to the adequacy of the above description for sales purposes. Most of them believed that this description was not too detailed and there were only a few suggestions for additions or deletions:

“Add more detail on strength.”

“Would still want samples.”

“We have not as yet accepted micron reflections on grease wool.”

“The description might be adequate if a mill were constantly buying wool in definite areas of Texas and knows ACH or the man who made the description.”

“Staple crimp is not necessary for us.”

“This information is adequate, but more mills buy in scoured state. Consequently only wool scourer will be supplied such information.”

“Descriptions are not as accurate as they should be.”

“Omit fiber diameter and staple crimp per inch.”

“Purchase by description is completely impractical.”

“Could delete color, crimp and other.”

“If this description is based on laboratory tests made from a coring sample, we would use it only as a guide and prefer a lot examination by our own buyers.”

“No sound wool firm would pay out money on above description or any other until Texas wools improve.”

“Why not check to see how wools are offered in the Australian sales.”

There is no general attitude against selling wool by description, only a lack of confidence that this method could be more reliable than the existing system. Similarly, a question on the feasibility of

cataloguing Texas wool by description brought no clear-cut opposition. About two-thirds of the firms considered it possible and several believed that it would be a more economical method of procurement. Twenty-seven firms indicated a preferred agency to supply the description. Of these, 17 favored the commercial testing companies, 2 government, 2 private wool growers associations, 2 favored reliable dealers backed by testing company reports and the remaining 4 selected miscellaneous agencies.

The firms listed several reasons they do not currently buy wool on description:

"Can't rely on it."

"Wool bought by experienced buyer, not by words on paper."

"Prefer to see sample."

"Buy through wool dealers who know our requirements."

"We like to see what we are going to get and compare shipment with the sample."

"Prefer to see wool, however, we do buy Australian classed wool from firms we have had experience with, on description which they stand behind."

"Because it is impossible to agree (seller and buyer) on fineness, etc., of descriptions."

"Have never been offered wool on description. A sample plus some description would be much better."

"Because we have never been able to rely on descriptions."

"Descriptions are not practical until such times as clips are graded and baled at the shearing pen."

"We would still have to go by grade and staple length."

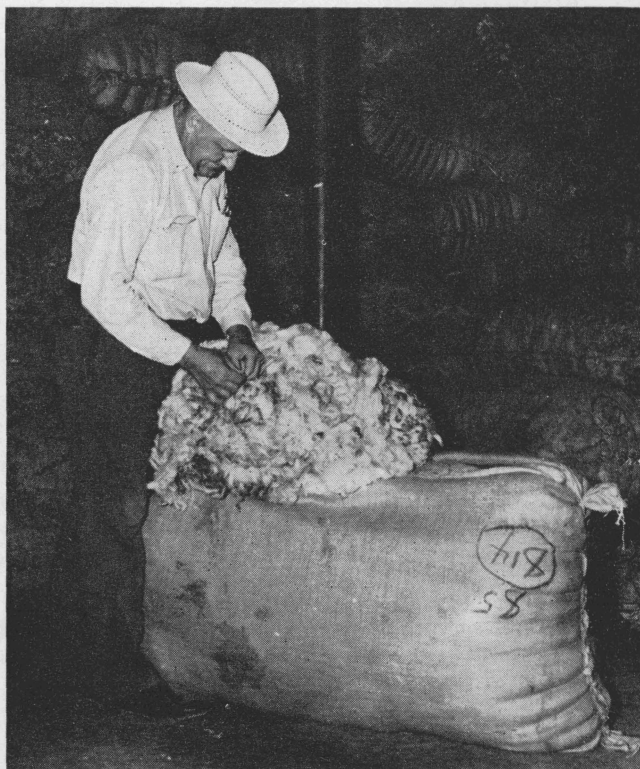
"Because past practice has indicated the description did not fit the wool."

Answers indicate the need for a completely reliable system before Texas wools can be sold on a description basis. The current variability in wool quality in original bags makes personal examination an apparent necessity and contributes to the continuation of the present marketing system.

Additional Suggestions for Improvement

A final question asked for additional suggestions which could be useful to Texas wool producers and warehousemen in marketing a more suitable product:

"Guarantee that no 8-month wool is packed with 12-month wool."



A buyer examining wool in a warehouse. The bags are slit, some fleeces are removed for examination and then replaced and the bag is sewed by hand. Courtesy: *San Angelo Standard Times, San Angelo, Texas.*

"If a clip has a small edge of 64's but is bulk 70/80's, some years for definite customers it may pay to grade."

"Sell wool on a core basis. Warehousemen cannot now sell wool without calling each individual grower."

"Endeavor to eliminate tippiness so that entire fiber has some dye affinity. Attempt to improve tensile strength."

"By some means lower percentage of burr and shive presently found."

"If Texas were to use the Australian method, we wouldn't have any further trouble."

"Culling all sheep producing grade over 64's; eliminate crossbred sheep with grade under 60's."

"Grading and baling at shearing sheds. Portable baling presses make this method of packing just as cheap as bagging and the packages are more economic to store and blend."

"Eliminate the warehouse system of selling and adopt an auction system which would tend to eliminate politics and horse traders from wool marketing and show the grower the true value of different grades of wools."

"Grading at time of shearing and packing; that is, preparations similar to those used to grade the Australian and Cape wools."

Summary of Survey with Woolen and Worsted Mills

The kinds of raw wool manufacturers required for their type of consumer or industrial wool fabrics also were considered important. Therefore, arrangements were made in the spring of 1959 with a number of worsted and woolen mills and one manufacturer of papermaker's felt to see their manufacturing processes and discuss with their management and production personnel the characteristics of the raw wool they purchased for their operations. All were more or less extensive users of Texas wools and some used or had used Texas mohair in varying amounts. Written questionnaires were obtained from six of the nine mills visited.

Two of the cooperating mills had been in their present locations more than 50 years, one for 36 years and three for 12 years or less.

A variety of mill operations were carried out including grading, sorting, blending, scouring, carding, combing, spinning, weaving, dyeing and finishing. Grading, sorting and scouring were done by fewer mills than were the other processes. Most of the mills made fabrics for men's and women's wear. One was exclusively a combing operation for top-making.

During 1958, 1.5 to 71.0 percent of the total wool fiber used by these mills was Texas wool. One worsted mill decreased its use of Texas wool and one topmaker used less than 7 percent of Texas wool.

The manager of the worsted mill preferred the characteristics of territory wools in the tops which he purchased. Another fabric manufacturer for women's wear considered decreasing his use of Texas wool because of the black hair content which could not, of course, be tolerated in fabrics to be dyed light colors. Most mills indicated that they would continue to use Texas wools for various reasons—the grade suited the type of fabrics made, the price was favorable in comparison to that of foreign wools and the felting quality of Texas wools was good. Price was indicated also as a deciding factor.

Favorable competitive price, felting qualities, length, fineness, color and spinning qualities were among the satisfactory qualities of Texas wools used in 1958. Lots of original bag wools were selected by one big mill to meet basic mill standards for type and quality, and graded staple lots were considered principally for specialty use in various seasons.

Statements that concerned unsatisfactory qualities were limited, perhaps because the Texas wools used in 1958 were carefully selected to be satisfactory. However, there were complaints about insoluble materials such as tar and paint, excessive vegetable matter, black hairs, excessive shrinkage because of dirt, and fleeces tied with strings. One mill found the short Texas bags objectionable. Some low grade fleeces were mixed in lots of supposedly good fleeces.



Buyers making visual estimates of wool characteristics such as length, strength, fineness, color and shrink prior to making bids. Courtesy: *West Texas Livestock Weekly, San Angelo, Texas.*



For shipment, original bags are compressed and wired.
 Courtesy: *The Radio Post, Fredericksburg.*

The mills used Texas wools scoured in Texas and in eastern scouring plants. Two received wool in the grease and did their own scouring.

All of the mills preferred raw wool baled for ease of handling.

Most mills bought Texas wools through dealers or commission warehouses. One mill had its own Texas buyer, although others sometimes sent buyers to Texas. One mill which was buying from a dealer, expressed a great deal of interest in sending a buyer to Texas and purchasing directly from producers and warehouses. Buying was done on dealer's descriptions, by small samples when not through a dealer and when the mill buyer could not see the lot, and by lot examination. Most managers expressed satisfaction with their present buying method. However, one said that, at times, lots were not as they were represented by the samples examined before purchase.

Sample size considered adequate ranged from 1 to 10 pounds. One man suggested a minimum of 5 pounds which would represent 20 percent of a lot.

There was little agreement on purchasing specifications and little definite information was given. However, fineness and staple length were mentioned most often. Color and price were also included.

Three mills out of six expressed a favorable attitude toward core sampling. One of these used laboratory scouring tests and wanted fiber strength tests. This mill used core testing in a limited way and preferred to use it altogether. Another mill using general, visual and hand tests planned to adopt core testing. One used core testing and considered it acceptable when lots could not be examined properly by the buyer. One used tests for moisture and grease content on virgin stocks but did not use core tests. Two others did not use core testing and one of these considered this sampling method unreliable.

The response was very favorable to the type of lot description developed by the Wool and Mohair Laboratory at The Texas Agricultural and Mechanical College.

The management of each mill was asked to consider this descriptive method and suggest ways it could be improved for their purposes. Two were enthusiastic about such a description, one indicating that it gave much more information than they were now getting. Both suggested that in addition to the information already given in the description, types of wool be designated perhaps by number. This is similar to a system used in Australia and would enable a mill to readily repurchase similar wools. One large mill with very modern equipment thought the description too detailed for a woolen mill and better suited to the needs of a topmaker or a worsted operation. This mill and the manager of one other mill felt that the description was not adequate for their purchasing. Two others had some reservations, one that the sample would have to be large enough to assure statistical accuracy and the other would still want a representative sample submitted before purchase.

All but one manager thought it would be feasible to catalogue Texas wools by such a description and by location and that it would help their firms to secure wool more economically. Opinion varied as to who should supply such a description, whether the government, commercial testing companies or warehouses.



Trucks are used to carry most Texas wools East for processing.
 Courtesy: *The Radio Post, Fredericksburg.*

When asked why they did not purchase raw wool on a description basis, managers indicated that adequate descriptions were not commonly available, that they bought from dealers whom they could rely on, that they supplied their own descriptions or that descriptions such as the one under consideration were too general. Presumably the latter meant that the mill might have some other requirements not covered by this description.

The Texas wools used by these mills were generally 8-month or 10 to 12-month clips, 2 to 3-inch staple or better and 60's, 64's and 70's.

In general, the managers did not think that Texas wools needed a further breakdown as to fineness, although one indicated that a further breakdown for medium and half blood would be an improvement.

Opinions of these men were divided as to the variations in uniformity of fineness and length of Texas wools compared to other wools. Three out of five said Texas wool was less uniform in fineness than either western or other domestic wools. Two said Texas wools were more uniform in fineness than foreign, one said less uniform, and two said about the same as foreign wools. Staple length was considered more uniform by one, less so by two and about the same by one, when compared to western wools. Of the four answering this question, all thought staple length of Texas wools less uniform than other domestic wools. In comparing staple length to that of foreign wools, they were equally divided between the opinion that it was more uniform and the opinion that it was about the same. Regarding staple length, Texas wools seemed to compare favorably with foreign wools, but were considered less uniform than western and other domestic wools.

Factors which placed Texas wool at a disadvantage compared to other domestic wools were higher shrinkage, higher scouring cost, lack of fiber strength, felting properties for some fabrics and higher price. One man said there were no disadvantages in Texas wools when compared to other wools grown in this country.

Compared with foreign wools, Texas wools were at a disadvantage because of incomplete classification, cost of conversion, more sorting required, short and irregular staple due to second cuts in shearing and lack of strength. The presence of black hairs was emphasized as a distinct disadvantage.

Difficulties encountered with Texas wools were the insoluble branding paints and tars used and excessive vegetable matter which presented problems in carding and which necessitated the use of a carbonizing process. These added to the cost of processing Texas wools. Over-felting properties, lack of strength and poor color were problems in some fabrics, in spinning or in blends. Difficulties were

found most often in sorting, scouring, carding and spinning operations.

These experienced wool manufacturers would like the following improvements in Texas wools: the elimination of black hairs, the use of soluble branding materials, longer and more uniform staple length, better tagging, improved color and strength and air drying of fleeces before packing. Several felt that the poor color often encountered in Texas wool was caused by shearing and packing when fleeces were damp. Several had found cotton strings and wanted these eliminated.

Long range breeding programs and improved feeding practices would accomplish much in achieving these improvements in quality. The mills stressed the establishment of effective shearing, sorting and putup methods and uniform adherence to these practices. Many of the complaints about Texas wools could be decreased or eliminated in a short time by these improvements. Problems of color, strength and some of the more intangible qualities of wool such as "character," which are probably problems that concern breeding and feeding, would require a period of years to correct. Several of the mill managers also stated that they could use more Texas 62's and 64's in both their woolen and worsted operations.

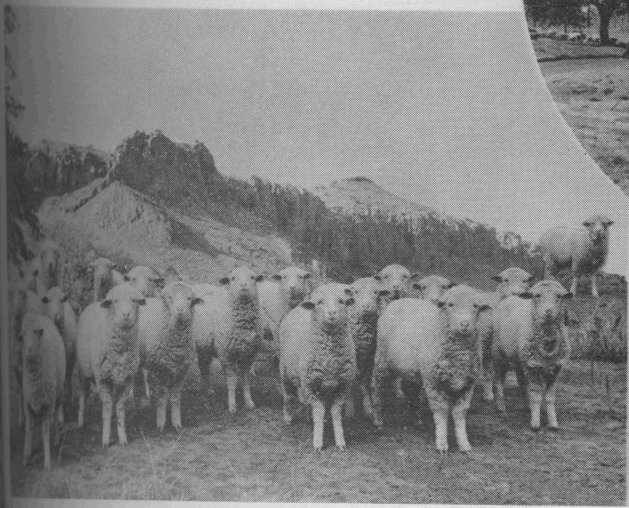
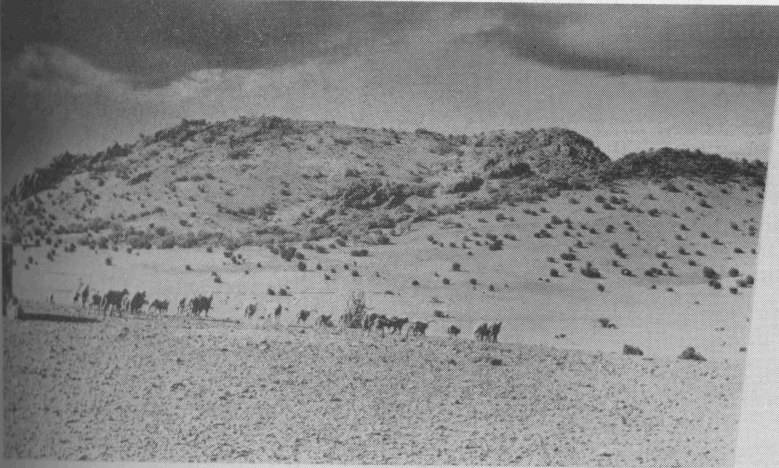
A wide variety of wools were considered good substitutes for Texas wools. Australian, followed by Cape or South African, were mentioned most often. South American and Territory wools were next. Others named were California wools and Ohio-Pennsylvania Delaines.

Opinion was about equally divided regarding the cost of processing Texas wools compared to other wools. Those who indicated processing costs were higher, quoted only a small percentage increase.

Wools from most other world sources were used in addition to Texas wools. These wools were of all degrees of fineness, but many were coarser wools ranging from 40's to 62's. Staple lengths were generally reported as 2 to 3 inches, although one manager indicated a staple length up to 5 inches.

The manufacturers listed a variety of qualities that Texas wools imparted to their finished fabrics. Their excellent felting properties result in fabrics with "good face" and "good cover." They give a "soft handle," "excellent blind face for flannels," "nice drape" and they "spin to a fine count." The quality most often mentioned was the "good handle" that Texas wool gives to fabric.

Qualities contributed by other wools were bulkiness and long nap from coarser, longer staple wools. Strength and sharpness of handle were also important qualities from other wools. For some types of fabrics, Texas wools were considered too fine and not strong enough and they did not card clear enough. Australian wool of the same quality as Texas wool



Sheep can make efficient use of low quality forage found on the range in the Edwards Plateau and Trans-Pecos areas. *Courtesy: San Angelo Standard Times, San Angelo, Texas.*

was used by one mill in its place because of the absence of black hairs.

During the previous year the trend in these mills swung toward a greater use of synthetics. Five or 10 percent of synthetics, such as nylon, orlon and other acrylic fibers add strength and stability. The increased strength makes it possible to spin finer yarns for the lighter weight fabrics now in demand. However, there was some opinion that the present competitive price of wool was resulting in an increased demand for all-wool fabrics.

A variety of fabrics were made by these mills including blankets, apparel fabrics for womenswear, menswear and childrenswear and women's coatings

Possible Improvements in Wool Marketing System

Less progress has been made in the marketing of wool in the United States than in any other agricultural commodity. Yet most of the possible changes are well known to people in the trade. For many commodities, the middlemen have integrated the marketing functions vertically for greater operational economy and to insure the adoption of methods considered desirable. In cotton, for example, contract selling is a means by which mill buyers can specify to producers the variety to be planted, methods of planting, fertilizing, spraying, defoliating, harvesting and ginning. The crop may be purchased before the seed is planted. Mill owners apparently are satisfied with present methods as indicated by a lack of comparable arrangements in wool marketing. Since these methods are unscientific and haphazard, it follows that the middlemen are able to protect their interests.

Some Australian Marketing Practices

A variety of potential improvements in wool marketing have been developed theoretically here and in other countries. Some of the major opportunities for improvement will be described. However, none of these methods will be adopted unless financial rewards are offered or unless some type of vertical integration requires change as a part of a contractual arrangement.

Comparison of the prices of Australian wool with domestic fine wools indicates a customary premium for the Australian wools. A review of the Australian marketing system provides some clues for this price differential.

In Australia, each large ranch has its own shearing plant. An important method used in Australia but not in this country is the sweating of sheep prior to shearing. The sheep are transferred from the

and sportswear. Most mills used many of the relatively recent developments to make wool fabrics moth-proof, washable, wrinkle and shrinkage resistant or stain repellent. Also used were water-repellent agents, softeners and whiteners. Blankets were sanitized by one mill. Washability was named most often as a quality that would do much to make wool fabrics more acceptable to consumers.

These management and production men discussed a number of qualities which they thought consumers desired in wool fabrics. Style or fashion, "handle," stability of fabric, washability, especially for children's clothes, lightness and quality, including wearability and durability, all were considered important.

corrals to the sweating pens which have temperatures 10 or more degrees warmer than regular pens. The sheep are herded together closely in these pens from 2 to 8 hours before shearing. This causes the yolk to flow more freely, putting the wool in perfect condition for shearing.

Machine shears are used for shearing, as in this country, except that the bellies, breech, neck, back, legs and face are usually removed separately. From the shearing platform, the fleece is spread on tables and skirted; the tags and inferior wool, including the neck are taken off, and the remainder is passed to the classer or grader. Here the fleece is carefully rolled and thrown into one of the different grading bins according to its classification. Next, the various grades go to the press, where they are made into bales weighing about 325 to 350 pounds, containing about 40 fleeces and are carefully wrapped. The type, grade and owner's name are then stamped or stenciled on each bale.

After the wool has been sheared, graded, and baled the producer usually consigns the clip to wool brokers in Sydney, Melbourne, Brisbane, Adelaide, or Geelong to be sold at auction. The broker holds no contract with the grower for the delivery of his wool except as he may have a claim to it on money advanced. This holds true for the cooperatives as well. Under these conditions the grower is at liberty to consign his wool to the concern he thinks able to give him the best service or net him the greatest return for his wool.

The woolhouse does a strict brokerage business and buys no wool for its own account. Wool is catalogued for sale in the order in which it arrives at the broker's warehouse, and at least 20 percent of the total clip must be in store to constitute an entry. Advances on wool may be made on such terms as the grower and the broker may agree on. There is no specific rule covering the amount or rate of

advance, except as may be agreed upon in conjunction with the Australian Wool Growers' Council.

The broker furnishes storage space for holding the wool and show floors for displaying auction lots, and covers it with insurance.

In contrast to the practice of the London Auction, only a certain percentage of each lot offered for sale is opened and displayed on the show floor in the warehouses. In 5 to 10-bale lots, 3 bales are shown; 20 percent of lots of 10 to 20 bales; 15 percent of lots of 20 bales to 100 bales; and 10 percent of lots of 100 bales or more. These bales are drawn at random to represent the entire lot as fairly as possible.

These stores open normally at 6 a.m. in the morning. The broker's catalogues are offered daily, containing a combined offering of not more than 12,000 bales, the limit per day. Buyers must begin very early if they wish to view all the wool offered, as the auction starts punctually at 3 p.m. in the wool exchange.

To place an order to purchase a certain amount of a known grade of wool in Australia, a manufacturer in the United States must first go to the various Boston representatives of the Australian wool buyers. After a particular grade is selected, the representative sends a cable giving the number of bales desired and the limit he will pay delivered in Boston. The buyer in Australia purchases the wool at the auctions and arranges for transportation and insurance to Boston.

The manufacturer receives exactly the kind of wool he needs, in the exact amount he wants, without the added expense, delay and trouble that would be involved in purchasing Texas "original bag" wool, sorting it, hoping to have enough of the quality he needs and then disposing of the lower grade wools and off-sorts that he cannot use. The manufacturer estimates that the Australian preparation and grading adds from 10 to 15 percent to the value of the wool.

Shearing and Handling Wool at Ranch

The shearing and handling of the wool at the shearing pen is perhaps the most important link in the marketing chain. It has been shown that wool sheared correctly, and handled properly before it is bagged, can be worth approximately 10 percent more than wool which is treated improperly.

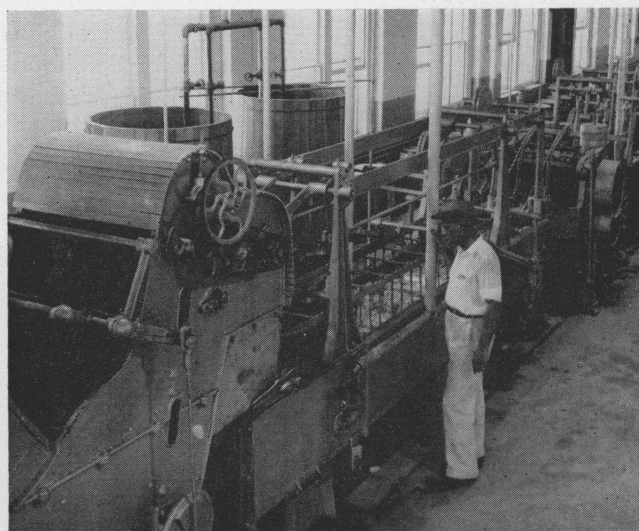
It is not economically feasible to grade or sort wool completely at the shearing pens, as in Australia, at this time. The cost per pound would be relatively high because of the absence of large shearing sheds, the lack of trained and experienced graders and the highly seasonal nature of the work. However, growers could increase the value of the clip by taking these precautions: (1) have sheep tagged before

regular shearing, (2) provide adequate shearing facilities, such as clean, dry shearing floor, with separate pens to hold the loose sheep, (3) take all necessary precautions to eliminate dirt, dust and vegetable matter from the shearing area, (4) insist on skilled shearers to prevent "secondcuts" and mangling of the fleece as it is sheared, (5) see that any black fibers coming from the face or legs of the sheep are not mixed with the main body of the fleece and (6) when the fleece comes from the shearing floor, place it on a table, weather side up, and separate all tags, dung-stained locks, and badly cotted or burry pieces from the main body of the fleece and sack separately. The fleece should then be rolled, flesh side out, and placed in the wool sack. Not only will these procedures enhance the value of the wool, but they can be carried out by an average wool producer without additional training, and in most cases with an insignificant amount of additional capital.

These suggestions are not intended to preclude grading wool at the shearing pens. Where the flock is large and adequate facilities and trained grading personnel are available, the shearing pen is the logical place to prepare the wool properly for market. In experiments where the facilities and trained personnel were available, wool was graded at the shearing pen for 0.25 cent per pound, whereas in the central market at Boston, the cost averages 1.2 cents per pound.

Warehousing

The local wool warehouse performs an important function in the marketing of Texas wool. More than 95 percent of all wool produced in Texas is marketed through about 90 local wool warehouses strategically located in the wool-producing area of the Edwards



A scouring train in the Texas Agricultural Experiment Station wool laboratory. Similar commercial scouring trains wash the wool and treat it chemically to remove dirt, grease and other foreign materials.

Plateau. The remainder is marketed directly from the ranch. In addition to the services offered by the local warehouses such as storage, insurance and selling, they could offer a wool-grading service which would be of inestimable value to the wool producer. About 14 million pounds of wool were graded in Texas in 1956. More than half of the warehouses reported grading some wool. If the wool producer is to be encouraged to produce a high quality wool and is to receive the full benefit of quality production, then that quality must be recognized while the wool is still in his possession.

The average local wool warehouse in Texas has a storage capacity of 1.5 million pounds of wool, but the warehouses vary greatly in size. Most warehouses have the capacity to handle more than their normal volume of wool. This excess capacity, along with additional lighting equipment, wooden tables and bins could furnish the facilities necessary for a grading service, with the addition of an experienced wool grader to grade the wool as it comes from the ranches.

This grader might be employed on a full-time basis by the warehouse, to help with some of the other warehouse duties during the off-season, or to help ranchmen cull their flocks for better quality wool production. A warehouse which handled too small a volume to employ a full-time grader could probably obtain one on a part-time, commission basis, as is done in some areas of the Edwards Plateau.

Probably the grading costs would be higher when grading is performed in the local warehouse than when it is performed at the shearing pen. This cost increase would be caused mainly by the additional labor involved in opening the sacks, dumping the wool for grading, resacking the wool and resewing the sacks. However, the grading costs at the local warehouse logically should be no greater than the grading costs at the central market area, since these

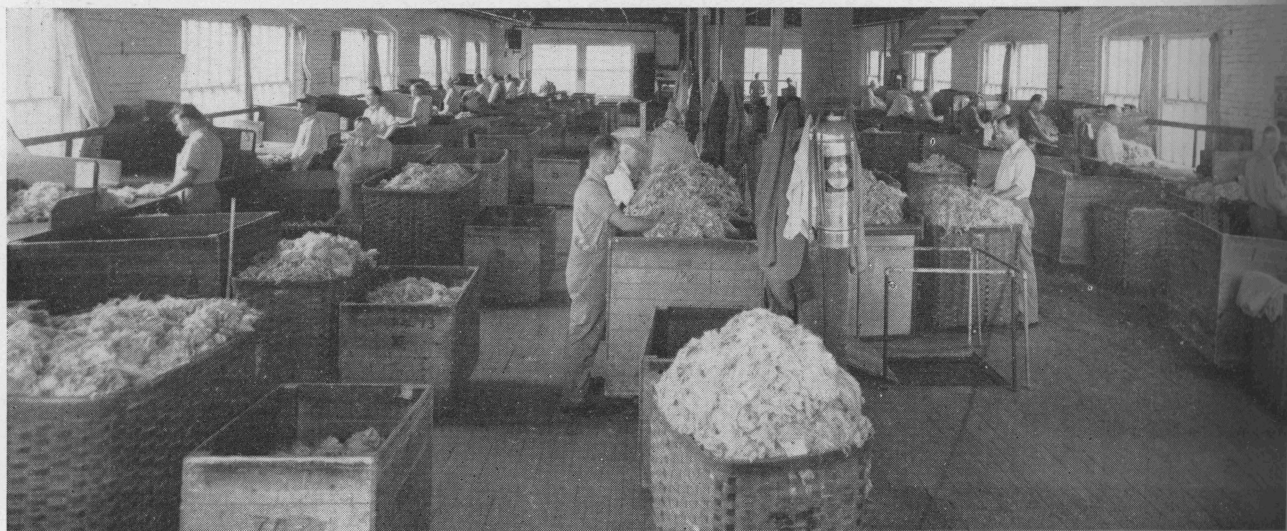
same operations would have to be performed. No experiments have been made to prove this, nor are data available to make a valid comparison between grading costs at the local warehouse and the central market. This lack of essential data is caused by the small amount of grading done at the local warehouses and the difference in kinds of wool grading systems used.

Standardized Wool Grading System

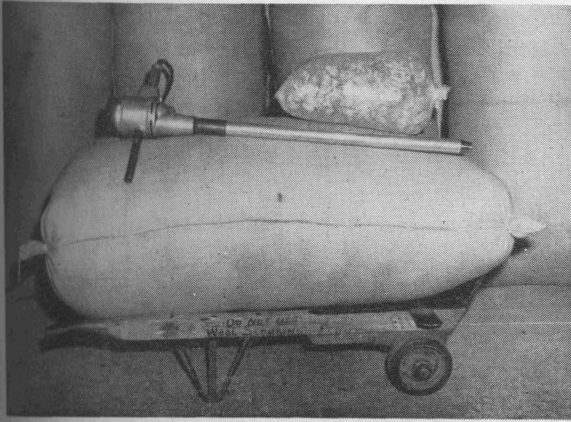
There is a complete lack of wool grading standardization in Texas and the United States. Since most wool is graded in the central market, concentrated mainly in Boston, Massachusetts, a jargon that describes wool characteristics has arisen among the members of the wool trade. The average wool producer seldom knows about the grades of wool he produces, since his wool clip is usually sold ungraded and loses its identity when it reaches the central market. It is doubtful that the wool producer would be much better informed, even if different wool clips were to retain their identity, since the wool dealers in the central market are not disposed to give information on grades and shrinkage.

No single grading or classification system is in universal use. Domestic wool is classified officially on the basis of fineness or fiber diameter, Table 3. In addition to the official standard of fineness, the wool trade considers other important characteristics of wool such as length, color, vegetable matter, strength and resiliency as the place, time and occasion require.

Two alternative systems of designating fineness of shorn wool—the blood system, commonly known as the American system, and the count system, com-



These scoured wools are being sorted and blended at a mill. *Courtesy: Sheep and Goat Raiser Magazine, San Angelo, Texas.*



Using the wool staple sampling tool to draw a small sample from an original bag.

monly known as the English system—are shown in Table 3. Originally, the blood grades designated the proportion of Merino blood in the sheep which produced the wool. The count numbers originally indicated the number of hanks of yarn (560 yards each) which could be spun from a pound of wool top. Both systems of grade terms, however, have lost their original significance. They are terms now generally known and accepted in the wool industry for the various degree of fineness in the wool fiber. In the United States, blood terms are used more commonly than count terms, whereas in practically all other countries the reverse is true. Table 3 shows the approximate correspondence between grades in the two systems.

In addition to general grading systems, various systems are used locally in wool-producing and wool-consuming countries. In the British Dominions, wools are sometimes classified in order of fineness, as Merino crossbred, fine crossbred and medium crossbred; the coarse wools are designated by breed names, such as Lincoln and Cotswold. South American countries use the system generally used in the world wool trade. However, a second system grades wool from fine to coarse as follows: Merino, prima, 1's, 2's, 3's, 4's, 5's, and 6's.

The terms used in both blood and count systems refer only to wool classification on the basis of fiber diameter or fineness. In the United States, the two terms that describe market groups for length are "combing wools" and "clothing." In general, combing wools are those long enough to be combed, that is, processed on the worsted system. Since English Bradford combs require longer wool than French combs, wools must be long enough to comb on Bradford combs to be graded as combing wools. Wools too short for Bradford combing are graded as carding wools. However, those long enough to comb on French combs but shorter than desired for Bradford combs are sometimes referred to as French combing wools. In each grade, the longest wools are the

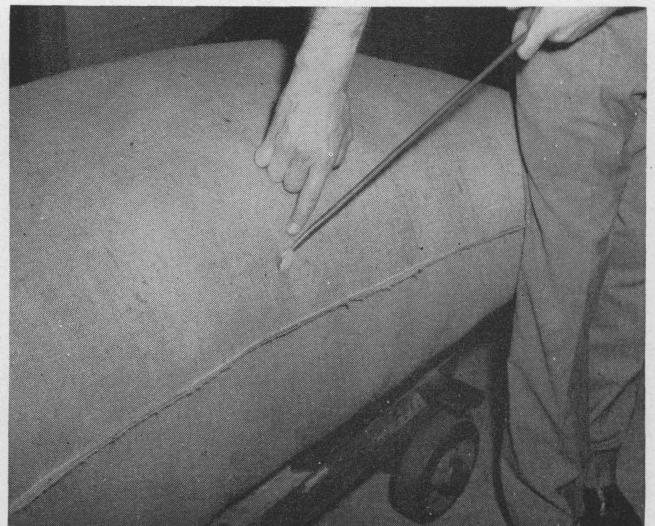
combing wools. For the fine and half-blood grades, it is customary to make three divisions; strictly combing, French combing and clothing. The term "Delaine" is frequently used to describe strictly combing fine wools from the eastern farming states and the term "staple" for strictly combing fine territory wools. Texas wools are classified according to growth as 12 months, 8 months and fall shorn.

The present grading or wool classification systems show that the methods not only are not standardized, but the system itself is inadequate for a good job of grading wool. The wool grading system, like so many of the other techniques used in wool preparation and marketing, seem to be an accumulation of makeshift methods.

Pricing

Core samples taken at three warehouses during 1957-59 were used to determine the comparative accuracy of wool pricing at the warehouse level under existing conditions. After these samples had been analyzed for length, fineness, yield, color and crimp, the analyses were mailed to the grower and warehouse operator for their information. The wool was sold in the usual manner and the warehouse operator recorded the sale price, date and terms of sale and forwarded these data for summary.

Each lot was evaluated using the objective measurement data as obtained from the laboratory analysis on fineness, length and shrink. No adjustments were made for color or crimp characteristics, since these factors are not considered in the present market quotations for wool. Prices were calculated on a clean basis delivered, Boston.



An electric coring device is used to draw representative samples from one or more locations in the wool bag. The sample is placed in a plastic bag and sent to a wool laboratory for analysis.

TABLE 3. STANDARD U. S. WOOL AND TOP GRADES

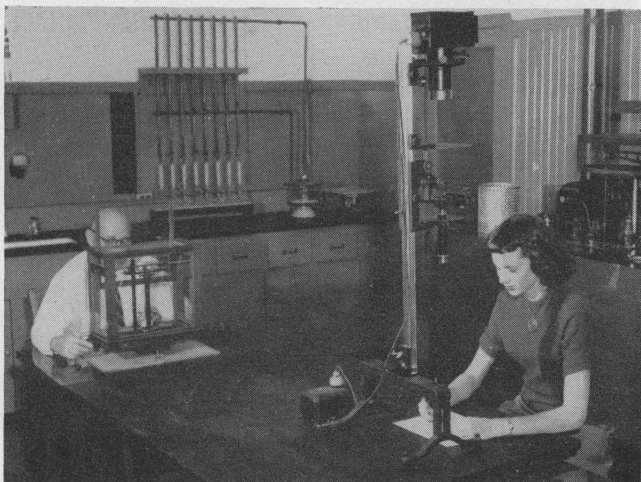
Blood system (American)	Count system (English)
Fine	80's, 70's, 64's
Half-blood	62's, 60's, 58's
Three-eighths blood	56's
Quarter-blood	54's, 50's, 48's
Low quarter-blood	46's
Common	44's
Braid	40's, 36's

Source — Carr, D. W. and Howell, L. D., U. S. Department of Agriculture, Technical Bulletin No. 1078, p. 88.

The difference was then figured between the quoted price at which clean wool of a particular quality was selling in Boston and the price actually paid for the cored wool lots at the Texas warehouses. Transportation and handling costs were added to the Texas price at the prevailing average rates. Boston prices were obtained on a standardized basis from the market news reports of the USDA.

A total of 332 cored lots was analyzed for pricing efficiency. Only 13 lots were sold at the exact calculated price and an additional 29 lots varied a cent or less. Most lots, 186, varied 1 to 10 cents from the calculated price, while 94 had a price variation of 10 cents or more and 22 of these exceeded a 20-cent differential.

Of all the lots whose selling price varied from the calculated total, 61 percent sold for less than the calculated amount and 39 sold for more. Also, wool selling for less than its calculated value averaged 8.5 cents too low per clean pound delivered, Boston. Wool that sold too high, averaged 7 cents above the calculated figure. The net difference between the



Complete wool fiber analysis requires such devices as the microprojector to determine fiber fineness, an Emerson conditioning oven to test moisture content, and apparatus for determining grease content of the sample.

losses and gains in total selling prices was a loss of about \$30,000 on 1,254,000 pounds of clean wool or 2.4 cents average loss per pound on the entire amount.

These figures indicate the wide variations in prices actually paid in relation to calculated values. The present system of wool buying lacks precision. In addition, the data confirm the assumption that the buyers tend to underevaluate wools in order to provide a margin for error in their buying.

Selling Wool on Description Basis

The major physical properties which determine the value of wool for a textile fiber are yield of clean fibers and fineness and staple length. These are determined usually by visual inspection for sale purposes. Producers and many buyers are unable to evaluate accurately clean content, fineness, length, strength and other clip characteristics. Consequently, wool at a given location tends to be sold on a flat price basis with little variation in prices on the basis of individual lot quality. This offers no inducement to the producers to improve quality and preparation of their wool.

This problem is accentuated by the lack of uniform standards to describe important quality elements of wool and by the absence of adequate classification and market information services. Official U.S. standards for wool grades based on fineness of the fibers were established in the 1920's and amendments were proposed in 1955 but have not been accepted by the trade. Facilities and methods have been developed for taking samples and estimating the yield of grease wool. Standards have been adopted by the American Society of Testing Materials for length, fineness, and strength. Objective measurements for color and other quality elements have not been adopted. Only relatively small quantities of wool are graded at the shearing pens. But some market agency takes the responsibility for assembling, transporting, grading, storing, financing and merchandising the wool as it passes from producer to manufacturer.

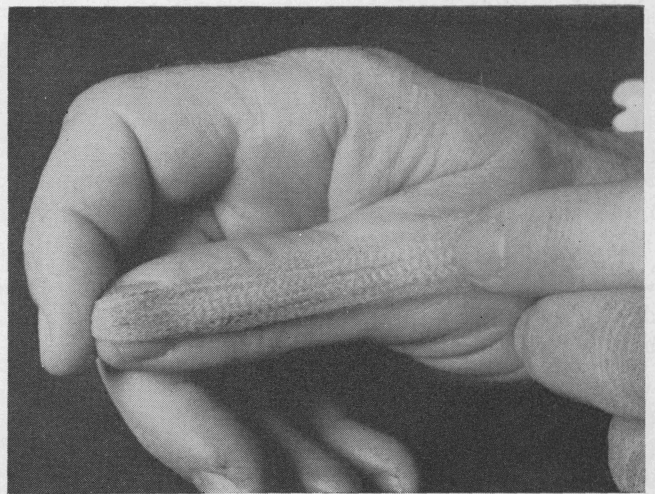
Development of adequate classification and market information services for handling wool on a description basis would be helpful to producers. The procedures required for these services in Texas are already in use on a limited basis. Wool is cored at some warehouses and the laboratory data are used to some extent as a basis for sale. This could be expanded.

Willingness to accept a classification system for grease wool by buyers, growers, warehouse operators and others depends on several factors. There must be mutual confidence in the system; this requires operation by a competent and unbiased agency. Measurements must be guaranteed if transactions are to be based on these measurements.

Evaluation of quality elements in individual lots is subject to some variation, but these variations should be small and should average out under normal conditions. When variations are extreme, recourse must be available to the seller or purchaser. Problems may arise through lack of lot uniformity or competency of the sampler in terms of training, supervision, equipment, methods, core samples and identification. This may necessitate the use of an official sampler, licensed and supervised by a state or federal agency.

Apparently, one way to build and maintain confidence in a classification service would be to provide for the sale of all wool by producers on the basis of classification by a reliable agency and to permit no selections or rejections of individual lots on the basis of other information about quality.

A change from the producer's practice of sale by inspection to sale on the basis of a classification service, would require cooperation of wool producers, warehousemen and buyers in the use of this service. Producers of better wools would benefit from the new system since superior quality would be reflected



The wool fiber has physical characteristics which make it especially useful in textile manufacturing.

in the sales price. But these benefits would be partly at the expense of producers of poorer wools who actually benefit from selling on a flat-price basis, with no premiums or discounts for quality.

Alternatives and Implications

The information required to improve Texas wool marketing is available but the incentives required for change are not offered. Sheep producers are not convinced that it is to their economic advantage to emphasize wool production over meat production. Neither do they believe that it pays to do a better shearing job or to grade at the shearing pen. Many warehousemen see no advantage in a change from sale in the original bag to alternative systems of grading or sale on basis of description.

The current stalemate in wool marketing can be broken when important groups in the wool trade provide the necessary incentives. For example, if manufacturers decide to obtain their necessary volume of Texas wools by contracting for these wools on a specification basis, they might offer specific price incentives for wool which met quality standards in shearing, grading and preparation and equivalent discounts for lower quality. These contracts might be made with warehousemen who would take the responsibility to work with producers to get each transaction performed properly.

Another way to get improved marketing would be through producer cooperatives. If the producers believed that it would be profitable to prepare their wools under a system that had the same general objectives as the Australian system, they could organize cooperatively to do so. The objective would be to perform properly and efficiently for themselves all of the functions required to obtain maximum net

returns for the wool clip. This would require a considerable amount of advance planning to insure that a profitable market existed for the product that the cooperative would sell. It is possible that the trade might discourage this type of organization and refuse to do business with it. Producer members of cooperatives are not always dependable in adopting methods which require better management or in remaining loyal to their cooperative organization if other firms offer incentives for breaking ranks.

A method used to obtain producer cooperation in the marketing of many agricultural products is the marketing agreement. Existing agreements in Texas are operated by the USDA under national legislation. Following a favorable vote by the producers, controls are established covering quantity, quality and rate of sale of the product. Usually producers do not approve marketing agreements until market disorganization is acute and prospects for gain through this method are substantial and evident.

Some form of integration, cooperation or public control eventually will remove the inefficiencies of the Texas wool marketing system. The new system will have to consider solutions for the following problems:

1. Dual nature and significance of producing both wool and meat as well as the economic consequences of alternative programs.
2. Small size of individual producer operations as a limitation on facilities, grading and marketing.

3. Difficulty of obtaining shearing crews at the time desired and usual lack of supervision of shearing and wool preparation.

4. Producers' low evaluation of penalties for heavy shrinkage, black hairs, burs, paint, stained wools and second cuts. Similar low evaluation of rewards for following the best practices.

5. Criticism of poor practices of producers by wool trade and lack of substantial rewards to producers for following good practices. Present buying methods that fail to provide proper incentives.

6. The fact that any comprehensive program for improvement will eliminate some personnel or firms and they can be expected to provide opposition. Also, the fact that many firms are well satisfied with their costs and returns under existing methods of wool marketing and will oppose any change. The fact that no change in wool marketing will be accepted without violent opposition and critics can be expected to be more vocal than the sponsors.

7. The lack of generally accepted goals that makes it difficult to organize a wool marketing or

production program as well as the fact that producers are quieted by incentive payments. Groups want varied goals that include agreement on grades and standards, specification buying, grading at the shearing pen or warehouse, breeding for length and fineness, a decrease in the unpredictability of shrink and foreign matter, the Australian system of marketing, scouring in the West, new methods for measuring length, fineness, color and crimp, to name only some of the desired programs.

8. The fact that everyone but the producer protects his interests under the existing system.

Acknowledgments

The authors are grateful for the cooperation of nine woolen mills in the Southeast and of scouring plants and woolen mills in Texas whose operations were observed and whose managers answered questionnaires. The assistance of the Textile Department visited at Clemson Agricultural College and the University of North Carolina is appreciated.

Glossary of Terms

- Breech wool*.....Wool, usually the coarsest in the fleece, from the lower parts of the hindquarters.
- Burry wool*.....Wool that contains burrs from any plants. Fine burry, medium burry refer to the grade of wool.
- Clean basis*.....Quotations of prices that are based on the estimated weight of fiber after removal of the grease and foreign matter.
- Clip*.....The weight or type of wool from all of the sheep in a particular area. The area included may be a single farm, county, state, nation, or the entire world.
- Crutchings*.....Wool shorn from the breech and inside the hindlegs. Also may refer to wool shorn from these areas before the regular shearing as part of the flock management.
- Dead wool*Wool removed from dead sheep. This does not include wool from slaughtered sheep.
- Domestic wool*.....Wool produced in this country in contrast to foreign grown wool.
- Fleece wools*.....A trade term for wool grown in the eastern and central states. More specifically this includes all wool grown under farm conditions as opposed to territory wools which refers to wool grown under ranch conditions.
- Grade*.....A means of designating wool according to fineness of fiber. Other quality characteristics include such factors as length of fiber, and amount and type of foreign matter.
- Grease wool*.....Wool in the form as just shorn, not scoured.
- Locks*.....Pieces of wool loosened from the main fleece.
- Off-sorts*.....Fleeces or parts of fleeces that are removed from regular lots of graded wools because they differ in some major characteristic such as color, length, fineness, foreign matter, etc.
- Put-up*.....Term used in wool trade describing methods used in preparing wool for sale or marketing.
- Rejects*.....Fleeces or parts of fleeces that are not suitable for regular lots of graded wools because of being badly stained, having undesirable color, etc.
- Shrinkage*.....The percentage loss in gross weight as grease and foreign matter are removed in the scouring process.
- Skirting*.....Removing the inferior and heavy shrinking parts of a fleece before it is marketed.
- Sorting*.....Dividing the fleece into its various qualities.
- Stained wool*.....Wool that has been stained by urine or manure to the extent that it cannot be scoured to a white color.
- Tags*.....Heavy manure-covered wool locks.

State-wide Research



★ MAIN STATION
● TAES SUBSTATIONS
■ TAES FIELD LABORATORIES
▲ COOPERATING STATIONS

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



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

ORGANIZATION

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. Cooperating agencies include the Texas Forest Service, Game and Fish Commission of Texas, Texas Prison System, U. S. Department of Agriculture, University of Texas, Texas Technological College, Texas College of Arts and Industries and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

THE TEXAS STATION is conducting about 400 active research projects, grouped in 25 programs, which include all phases of agriculture in Texas. Among these are:

OPERATION

Conservation and improvement of soil	Beef cattle
Conservation and use of water	Dairy cattle
Grasses and legumes	Sheep and goats
Grain crops	Swine
Cotton and other fiber crops	Chickens and turkeys
Vegetable crops	Animal diseases and parasites
Citrus and other subtropical fruits	Fish and game
Fruits and nuts	Farm and ranch engineering
Oil seed crops	Farm and ranch business
Ornamental plants	Marketing agricultural products
Brush and weeds	Rural home economics
Insects	Rural agricultural economics
	Plant diseases

Two additional programs are maintenance and upkeep, and central services.

Research results are carried to Texas farmers, ranchmen and homemakers by county agents and specialists of the Texas Agricultural Extension Service

AGRICULTURAL RESEARCH seeks the WHATS, the WHYS, the WHENS, the WHEREs and the HOWS of hundreds of problems which confront operators of farms and ranches, and the many industries depending on or serving agriculture. Workers of the Main Station and the field units of the Texas Agricultural Experiment Station seek diligently to find solutions to these problems.

Today's Research Is Tomorrow's Progress