Bulletin No. 316 - Wool Preparation & Marketing

University of Wyoming Agricultural Experiment Station

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Regional Wool-Marketing Project WM-5

"Preparation and Processing of Domestic Wools to Enhance Their Market Value and to Increase Returns to the Woolgrower"

ADMINISTRATIVE PERSONNEL

Office of Experiment Stations: F. D. Fromme, Research Coordinator
Wool Advisory Committee: H. R. Marston, OES Secretary
Administrative Adviser: J. A. Hill, Wyoming (deceased); H. M. Briggs, Wyoming
Chairman of Technical Committee: R. H. Burns, Wyoming
Representative of Western Agricultural Economics Research Council: P. W. Cockerill, New Mexico

Members of the Technical Committee:

<table>
<thead>
<tr>
<th>State Agricultural Experiment Station</th>
<th>Subproject Leader</th>
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<td>California</td>
<td>J. F. Wilson</td>
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<td>Colorado</td>
<td>E. B. Bertone</td>
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<td>A. L. Banta</td>
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<td>A. L. Esplin</td>
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<td>Idaho</td>
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<td>Wyoming</td>
<td>M. A. Madsen</td>
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<td>J. A. Bennett</td>
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<td>U.S. Department of Agriculture</td>
<td>Alexander Johnston</td>
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<td>Production and Marketing Administration</td>
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<td>Wool Division</td>
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Under the procedure of cooperative publications this report becomes, in effect, an identical publication of each of the cooperating agencies and is mailed under the frank and indicia of each. It is suggested that copies be requested through one source only from the small supplies available to the directors of the above experiment stations.

The research under which this report is based was made possible with funds provided under the Agricultural Research and Marketing Act of 1946.
Wool Preparation and Marketing

A Regional Report

By

A Technical Committee Representing the Agricultural Experiment Stations of Nine Western States*

In Cooperation with

The Wool Division, Production and Marketing Administration
United States Department of Agriculture

Published by

The Agricultural Experiment Station
University of Wyoming
Laramie

Bulletin 316 June 1952

*Texas was also a participating state in this study although geographically a member of the Southern States in the allocation of regional research funds.
# Contents

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
</tr>
<tr>
<td>Proposed Wool Marketing Research Project, Western Regional Agricultural Experiment Stations</td>
</tr>
<tr>
<td>Summary of Results of the Work for 1948, 1949, and 1950 Done by the Cooperating States</td>
</tr>
<tr>
<td>Reports from Cooperating States and Agencies</td>
</tr>
<tr>
<td>California Agricultural Experiment Station 1948</td>
</tr>
<tr>
<td>1949</td>
</tr>
<tr>
<td>1950</td>
</tr>
<tr>
<td>Colorado Agricultural Experiment Station 1948</td>
</tr>
<tr>
<td>1949</td>
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<td>1950</td>
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<td>Report of the Wool Division, Production and Marketing Administration, U. S. Department of Agriculture</td>
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<tr>
<td>Summary and Conclusions</td>
</tr>
</tbody>
</table>
Foreword

U.S. Public Law 733, known as the Research and Marketing Act of 1946, provided funds and stimulus for research in the marketing of agricultural products and defined procedures for administering regional cooperative research in which federal-grant funds are used. Title 1 of Public Law 733 is a revision of the Bankhead-Jones Act and it is under Section 9b of this Title that the regional project in wool marketing, WM-5, is operating. Eight agricultural experiment stations of the Western Region together with Texas from the Southern Region took advantage of the opportunity this act provided, and the Wyoming Agricultural Experiment Station as the key unit developed the tentative project which was revised and adopted by the cooperating states; these set up a Technical Committee to direct the project. At the same time an administrative adviser, J. A. Hill* of the Wyoming Station, was appointed by the federal Office of Experiment Stations, which supervised all projects under the act.

The WM-5 Project was concerned with preparation and processing of domestic wools to enhance their market value and increase returns to the woolgrower. A project of this kind depends upon cooperation of the trade, yet it was found difficult to follow prepared and unprepared clips through regular channels of trade. Some of the difficulties encountered were beyond power of the cooperating wool-handlers to correct, but after three years of operation these difficulties have been corrected. In recent studies it has been possible to follow through lots of wool to preparation of “tops”, the second stage after scouring.

It is proposed to present the development of the work of the various cooperating states and agencies in sequence, beginning with (a) the original project as approved by all cooperators, following this with (b) a summary of all experiments, and ending with (c) the condensed reports of all cooperators.

* Deceased March 10, 1951.
Proposed Wool Marketing Research Project, Western Regional Agricultural Experiment Stations

I. Title:
Preparation and Processing of Domestic Wools to Enhance their Market Value and Increase Returns to the Woolgrower

II. Objectives:
1. To compare the economy of marketing grease wool by grading, sorting, and scouring the off-sorts, using as a standard the present practice of selling wool in the grease.
2. To determine if it is feasible to market dusted, scoured, or combed wool processed in the wool-producing areas of Texas and the West.

III. Justification:
Since the Wool Division of the Production and Marketing Administration, U.S.D.A., is preparing quantities of Commodity Credit Corporation wool for sale, in accordance with acceptable wool-market standards, it would seem an appropriate time to test the economic feasibility of processing grease wools at source of production.

IV. Procedures:
1. List of cooperating agencies:
   (a) The Agricultural Experiment Station of Texas
   (b) The Agricultural Experiment Station of Wyoming
   (c) The Agricultural Experiment Station of Montana
   (d) The Agricultural Experiment Station of Utah
   (e) The Agricultural Experiment Station of California
   (f) The Agricultural Experiment Station of Colorado
   (g) The Agricultural Experiment Station of New Mexico
   (h) The Agricultural Experiment Station of Idaho
   (i) The Agricultural Experiment Station of Oregon
   (j) The Wool Division of the Production and Marketing Administration, U.S.D.A., hereafter called the P.M.A.
   (k) The Commodity Credit Corporation, Production and Marketing Administration, U.S.D.A., hereafter called the C.C.C.
   (m) The Bureau of Agricultural Economics, U.S.D.A., hereafter called the B.A.E.
2. The priorities given to each objective will be in the order of 1 and 2 as listed in the section dealing with objectives.

3. Phases of work allocated to each cooperating station or bureau of the U.S.D.A. are as follows:

(a) The P.M.A., Livestock Branch, is now carrying on investigations dealing with the skirting and matching of domestic wools. This agency will be called upon to grade and sort wools in this experiment.

(b) The Texas Station has a commercial wool-scouring plant and qualified personnel. This station will, therefore, be asked to scour all the off-sorts from the experimental clips.

(c) The personnel of the Wyoming Station, assisted by technicians from other stations concerned, will be present during preparation (grading, sorting) of the experimental clips in Western wool warehouses.

(d) During 1947 (September to December), grading, sorting, and scouring off-sorts will be undertaken on any representative clips from the cooperating states available in Western wool warehouses.

(e) During 1948, and for the remainder of the period the project is active, at least three clips annually from each cooperating state will be graded, sorted, and the off-sorts scoured.

(f) Arrangements will be made with the C.C.C. so that the scouring of off-sorts can be undertaken by the cooperating states.

(g) Arrangements will be made with the C.C.C. for sale of the lots of processed wool.

(h) Each station when feasible will take, or make arrangements to take, core samples of the main lines and the off-sorts of each clip, and these core samples will be processed by the P.M.A.

(i) The B.A.E. will undertake a study of the economic aspects of marketing wool and the demands of the trade in respect to wool types.

(j) The Wyoming Station and other interested collaborating stations having facilities will make physical measurements of the processed wools in order to classify them.

(k) All findings of this study shall be made available to all cooperating agencies, and publication of these results will be made in form acceptable to all.
V. Organization:

(1) Intraregional

(a) A regional advisory committee has been formed composed of the sub-project leaders in the cooperating states. Robert H. Burns, wool specialist of the University of Wyoming, is chairman of this committee.

(b) J. A. Hill, Director of the Wyoming Experiment Station, will be regional coordinator for the project. He will contact the Southern Region for cooperation with Texas and will perform the other duties of coordinator. (J. A. Hill died March 10, 1951, and was succeeded by H. M. Briggs.)

(2) Interregional

(a) This project is being set up for cooperation with Texas from the Southern Region. Texas joined the Western Region after the project was originally submitted.

VI. Duration:

(a) The project will run for a period of five years. The first two years will be in the nature of preliminary study. Then the project will be restudied and revised and continued for an additional three years.
Summary of Results of the Work
For 1948, 1949, and 1950
Done by the Cooperating States

The following summary of the wool-preparation work is based upon the actual results of the many experiments carried out by the cooperating states. Approximately 7,219,000 pounds of grease wool of many types and grades were involved in these studies.

The whole investigation was undertaken in order to ascertain if superior wool preparation could possibly be advocated under existing facilities and conditions prevailing in the producing areas and in the central wool markets. Thus the results presented under the following headings pertain to practical conditions of the present day.

In many cases the experimental results were influenced adversely by factors over which the investigators had little or no control.

This summary does not specify the states concerned in the individual experiments cited. If the reader desires further data concerning the experiments conducted in each state, he is referred to the state reports which follow the summary.

I. Grading Clips at Shearing Pens

In a number of experiments in which definite figures were obtained between comparable graded and ungraded wools, certain small margins of profit were found in favor of grading, ranging from 1.00c to 4.88c per grease pound. The majority of these favorable tests consisted of separating the tags and stained wools from the fleeces, then grading the tied fleeces on the grading table for length and fineness, packing the grades separately, and selling each graded lot seperately.

In several experiments the results obtained indicated that losses were incurred by preparation of the clips, for the prepared wools sold for lower prices than similar or identical lots of unprepared fleeces. A typical case of such loss occurred when three representative lots, each of 3,000 pounds, of mixed, ungraded fleeces sacked with tag "rings" in the bags from 3 clips, were sold on the Boston market from 1.67c to 3.45c per grease pound higher than large graded and detagged lots from the remainders of these clips.
In one experiment the woolgrower divided his flock into two parts with the dodge gate, cutting the ewes with Fine and \( \frac{1}{2} \) Blood fleeces one way and those with medium-wooled fleeces the other. It was stated that these subdivisions were accurately made by the grower, for the buyers accepted the two lots of wool.

Many results from similar experiments, involving both large and small clips and graded lots, were rendered valueless because the whole clips were sold for single flat prices, or because the several lots were sold at different market levels at various times.

II. Grading for Staple Length

In several states the investigators found that definite premiums were obtained from selling clips by lots graded for length of staple. The premiums amounted to from 2c to 6c per grease pound. These clips were of such uniform fineness that they could be designated as Original-bag wools.

Not only were premiums realized by staple-length grading, but it was found that this preparation was actually a selling aid, for wool buyers competed for these clips to a greater extent than they did for similar ungraded clips.

In one experiment it was found that when sheep were subdivided into fleece staple-length classes in the corral chute before shearing, this method was practicable for staple-length grades of shorn fleeces.

It was found that, while length grading could be advantageously done on larger clips, it should not be undertaken on small clips because the length subdivisions made were, in many cases, too small to command market-price preferences.

III. Skirting

Skirting of fleeces in general at the shearing sheds involved separating Belly, Coarse breech and defective wools, and Tags and Stained wools from the fleeces before they were tied and graded. In one or two clips paint-branded wools were also taken out of the fleeces. Strictly speaking, this constituted only partial skirting in comparison with Australian fleece skirting, in which all short wools and head wools from the margin of the fleece as well as dusty-back wools are taken out.

In practically every test of this partial skirting preparation method, it was found to be unprofitable. Several investigators found small monetary increases resulting from partial skirting, but these returns did not cover cost of skirting.
In one case a skirting method involving the shearing and separation of wools from head, legs, and belly before shearing the remainder of the fleece, returned a profit of 1.89c per grease pound to the woolgrower. This method was found to be cheaper than skirting on the table.

In a number of these tests it was found that belly wools should have been left in the fleeces because, under current manufacturing practices, these wools are not separated from the main fleece but are processed along with it. For this reason no profit could be shown for separation of belly wools.

IV. Cost of Grading

The actual cost of grading wool at the shearing pens, including cost of taking out Tags and Stained wools, varied considerably in the various states. These variations were caused by the extent to which grading facilities were available, costs of supplementary grading labor, number of shearers, speed of shearing, and extent to which grade subdivisions in each clip were required.

Clips (Original Bag) which were subdivided for staple length only were relatively cheap to grade, while clips containing wide ranges of fleece qualities required more labor and facilities, with greater cost for such preparation.

For grading of mixed-quality clips, costs were found to vary from 0.28c to 1.21c per grease pound, with an average of approximately 0.6c per grease pound.

Grading for staple length alone was found to vary from 0.20c to 0.28c per grease pound.

V. Cost of Skirting and Grading

In experiments involving skirting before grading, the combined costs of both operations were found to run from 0.81c to 1.34c per grease pound, with an approximate average cost of 1.00c per grease pound.

The cost of skirting alone, in the experiments where this charge was determined separately, was found to be 0.54c per grease pound.

VI. Total Costs of Marketing Wool

Total costs for marketing grease wool were determined in a few cases. These include railroad freight charges, grading charges, insurance, selling commissions, storage, trucking, and,
in some cases, core-testing. These total charges were found to vary from 5.51c to 7.45c per grease pound with an approximate average cost of 6.70c per grease pound paid by the woolgrower.

VII. Scouring of Tags and Off-Sorts

In the majority of the experiments, tags and offsorts were scoured before selling. In general, this practice was found to be profitable, for price increases up to 10.49c per pound, grease basis, were realized. Scouring of these subgrades resulted in making them more attractive and creating higher sale prices as well as reducing the total marketing costs primarily through saving in transportation and selling costs, which are based on grease weight.

On the other hand, one investigator found that scouring of Tags and offsorts was of doubtful value, since the prices normally paid by buyers for these wools in the grease state were in line with comparable values determined for the scoured products.

Wide variety of customs concerning sales of Tags and offsorts exists in many areas; these methods are not based upon the intrinsic value of the products involved.

VIII. Scouring of Short Wools

No profit was realized by scouring short, woolen-type clothing wools in the single experiment in which this was tried. The only advantage noted was a saving in marketing cost.

IX. Relative Values of Ram Wool and Ewe Wool

In one experiment fine ram wool and fine ewe wool from the same clip were separately processed into top and noil. The ram wool contained more staple wool than the ewe wool according to the mill sorting report. The combing report also showed that the ram wool had the advantage over the ewe wool of a greater amount of top and less noil per pound of scoured wool. The ram wool in the grease state was heavier in shrinkage than the ewe wool by 6 percent.

X. Selling of Prepared Wools

Wide differences in buyers' reactions to the wool preparation work were noted by the investigators in the different states.

In general the buyers were favorably inclined towards staple-length grading of the fine Original-bag clips, and they demonstrated their appreciation by bidding for the separate lots in these clips at price levels corresponding to the length designations
of the lots. Staple lots were bought at higher prices than the shorter French Combing-length lots, which in turn were bought at higher values than the shorter Clothing lots. Consequently the length grading of the fine Original-bag clips was demonstrated to be profitable to the woolgrower.

In a number of experiments involving mixed-grade clips mainly of crossbred wool types, the buyers were reluctant to buy the graded lots for the following reasons:

A. Selling of prepared wools was something new and it differed greatly from the established practice of offering for sale ungraded wools with Tags in the fleeces.

B. Wool buyers lacked precise market-price information which would enable them to establish basic buying limits for the various graded lots and off-sorts. In many cases their knowledge of wool values was based upon ungraded mixed wools.

C. In some instances the investigators noted definite resistance on part of the wool buyers to any innovations which would disturb the long-established wool-buying practices with which they were familiar. It was noted that buyers very often persuaded the woolgrowers to accept single prices for their entire clips, despite the fact that these clips had already been subdivided into value classes by grading and other preparation.

D. Buyers objected to the making of small lots of minor grades and off-sorts on the ground that these lots were too small to command full value on the market.

The experimental results indicate that grades of specific length are recognized and priced accordingly by the trade, while quality grades based on fineness are more flexible and vary within comparatively wide limits according to market demands.

When a prepared clip was sold for a single price, any benefit resulting from preparation was entirely lost to the experiment.

XI. Manufacturers' Opinions Concerning Wool Preparation

With one exception the wool manufacturers who bought the prepared wools made very favorable comments concerning the work. In several instances these manufacturers expressed the hope that grease-wool preparation would be continued and expanded in the future.

Concrete expression of the manufacturers' appreciation of this work was demonstrated in a public sealed-bid sale of 1,000,000
pounds of prepared wools on the Boston market in November 1949. The manufacturers submitted higher bids than wool dealers on 99.8 percent of all wools offered for sale.

In one exception involving separation of paint-branded wools from the fleece, the wool manufacturer stated that this separation had not been complete, for they found small bits of the paint brand still remaining in the fleeces.

XII. Processing Grease Wool Into Top and Noil Before Selling Them

This phase of the work was not undertaken to any extent during the three years of the experiment.

In the single trial involving processing of the grease wool, a clip was bought by the manufacturer before processing. Valuable processing data were obtained. Comparable price data from sale of similar wools could not be obtained.

XIII. Sealed-bid Auction Sales of Prepared Wools

A public-auction sale by sealed bids of experimental prepared wools and Original-bag clips was held in Boston on November 29, 1949. Manufacturers and dealers submitted bids on these wools.

It was found that the manufacturers out-bid the dealers by 8.01c per grease pound on an average, that the manufacturers tendered higher bids on 99.8 percent of the wools in the sale, and that the manufacturers who bought the prepared wools were, without exception, well satisfied with the preparation of the lots, which had been done at the shearing sheds. In several experiments, prepared and unprepared wools were sold successfully at sealed-bid sales by wool warehouses and by individual woolgrowers in the field.

In another experiment a small prepared clip was offered for sale by sealed bids in the field. No bids were received for the separate graded lines of this clip, but all buyers present were willing to purchase the whole clip at a single price.

XIV. Method for Calculating Grease-wool Shrinkage

One state collected fleece and body-weight data in order to establish a reliable index of the yield for grease wool. By weighing the sheep, measuring the staple length, and ascertaining the comparative density of the wool on the body, it was found possible to calculate reliably the amount of clean wool in the shorn fleece with a very small margin of error.

From these data it was found that 8 pounds' variation from
the average body weight had a clean-wool equivalent of 0.2 pounds, and that one-eighth inch variation of unstretched staple length was equivalent to 0.2 pounds of clean wool. In a second array of data involving density of wool on the sheep's body, it was found that 4 pounds of body weight and 1/16 inch of staple length had a clean-wool equivalent of 0.16 pounds, and that two units of density were also equal to 0.16 pounds of clean wool.

XV. Moisture in Grease Wool

A study involving several thousand pounds of grease wool was made of the behavior of moisture in grease wool under varying atmospheric conditions of humidity and temperature. Observations and measurements of wools stored in various atmospheres were obtained over a period of almost eight months. The derived data yielded the following results:

A. Within 10 weeks the moisture content of 3/8 Blood and 1/2 Blood wools increased 74.8 percent and 69.2 percent respectively.
B. During a transportation period of 14 days, moisture content of the entire lot dropped from 16.75 to 14.37 percent.
C. Inverse relationship existed between the amount of bag surface exposed and the rapidity of change in moisture content of the grease wool. In other words, the bags with least surface exposed lost moisture less rapidly than those with large surfaces exposed.
D. Wool of 3/8 Blood quality lost ("desorbed") moisture more rapidly than 1/2 Blood wool.

XVI. Machine Versus Blade Shearing

In one test of speed, data were kept for a blade shearing crew and a machine shearing crew at two different shearing sheds for a period of approximately 10 days.

It was found that the machine crew sheared on an average 13.28 sheep per hour per man, while the blade crew sheared on an average 9.45 sheep per hour per man—a difference of 40.5 percent in favor of the machine crew.

XVII. Wool-measurement Studies

For the 3-year period (1948-1950), fiber-diameter measurements and staple-length measurements were made and grader-performance records were kept by one state for all the wools involved in its experiments. Samples of the fleeces were drawn
at regular intervals during the shearing period.

The following results were significant:
A. Fiber-diameter measurements agreed very well with accepted classification limits.
B. Diameter measurements of yearling wools tended to be somewhat coarser than ewe wools of corresponding grade; they were also below (coarser than) the micron limits of the standards.
C. Each grader is highly consistent in estimating grade fineness according to his own conception of the fineness limits of each grade.
D. The shorter lengths within each grade became progressively finer with decreasing length.
E. Differences in estimating fiber quality and length between qualified wool graders are insignificant.

XVIII. Facilities for Wool Preparation at Shearing Sheds

In most cases the investigators found that existing facilities at shearing sheds were inadequate for proper preparation of fleeces.

Space to do the work properly was lacking in many cases since the shearing sheds were originally built for shearing only and did not include space for preparation or storage.

Insufficient light hampered the grading work in many experiments. Grading of grease wool for quality requires plenty of direct daylight (preferably north light); dim light results in inaccurate grading.

Lack of protection from wind and rain hindered the work in a number of tests. Apart from discomfort of the grader and shearers, wind and rain can damage the graded wools by carrying dust and excess moisture into them and cause decrease in value of the wool.
Reports From Cooperating States and Agencies

The following section gives the reports by states in the words of the leaders along with a few editorial changes.

CALIFORNIA, 1948

1. Grading at the Shearing Shed

Object of this project was to determine whether or not greater returns would accrue to the producer of a rather large, well-bred, and well-grown clip of wool by grading it at the shearing shed.

The clip selected represented heavy infusion of Romeldale blood, brought about through years of breeding to purebred rams of that breed. The clip contained roughly 5,600 fleeces.

The shed employed 10 shearers. The fleeces shorn by the five shearers nearest the grading table were graded. The plan of the shed and the mechanics of filling the catch pens were such that bias in selection of graded and ungraded wool was highly improbable. A suitable grading table was set up; close by, four bins, each large enough to hold about 500 pounds of wool, were built. A fleece carrier was employed to carry the grading fleeces to the table. As the bins filled with graded wool, the fleeces were bagged. Most of the time, the sackers alternated between the graded and ungraded lots. All the sheep had been machine-tagged some weeks before shearing.

The additional expense of grading to the grower was as follows:

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
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<tbody>
<tr>
<td>1 grader, 5 days at $30.00</td>
<td>$150.00</td>
</tr>
<tr>
<td>1 fleece carrier, 5 days at $12.25*</td>
<td>61.25</td>
</tr>
<tr>
<td>1 sacker, half time, 5 days at $14.75*</td>
<td>36.87</td>
</tr>
<tr>
<td>1 sacker's helper, half-time, 5 days at $12.25*</td>
<td>30.62</td>
</tr>
<tr>
<td>1 fleece tier, half-time at 2c a head, or $20 a day, 5 days*</td>
<td>50.00</td>
</tr>
<tr>
<td>4 bins (lumber partially recoverable) plus labor of building</td>
<td>30.00</td>
</tr>
<tr>
<td>Miscellaneous: Labelling ink for branding graded lines</td>
<td>.65</td>
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<td><strong>$359.39</strong></td>
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In addition to above, University of California contributed:

- General supervision and planning: $135.00
- 212 miles travel by U. C. automobile at 6c: 12.72

**TOTAL ADDITIONAL EXPENSE** $507.11

The following grades were made:

- No. 1 Fine Staple and big French
- No. 2 Half Blood Staple and Big French
- No. 3 Three-eighths Blood
- No. 4 Fine stubby and tender

* These workers usually are required in the shearing shed whether grading is done or not.
The amounts and weights of the various lots are as follows:

<table>
<thead>
<tr>
<th>Lot Description</th>
<th>No. of bags</th>
<th>Weight (Lbs.)</th>
</tr>
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<tbody>
<tr>
<td>Dry ewes, ungraded</td>
<td>15</td>
<td>3,265</td>
</tr>
<tr>
<td>Ewes with lambs, ungraded</td>
<td>57</td>
<td>12,517</td>
</tr>
<tr>
<td>Graded Fine Staple and Big French</td>
<td>35</td>
<td>7,320</td>
</tr>
<tr>
<td>Graded half Blood Staple and Big French</td>
<td>35</td>
<td>7,320</td>
</tr>
<tr>
<td>Graded three-eighths Blood</td>
<td>15</td>
<td>3,265</td>
</tr>
<tr>
<td>Graded Fine stubby and tender</td>
<td>7</td>
<td>1,160</td>
</tr>
<tr>
<td>Graded yearling No. 1 Fine Staple and Big French</td>
<td>14</td>
<td>3,116</td>
</tr>
<tr>
<td>Graded yearling No. 2 half Blood Staple and Big French</td>
<td>5</td>
<td>992</td>
</tr>
<tr>
<td>Yearling ungraded</td>
<td>4</td>
<td>845</td>
</tr>
<tr>
<td>Pieces</td>
<td>2</td>
<td>485</td>
</tr>
<tr>
<td>Bucks, ungraded</td>
<td>2</td>
<td>485</td>
</tr>
</tbody>
</table>

The entire clip was offered at sealed-bid sale April 25, 1949, several primary handlers submitting bids. None of the bidders was willing to make separate bids on the graded lines. All wanted the clip as a unit; therefore the whole clip was sold for the flat price of 62c per pound.

At owner's request, one of the wool buyers estimated the grease values of the various graded lines on the ranch as follow:

- Yearling graded Fine Staple and Big French: 68.8 cents
- Yearling graded half Blood Staple and Big French: 66.0 cents
- Ewe graded Fine Staple and Big French: 66.5 cents
- Ewe graded half Blood Staple and Big French: 63.7 cents
- Ewe graded three-eighths Blood: 49.2 cents
- Ewe graded Fine stubby and tender: 48.0 cents

During shearing, the following clean values in Boston had been estimated by a local wool buyer:

- Fine Staple and French: $1.55 to $1.60
- ½ Staple and French: 1.45
- ¾ Staple: 1.15
- Fine stubby and tender: 1.20

Among the handlers who examined the wool after it was put on display, estimates of shrinkage for the entire clip varied from 43 to 49 percent. Among the larger lots, approximately 10 percent of the bags were cored. Six cores were taken from each bag, using the large 3-inch tube. These cores were all taken within an hour of filling each bag.

The data secured from the scouring tests of the cores are presented below. The Koroseal bags used to hold the cores were too small to hold all six cores taken from each bag. Accordingly only three cores were placed in each bag. Each lot of three cores was then scoured separately to ascertain the spread in shrinkage from two series of cores removed from each bag.
Near close of shearing, one bag of "Superfine" (70/80's) was graded separately from another comparable bag of fine (64/70's) to get the shrinkage on each of these types separately, although in all other instances, the two types were put into one graded line. (Table 1.)

**TABLE 1—SHRINKAGE OF SEXTON CLIP, 1948**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>1st 3 cores</th>
<th>2nd 3 cores</th>
<th>6 cores</th>
<th>All cores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 bag, graded yearling Fine</td>
<td>40.9</td>
<td>42.5</td>
<td>41.8</td>
<td>41.8</td>
</tr>
<tr>
<td>1 bag, graded yearling half Blood</td>
<td>50.8</td>
<td>47.8</td>
<td>49.4</td>
<td>49.4</td>
</tr>
<tr>
<td>1 bag, ungraded yearling</td>
<td>40.5</td>
<td>39.7</td>
<td>41.8</td>
<td>41.8</td>
</tr>
<tr>
<td>1 bag, graded Superfine</td>
<td>44.6</td>
<td>43.0</td>
<td>43.8</td>
<td>43.8</td>
</tr>
<tr>
<td>1 bag, graded long Staple Fine</td>
<td>39.4</td>
<td>34.5</td>
<td>37.3</td>
<td>37.3</td>
</tr>
<tr>
<td>3 bags, graded Fine</td>
<td>43.3</td>
<td>39.0</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>43.2</td>
<td>43.1</td>
<td>43.2</td>
<td>41.3</td>
</tr>
<tr>
<td></td>
<td>40.8</td>
<td>39.3</td>
<td>39.9</td>
<td></td>
</tr>
<tr>
<td>3 bags, graded ½ Blood</td>
<td>34.5</td>
<td>35.2</td>
<td>34.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>34.3</td>
<td>34.7</td>
<td>34.5</td>
<td>35.8</td>
</tr>
<tr>
<td></td>
<td>37.9</td>
<td>38.9</td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td>2 bags, ungraded old ewes</td>
<td>37.6</td>
<td>34.8</td>
<td>35.9</td>
<td>38.5</td>
</tr>
<tr>
<td>6 bags, ungraded, ewes</td>
<td>38.7</td>
<td>34.5</td>
<td>37.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.6</td>
<td>40.0</td>
<td>39.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>36.3</td>
<td>39.4</td>
<td>37.3</td>
<td>38.9</td>
</tr>
<tr>
<td></td>
<td>37.5</td>
<td>39.7</td>
<td>38.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>37.4</td>
<td>38.7</td>
<td>38.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>39.4</td>
<td>41.5</td>
<td>40.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistical Summary</th>
<th>percent</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average yield of entire clips</td>
<td>59.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average shrinkage of entire clip</td>
<td>40.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average bur in scoured wool</td>
<td>5.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average bur in grease wool</td>
<td>3.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average shrink of entire clip, all bur and seed removed</td>
<td>43.30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cost of determining shrinkages by coring follows:

- Supervision, planning, and labor: $249.00
- Materials, sal soda, detergent, etc.: $6.00

**Total Cost**: $255.00

To complicate further the evaluation of this experiment on commercial basis, the grower, about two months before shearing, could have contracted his clip at 67c f.o.b. ranch. He passed this opportunity because he had agreed to cooperate in the grading project. At shearing time the market had declined everywhere. This fact is not proof in itself of failure of the project, since free markets of all agricultural commodities are seldom stable over protracted periods. It is significant, however, that the buyers who looked at the clip, and were willing to bid on it as a whole at a sealed-bid sale, were all entirely disinterested in bidding on separate graded lines.
2. Processing a Clip by Scouring, Carding, and Combing

The University of California’s 1948 clip was consigned to the Forstmann Woolen Co. at Passaic, New Jersey, for processing. This company had agreed in April 1948 to take the clip at $1.43 a pound, clean-landed at the mill. This price was about 8¢ a pound above market at that time, although later the price rose considerably higher.

All data included in this report were furnished by the Forstmann Co. The invoiced weight of the clip was 2,632 pounds, its reweight 2,623 pounds. It apparently lost only 9 pounds in shipping.

TABLE 2—RESULTS OF SORTING, PERCENTAGE DISTRIBUTION

<table>
<thead>
<tr>
<th>Sorted grade</th>
<th>70's</th>
<th>64's</th>
<th>62's</th>
<th>58/60's</th>
<th>Stained</th>
<th>String</th>
<th>Sorting loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>percent</td>
<td>2.61</td>
<td>38.99</td>
<td>43.11</td>
<td>11.18</td>
<td>0.08</td>
<td>25</td>
<td>3.78</td>
</tr>
</tbody>
</table>

Table 2 shows the clip to be a bulk 62/64's with an edge of 58/60's. This is to be expected from a clip made up of pure Rambouillet, pure New Zealand Merino strong wool, and crosses between the two strains of Merinos.

Table 3 shows the laboratory yield of clean scoured wool of the various sorts to be highly variable. This can be accounted for by the fact that practically all the 70's came from Rambouillet sheep, while practically all the 58/60's were produced by New Zealand Merinos. Bulk of the 62/64's was grown by the crosses. The small difference in yield between the 62/64's and the 58/60's illustrates how strongly the high yield of the New Zealand sheep is inherited by the crosses between them and the Rambouillets. The laboratory yield obtained by the Forstmann Company on the three finer sorts is within 2 percent of the laboratory yield obtained by the University of California in scouring.
side samples taken from the sheep at shearing time. Scouring tests over a period of years at the university's wool laboratory show the New Zealand Merino to yield around 59 to 60 percent and the Rambouillet about 48 percent (Table 4).

### TABLE 4—TOP, NOIL, AND WASTES

<table>
<thead>
<tr>
<th></th>
<th>St. pounds</th>
<th>Percentage of raw wool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw wool</td>
<td>2222.3</td>
<td>100</td>
</tr>
<tr>
<td>Scoured wool</td>
<td>1234.4</td>
<td>53.09</td>
</tr>
<tr>
<td>Top and Noil</td>
<td>1128.8</td>
<td>48.53</td>
</tr>
<tr>
<td>Top</td>
<td>1051.6</td>
<td>44.92</td>
</tr>
</tbody>
</table>

Forstmann's comments on the above figures are as follows:

The California experimental wool had a good appearance generally, adequate staple length, and somewhat better yield of clean fiber than domestic fine wools. However, its tensile strength was inferior to comparable wools. It has been noted that the lot contained considerable amounts of coarse wool, graded as 58/60's, which are not found in classed Australian wools. Presence of the 58/60's wool detracts from appearance and value of the clip. Losses in sorting and amounts of Stained wool and Strings are high compared with Australian wools of the same type.

The yield of Top, 45 percent, was higher than for territory or Texas wools, which normally yield from 33 to 36 percent of Top. However, according to the American Wool Handbook, 62's Australian wool will yield 60 percent Top. The tare—the ratio between Top and Noil weights—was 12, which again compares favorably with territory wools as well as with 62's Australian wool. The noilage, 3.7 percent, was slightly lower than the value reported for Australian wool.

**CALIFORNIA, 1949**

The University of California's clip was treated exactly like its 1948 clip with one exception: bellies, after being separately weighed with the "breast plate" and sweat locks removed, were put back in the fleeces.

In 1949 the additional expense over and above that which would have been incurred, had the clip not been so treated, was as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages, one man, carrying fleeces to skirters' table, 4 days at $8.00 (student help)</td>
<td>$32.00</td>
</tr>
<tr>
<td>Wages, one man skirting Tags and sweat locks, rolling fleeces, 4 days</td>
<td>32.00</td>
</tr>
<tr>
<td>Supervision</td>
<td>108.00</td>
</tr>
<tr>
<td></td>
<td>$172.00</td>
</tr>
</tbody>
</table>
CALIFORNIA, 1950

The clip produced by the University of California was again put up semi-Australian style, but with bellies left in the fleece after being weighed separately. This clip was unsold as of February 1952.

Arrangements had been made to grade the Placer County wool pool at the collection center in Lincoln, California. However, about two weeks before shearing the grower-directors of the pool decided, for reasons known only to themselves, not to have the work done. Since this was the only pool in the state that was to have been directly involved in the WM-5 project, the directors' decision amounted to withdrawal of the state.

As a result of lack of interest on part of the producers in doing anything in furtherance of the WM-5 project, it was decided not to attempt to induce any grower or any group of growers to participate in future work. Instead, the activities of the California College of Agriculture will henceforth be directed toward stimulating interest in formation of simple pools whose sole object is to gather together enough wool in a single place to attract attention and competition of primary handlers and thus secure better prices than would otherwise be possible.

Wool-marketing pools are now operating in several counties. El Dorado was one of the first counties to organize such a pool, and it has been operating successfully for 11 years. The pool in Placer County has completed its second year of operation, and Fresno-Tulare, Los Angeles, and the tri-county (Monterey, San Benito, Santa Cruz) were organized within the past year.

These pools have proved to be helpful to the producer having a relatively small lot of wool to market. Even with the drop in the wool market from the high peak, which reportedly was paid for some large clips, producer pools have realized a satisfactory price for the wool sold.

COLORADO, 1948

1. Removal of Bellies and Crutchings

A study was made of shearing of Bellies and Crutchings before lambing.

In one flock, 2822 ewes were tagged before lambing. Bellies were removed at the same time. Heavy Tags were not saved for marketing. Light Crutchings and Bellies were sacked as one lot. Average belly wool weighed 0.85 pounds and light Crutchings weighed 0.40 pounds, giving a total of 1.25 pounds of off-sorts from each ewe tagged.

It was estimated that yield increase of 3 percent was achieved by removal of Bellies, which increased the price of the wool by 4.5c per
pound. However, the Bellies were not sold because of reluctance of buyers to handle small lots of off-sorts, although one handler appraised the off-sorts at 25.0c per pound.

It was found that removal of Bellies is not economical, since no extra premium was paid for belly-free wool due to increased attractiveness of fleece (beyond premium for increased yield). The belly wool in this case was of combing length in the main, free from stains. The extra charge for shearing Bellies also makes this treatment of dubious value. In this case, a charge of 6c per fleece was made for the extra operation.

There is, too, possibility that the shearers removed an excess of belly wool.

To date, it is not recommended that Bellies be removed from fleeces at the shearing shed unless the Bellies are defective because of Burs or Stains.

2. Rough Grading of Wool at Cutting Chute

This study was conducted by a woolgrower from the Craig, Colorado, region in order to determine the efficiency of chute-cutting sheep for grading wool. By observing in the cutting chute those sheep which carried denser, shorter fleeces, this grower was able to divide the half-blood and fine-wool ewes from the coarser-wool ewes. Little handling of the sheep was necessary except where doubt existed. Great care was taken to place breechy wool sheep with the coarser group.

The grades of several hundred fleeces were checked at shearing time, and the grower's judgment was found to be excellent. The buyer purchased the fine and half-blood wool as a single lot, thus saving the grower the grading charges on this lot.

3. Behavior of Moisture in Sacked Wool

Twelve sacks of grease wool, 6 of ½ Blood and 6 of ¾ Blood, were exposed for periods of time to atmospheres varying in controlled temperatures and humidities. Absorption and desorption of moisture by these wools were measured by the changes in weight of the two lots; the basic moisture contents were established by core-sampling the bags and by conditioning the samples.

The wools were first stored for a period of 10 months in a potato cellar in which the temperature ranged from 37° to 41° F. and the relative humidity from 48 to 51 percent. The bags were piled in two tiers with 3 bags of each grade in each tier in alternate locations. Every week for a period of 18 weeks each sack was weighed and returned to the same relative position in the tier.
During the initial 10-week storage period in the potato cellar, moisture content in the sacks of wool increased by 74.8 percent in the \(\frac{3}{8}\) Blood and by 69.2 percent in the \(\frac{1}{2}\) Blood.

During the transportation period of 14 days, moisture content of the wool dropped from 16.75 to 14.37 percent. This drop of 2.38 percent in moisture content represents a loss of 14.2 percent of the original moisture.

The bags of grease wool stored in two tiers during the final 18-week period in an atmosphere of 73° F. and 50 percent R. H. tended to lose moisture from the initial content of 8 percent. Under the same conditions wools with initial moisture content of 14 percent "desorbed" fairly rapidly at first and then more slowly during the 18-week period.

Definite relationship existed between the amount of bag surface exposed and the moisture content of the wools during the successive weekly weighings; the bags with least surface exposed lost moisture less rapidly than those with large surfaces exposed.

It was found that bags in the top layers of the tiers exhibited differences in moisture losses by grade of wool, but no significant differences by grade of wool were shown by bags in the lower tiers. The \(\frac{3}{8}\) Blood wool lost moisture more rapidly than the \(\frac{1}{2}\) Blood wool.

**COLORADO, 1949**

Study of wool-warehouse grading and shearing-shed grading was made. One clip of wool which included 14,889 fleeces, or 147,285 pounds, was studied. Approximately half of the clip was graded at shearing shed.

The entire clip including the shearing-shed-graded wool and the ungraded wool was sold at the ranch as one lot of wool before completion of the test. No information was obtained as to value of the ranch grading.

**COLORADO, 1950**

Selling of shearing-shed-graded wool and Original-bag wool was compared.

Two similar clips of crossbred wools from the North Park area of Colorado were selected. Clip A, containing 2,701 fleeces, was graded at shearing shed. Clip B, containing 2,000 fleeces, was sent to market and sold as Original-bag wool. Both clips were considered to be sufficiently similar to be of comparable value.

A Texas crew of 14 shearers was employed to shear Clip A. A commercial grader graded the fleeces. Two students assisted.
Heavy dung locks were removed from the fleeces. A bag of these Tags and grading locks was separated by this procedure.

Unfortunately, both clips were rejected by buyers at the Denver Auction Sale when offered for sale. It is felt that the stipulation that bidding be on basis of clean wool as determined by the core test may have been responsible for the buyers' reluctance to bid. Both clips were sold immediately after the unsuccessful auction by private treaty. Comparison of the two clips follows (Table 5).

**TABLE 5—CLIP A (Graded)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage of clip</th>
<th>Percentage of yield</th>
<th>Clean price Denver</th>
<th>Gross price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine E &amp; Y</td>
<td>22.6</td>
<td>50.1</td>
<td>$1.497</td>
<td>$0.75</td>
</tr>
<tr>
<td>1/2 Bl. E.</td>
<td>35.6</td>
<td>52.9</td>
<td>1.361</td>
<td>0.72</td>
</tr>
<tr>
<td>1/2 Bl. Y.</td>
<td>10.5</td>
<td>56.8</td>
<td>1.320</td>
<td>0.75</td>
</tr>
<tr>
<td>3/8 Bl. E &amp; Y &amp; Ram</td>
<td>31.3</td>
<td>54.8</td>
<td>1.241</td>
<td>0.68</td>
</tr>
<tr>
<td>Weighted average</td>
<td>100.00</td>
<td>53.27</td>
<td>1.350</td>
<td>0.72</td>
</tr>
</tbody>
</table>

**CLIP B (Not Graded)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent of clip</th>
<th>Percent of yield</th>
<th>Clean price Denver</th>
<th>Cross price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Bag</td>
<td>100</td>
<td>59.0</td>
<td>$1.24</td>
<td>$0.73</td>
</tr>
</tbody>
</table>

While Clip B brought an average of $0.73 per pound as compared with $0.72 for Clip A, the former sold at disadvantage when the yields for the two clips are considered. Whereas Clip A with yield of 53.08 percent brought the lower figure, Clip B with yield of 59.00 percent brought a premium of only 1c.

In this limited trial, it is felt that the grading in Clip A was in a measure responsible for the high price paid for that wool. Cost of grading came to slightly more than 0.6c per pound (0.64c).

It can be concluded that, if grading charges can be kept as low as those in this trial, and if buyers will purchase similar wools and pay similar prices to those encountered in this study, grading at the shed will be feasible. However, since the type of market in 1950 has been conducive to fast selling at relatively high prices, it is difficult to predict what would occur under a less stimulated market.

This study demonstrated that shearing-shed grading could be done even with the mobile Texas-type shearing plant.

**IDAHO, 1948**

Skirting and grading of two clips of wool at the corral were studied: Flock "A", 1,834 ewes, the fleeces grading 62 percent 3/8 and 1/4
Blood; 22 percent, $\frac{1}{2}$ Blood; and the remaining 16 percent Bellies and off-sorts.

Flock “B”, 2,300 ewes, 1,343 yearling ewes, and 37 bucks.

The major portion, 35,862 pounds of this clip was graded and skirted, and the balance of 11,019 pounds was only graded. The skirted lot had 52 percent $\frac{1}{2}$ Blood, 31 percent $\frac{3}{8}$ Blood and $\frac{1}{4}$ Blood, and the remaining 17 percent Bellies and off-sorts. The lot graded had only 24 percent Fine, 45 percent $\frac{1}{2}$ Blood, and the remaining 31 percent $\frac{3}{8}$ and $\frac{1}{4}$ Blood. It is evident that the experimenters did not make even division of sheep for these two methods of wool preparation, but that is what happened in handling those crossbred wools.

An acceptable job of skirting and grading was done according to mills in the Portland, Oregon, area. The skirted wools sold for more money but still, not enough to justify the expense of skirting at shearing corral. By skirting the clip the grower had many small lots of off-sorts to market, which was a disadvantage. Skirting of wool at shearing corral is not practical in Idaho because most sheep in Idaho are sheared by movable outfits and not at permanent sheds. Under these conditions, facilities for skirting and grading generally are inadequate, such as space for grading, bins, lights, etc.

IDAHO, 1949

Grading of only two clips of wool at the shearing corral was studied. Flock “A”, 7,598 ewes, 1,860 yearling ewes, and 150 bucks. This clip was 7 percent Fine, 42 percent $\frac{1}{2}$ Blood, 39 percent $\frac{3}{8}$ Blood, and the remaining 12 percent $\frac{1}{4}$ Blood, Tags, Crutchings, and Black. The Fine, the $\frac{1}{2}$ Blood, and the Tags were sold on the open market, and the balance was sold through the C.C.C. The full sales account was received for this clip, but no comparisons with other clips were available. The Crutchings were sent to Portland, Oregon, to be scoured before sale. That proved advantageous compared with previous years, when crutchings were sold in the grease.

Flock “B”, 3,082 ewes, 200 yearling ewes and 41 bucks. The grower marketed part of his clip in Boston through the National Wool Marketing Corporation, and the balance through the Western Wool Storage Co., Portland, Oregon. The portion shipped to Portland had 21 percent Fine, 17 percent $\frac{1}{2}$ Blood, and 29 percent $\frac{3}{8}$ Blood; the remaining 17 percent was Low $\frac{1}{4}$ Blood, Braid, Black, and Tags. The balance was regraded at Boston into many grades that were not comparable; consequently no information was gained by the grower on the project.
IDAHO, 1950

Types of Wool by States

The Panama, developed and owned by James Laidlaw and Sons, Inc., Muldoon, Idaho, was selected to get samples for grading and scouring. Wool samples were collected from 81 ewes and 25 stud rams. The sheep, run under range conditions, are considered typical for both the Panama breed and the average Idaho range ewe. The University of Wyoming is determining the shrinkage and making up the sets of wool types for the cooperating states.

Summary of 1948 and 1949 Work

Skirting of wool at shearing corral was not adapted to Idaho conditions because small mobile shearing outfits were used instead of permanent shearing sheds. Existing facilities were inadequate. There seemed to be some resistance on part of the wool trade to change the marketing system. However, project collaboration had excellent cooperation from the Western Wool Storage Co. and from some buyers.

Evidence indicated profit in selling Crutchings etc. on scoured basis. Even though little information has accumulated showing increased value of preparation of wools at the shearing corrals, the sheepmen who cooperated learned a great deal more about grade and shrinkage of their wool clips. This knowledge will be helpful in their wool-improvement plans and in developing future wool-marketing programs.

MONTANA, 1948

A fleece-skirting and grading project was carried out in cooperation with two Montana woolgrowers, the Montana Wool Laboratory, and the P.M.A.

The test was designed to determine the feasibility of skirting and grading fleeces on the shearing floor to enhance their market value.

After the fleece was shorn, a fleece carrier, using a large burlap apron, carefully removed the fleece from the shearing floor and tossed it on to the skirting table with the weathered side up. The first process was to remove the belly wool, which was put in a separate bin. Next, hairy breeches, chaffy necks, Stained wool, and other inferior wools were removed whenever found. The fleece was then graded, classified, and passed on to the fleece-tier. After rolling and tying, the tier placed the fleece in the proper sack or bin, depending on the quantity of wool in each grade. Each grade line and off-sort was bagged separately; the bags were branded with the bag number, grower's brand, grade, and classification. Since no definite contract had been made with any mill in regard to purchase of the wool, it was thought advisable to tie all fleeces so that their individual identity could be maintained.

— 26 —
As much as possible, the sheep were segregated as to black wool, rams, and yearlings before they were put into the holding pens. This speeded up the work at the grading table. It was especially helpful in keeping the off-color wool from being mixed with the white wool.

The growers were on hand throughout the process, as it offered opportunity for them to learn a great deal more about their sheep and wool than they had ever known. They were soon able to distinguish between the various grades and to realize the need for skirting.

After shearing operations were completed in the evening and before they began in the morning, the material under the skirting table was sorted into Tags and grading locks, and wool remaining in the bins was sacked to allow room for the next day's work.

Table 6 shows the various grades and off-sorts made from both of the clips. Clip 1 consisted of almost 70 percent fine wool as contrasted with 55 percent for Clip 2. The yearling wool of both clips was better grown, of longer staple, and of lighter shrinkage than the ewe wool. Therefore, the Fine and the 1/2 Blood yearling fleeces were bagged separately.

Tables 7 and 8 show the number and type of sheep owned by each grower, actual cost of shearing, and additional costs due to the skirting and grading process. The fleeces of both clips averaged approximately 11 pounds, grease weight.

The prepared wool clips were placed in a warehouse at Judith Gap, Montana. Core samples were taken by the P.M.A. for clean-yield determination. The wool was stored from shearing time in June 1948 to February 1949, when it was sold to a Boston wool merchant at 60c per grease pound. This equaled a pre-shearing bid of May 1948. However, a bid of 65c per grease pound was made in July because of the desirable preparation job. This bid was turned down by the growers.

It is difficult to evaluate the results of such a skirting and grading project, for the clips were not large enough to split and sell a portion as unprepared and the other as prepared wools. It was concluded, however, that under present marketing methods it is not economically feasible for a grower to skirt and grade his clip at the ranch.

MONTANA, 1949

The value of wool preparation, detagging, and grading Montana wools at time of shearing was investigated.

The wool clip representing 52,502 greasy pounds from two Montana woolgrowers was detagged and packaged by graded line. The work was carried out by the woolgrowers in cooperation with the Montana Wool Laboratory.
<table>
<thead>
<tr>
<th>Grade</th>
<th>No. of bags</th>
<th>Pounds*</th>
<th>Percent of total wt.</th>
<th>No. of bags</th>
<th>Pounds*</th>
<th>Percent of total wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple and Good French</td>
<td>53</td>
<td>18,154</td>
<td>45.1</td>
<td>26</td>
<td>7,897</td>
<td>38.7</td>
</tr>
<tr>
<td>Fine Average French</td>
<td>16</td>
<td>4,349</td>
<td>13.3</td>
<td>8</td>
<td>2,394</td>
<td>11.7</td>
</tr>
<tr>
<td>Yearling Fine Staple</td>
<td>14</td>
<td>4,632</td>
<td>11.5</td>
<td>3</td>
<td>957</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>28,135</td>
<td>69.9</td>
<td>37</td>
<td>11,248</td>
<td>55.1</td>
</tr>
<tr>
<td>Total Fine Wool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 Staple and Good French</td>
<td>11</td>
<td>3,017</td>
<td>7.5</td>
<td>12</td>
<td>3,367</td>
<td>16.5</td>
</tr>
<tr>
<td>Yearling 1/2 Staple</td>
<td>6</td>
<td>1,816</td>
<td>4.5</td>
<td>3</td>
<td>929</td>
<td>4.5</td>
</tr>
<tr>
<td>Total 1/2 Wool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8 Staple</td>
<td>5</td>
<td>1,090</td>
<td>2.7</td>
<td>4</td>
<td>991</td>
<td>4.9</td>
</tr>
<tr>
<td>1/4 Staple</td>
<td>1</td>
<td>145</td>
<td>.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Medium Wool</td>
<td>6</td>
<td>1,235</td>
<td>3.1</td>
<td>4</td>
<td>991</td>
<td>4.9</td>
</tr>
<tr>
<td>Fine and 1/2 Bellies and pieces</td>
<td>9</td>
<td>3,142</td>
<td>7.8</td>
<td>6</td>
<td>1,943</td>
<td>9.5</td>
</tr>
<tr>
<td>Grading locks</td>
<td>5</td>
<td>2,011</td>
<td>5.0</td>
<td>2</td>
<td>685</td>
<td>3.4</td>
</tr>
<tr>
<td>Black wool</td>
<td>2</td>
<td>453</td>
<td>1.1</td>
<td>2(g)</td>
<td>109</td>
<td>.5</td>
</tr>
<tr>
<td>Britch wool</td>
<td>4(g)</td>
<td>80</td>
<td>.2</td>
<td>1(g)</td>
<td>65</td>
<td>.3</td>
</tr>
<tr>
<td>Tags</td>
<td>1</td>
<td>330</td>
<td>.8</td>
<td>2</td>
<td>1,083</td>
<td>5.3</td>
</tr>
<tr>
<td>Total off-sorts</td>
<td>21</td>
<td>6,016</td>
<td>14.9</td>
<td>13</td>
<td>3,885</td>
<td>19.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>127</td>
<td>40,219</td>
<td>100.0</td>
<td>69</td>
<td>20,420</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Net Selling Weight.
(g) Gunnsack.
The tied fleeces were carried from the shearing floor and placed on the grading table, where they were detagged and graded. The fleeces were graded by one of the growers under supervision of Montana Wool Laboratory personnel.

After the fleece was graded it was binned with other fleeces of similar grade. The fleeces were then sacked after volume enough was accumulated in a bin.

All sacks were core-tested and weighed to determine the clean-wool production in each grade.

**TABLE 7—LABOR COSTS OF SKIRTING AND GRADING**

(Clip One)

3,791 fleeces weighing 41,903 pounds  
Net coring weight  
11.05 pounds grease wool per sheep  
4.36 pounds clean wool per sheep

**Sheep sheared:**
- 830 yearlings
- 500 2-year-old ewes
- 700 3-year-old ewes
- 791 4-year-old ewes
- 680 5-year-old ewes
- 200 6-year-old ewes
- 90 bucks

**Costs of shearing:**
- Cost of shearing (30c per head) $1,165.73
- Tramper (1½c per fleece) 56.87
- Other labor 144.00
- String (1c per fleece) 37.91

**TOTAL COST** $1,731.51

**Cost per fleece** 45.67

**Additional cost due to skirting and grading process:**
- 1 supervisor (1c per pound) $419.00
- 1 pick-up boy (4 days @ $6.00 per day) 24.00
- Meals (approximately 48 @ $1.00 per meal) 48.00

Skirting and grading costs paid by Clip One 491.00
Cost of 2 skirters @ $8.89 per day each (Borne by Montana Wool Laboratory) 71.12

**TOTAL COST** $562.12

**Cost per pound, skirting and grading** $ .0134
**Cost per fleece, skirting and grading** .1482
TABLE 8—LABOR COSTS OF SKIRTING AND GRADING

(Clip Two)

1,932 fleeces weighing 21,037 pounds
Net coring weight
10.89 pounds grease wool per sheep
4.30 pounds clean wool per sheep

Sheep sheared:
250 yearlings
400 2-year-old ewes
600 3-year-old ewes
500 4-year-old ewes
152 5-year-old ewes
32 bucks

Costs of shearing:
Cost of shearing (30c per fleece) .......................................................... $603.75
Wool tramper (1½c per fleece) ................................................................. 28.98
Other labor ................................................................................. 72.00
String (1c per fleece) .................................................................. 19.32
Meals ...................................................................................... 163.50

TOTAL COST ....................................................... $887.55
Cost per fleece ...................................................................... .4593

Additional cost due to skirting and grading process:
1 supervisor (1c per pound) ................................................................. $210.37
1 pick-up boy (2 days @ $6.00 per day) ........................................ 12.00
Meals (approximately 24 @ $1.00 per meal) ....................................... 24.00

Skirting and grading costs paid by Clip Two ..................................... 246.37
Cost of 2 skirters @ $8.89 per day each .......................................... 35.56

Borne by Montana Wool Laboratory

TOTAL COST ....................................................... $281.93

Cost per pound, skirting and grading .............................................. $ 0.0134
Cost per fleece, skirting and grading .............................................. 0.1459

The pre-shearing offer for Original-bag preparation was 6.2c less
than Boston graded quotations, compared with 3.7c less at time of
actual sale of the prepared wool.

The wide spread in clean values, and the demand during the period
when offers were made to buy this clip of wool, made it impossible to
appraise the value of the wool. Lack of volume enough to compare
prepared and unprepared wools sold on the same market makes it
difficult to measure the value of detagging and grading work.

MONTANA, 1950

Study was made to determine the true value of off-sort wools to
Montana woolgrowers and to determine the yields of these wools.
Two months before the 1950 shearing season the Montana Wool Labora-
tory made arrangements with seven woolgrowers in the state to scour
and sell the pre-shearing clippings and the shearing-floor off sorts. After
shearing, the bags of wool were identified, weighed, and loaded. The carload of wool was shipped direct to a commercial scouring plant on the East Coast, where each individual grower's clip was sorted and weighed separately. Like sorts from each clip were then combined into one lot and scoured. A representative from the P.M.A. supervised the sorting, weighing, and identity of each lot. The scoured wool was turned over to a commission wool dealer who sold it September 18, 1950.

Table 9 shows the net grease weights at the mill and the net grease price at the ranch of prepared off-wools for each grower. The ranch grease value was calculated on the basis of pounds of clean wool in each sort.

TABLE 9—1950 MONTANA OFF-SORTS—VALUES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,559</td>
<td>435</td>
<td>634</td>
<td>490</td>
<td>69</td>
<td>502</td>
<td>47.4</td>
</tr>
<tr>
<td>B</td>
<td>9,452</td>
<td>3,213</td>
<td>2,100</td>
<td>3,568</td>
<td>8</td>
<td>7</td>
<td>48.1</td>
</tr>
<tr>
<td>C</td>
<td>1,885</td>
<td>619</td>
<td>1,241</td>
<td>10</td>
<td>8</td>
<td>7</td>
<td>49.9</td>
</tr>
<tr>
<td>D</td>
<td>8,395</td>
<td>689</td>
<td>4,809</td>
<td>2,598</td>
<td>41</td>
<td>258</td>
<td>46.1</td>
</tr>
<tr>
<td>E</td>
<td>5,831</td>
<td>974</td>
<td>2,921</td>
<td>1,834</td>
<td>102</td>
<td></td>
<td>46.6</td>
</tr>
<tr>
<td>F</td>
<td>2,428</td>
<td>330</td>
<td>1,341</td>
<td>752</td>
<td>5</td>
<td></td>
<td>46.2</td>
</tr>
<tr>
<td>X</td>
<td>1,106</td>
<td>22</td>
<td>972</td>
<td>106</td>
<td>6</td>
<td></td>
<td>46.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30,656</td>
<td>6,282</td>
<td>14,018</td>
<td>9,358</td>
<td>231</td>
<td>767</td>
<td>46.9 (Av.)</td>
</tr>
</tbody>
</table>

Table 10 shows the weights of each sort and the percentage of the total that each sort represents. A 1.30 percent loss of grease weight during shipping is not included in these weights.

Costs for all operations in this work are listed in Table 11. (These are all standard costs involved in the commercial industry.) Time and expenses of the Montana Wool Laboratory and P.M.A. personnel are not included.

Summary of the 1950 returns shows that scouring and selling Montana off-sorts was a profitable enterprise compared with sale value of the clips. The off-sorts returned to the grower from 12c to 18c more than was offered at time of selling his wool clip in spring. Increased value of the off-sorts was due to a large degree to increase in the Boston wool market values.

Under conditions of a stable wool market, the conventional method of selling off-sorts at one-half the fleece price is probably in line with the actual value of such off-sort wools; however, the work will have to be carried out over a period of years to measure the value accurately to the woolgrowers.

—31—
### TABLE 10—WOOL WEIGHTS AND YIELDS

<table>
<thead>
<tr>
<th></th>
<th>Total grease wt. of sorts (pounds)</th>
<th>Percentage of total wt. sorted</th>
<th>Total scoured wt. of sorts (pounds)</th>
<th>Shrinkage (percent)</th>
<th>Yield (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Stain</td>
<td>6,282.00</td>
<td>20.49</td>
<td>2,701.89</td>
<td>56.99</td>
<td>43.01</td>
</tr>
<tr>
<td>Heavy Stain</td>
<td>14,018.00</td>
<td>45.73</td>
<td>5,195.05</td>
<td>62.94</td>
<td>37.06</td>
</tr>
<tr>
<td>Tag</td>
<td>9,358.00</td>
<td>30.53</td>
<td>3,016.08</td>
<td>67.77</td>
<td>32.23</td>
</tr>
<tr>
<td>Low</td>
<td>231.00</td>
<td>.75</td>
<td>103.76</td>
<td>55.08</td>
<td>44.92</td>
</tr>
<tr>
<td>Grey</td>
<td>767.00</td>
<td>2.50</td>
<td>331.04</td>
<td>56.84</td>
<td>43.16</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30,656.00</td>
<td>100.00</td>
<td>11,347.82</td>
<td>62.99</td>
<td>37.01</td>
</tr>
</tbody>
</table>

### TABLE 11—1950 MONTANA OFF-SORTS—COSTS

<table>
<thead>
<tr>
<th>Cost items</th>
<th>Cost per pound (cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight and transfers 31,058 pounds</td>
<td>$ 868.88</td>
</tr>
<tr>
<td>Loading labor</td>
<td>10.00</td>
</tr>
<tr>
<td>Sorting cost 30,736 pounds @ 1.65/cwt.</td>
<td>507.15</td>
</tr>
<tr>
<td>Scouring cost and bands 30,656 @ 2.60/cwt., 25c per band</td>
<td>806.06</td>
</tr>
<tr>
<td>Bale covers 36 @ 1.20</td>
<td>43.20</td>
</tr>
<tr>
<td>Loss in weight 41 pounds @ 1.52</td>
<td>62.32</td>
</tr>
<tr>
<td>1 percent trade discount</td>
<td>173.33</td>
</tr>
<tr>
<td>Selling commission—3 percent</td>
<td>516.12</td>
</tr>
<tr>
<td>TOTAL COSTS</td>
<td>$2,987.06</td>
</tr>
</tbody>
</table>

### NEW MEXICO, 1948

1. **Table Sorting and Skirting at Shearing Shed**

   Study was made of feasibility of table sorting and skirting at the shearing shed.

   A clip of 38,330 pounds of grease wool was used.

   Cost of grading and sorting was 1.17c per pound. The wool sold for $1.45 per pound, clean basis, or 62.36c per pound, grease basis. The Bellies, Crutchings, and Tags were appraised 14.17c and 14c per pound, respectively, by local buyers. When these off-sorts were scoured they sold for equivalent prices of 52.09c, 42.30c, and 20.49c per pound in the grease.

   If this clip had been sold for 60c per pound in the grease, as were comparable clips in the same area, it would have given a net return of $22,998.00 to the woolgrower. Its net value when skirted and sorted was $22,786.80. The loss due to skirting was, therefore, $211.20.
2. Skirting Fleeces by Shearers

A test was made of the efficiency of skirting fleeces by shearing the heads, legs, and bellies before shearing the main fleece, packing these skirts apart from the main fleece, and selling each class of wool separately. A clip of 16,442 pounds of grease wool was used in this test. Grading and skirting cost amounted to 0.76c per pound. The wool sold for $1.42 per pound, clean basis, or 64.06c per pound, grease basis. It was estimated that total value of this clip as an Original-bag clip would have been 60c per pound, or a total of $9,853.20, compared with the derived value of $10,111.64 when it was skirted. This profit of $309.96 is attributable to skirting.

The general results for both of the 1948 experiments follow:
1. Skirting of fleeces can be done effectively and more economically by the shearer and compared with customary skirting at a table by a separate operator.
2. Off-sorts from skirting sell for more after being scoured.
3. Wool buyers have little knowledge of the values of the different sorts made in this method of packaging wool in the West. Because of this, they are unwilling to set prices.

3. Combining Chute-grading for Length and Table-grading for Fineness

This experiment was done with a clip of 30,000 pounds of grease wool. The sheep were graded by natural staple length in the cutting chute. The length classes made were (1) 3 inches and over, (2) 2.5 to 3.0 inches, (3) 2.0 to 2.5 inches, and (4) under 2 inches. Each group was sheared separately and graded separately by qualities and commercial lengths of Staple (Combing), French Combing, and Clothing.

Each grade and length class was sacked separately.

By grading for length in the chute before shearing, the rancher was able to select his best shearing ewes as well as reduce the number and size of bins needed on the grading floor. Instead of needing 9 different grading bins for the different grades, he got by very nicely with four. This resulted in one sacking man keeping all the wool sacked for eight shearers.

The different lots of graded wool were not sold as individual lots. A buyer inspected the lots and watched the grading at shearing time. He then set a price on the whole clip that was more than the owner and grader thought the wool would sell for, so the buyer’s flat price for all the grades together was accepted.
4. Grading for Length in the Chute

In 1948, 69,485 pounds of fine grease wool was graded on the sheep and then shorn.

The wool was opened on the hip of each sheep and the length was estimated. The staple length classes made were (1) 3.0 inches and over, (2) 2.5 to 3.0 inches, (3) 2.0 to 2.5 inches, and (4) 2 inches and under. Each class was sheared separately and the fleeces were packed by class.

The different classes were sold in Boston for the following prices per grease pound:

1. 3.0 inches and over—5,713 pounds ................... 64c
2. 2.5 to 3.0 inches—34,604 pounds ................... 64c
3. 2.0 to 2.5 inches—22,425 pounds ................... 62c
4. Under 2 inches—6,743 pounds ....................... 52c

These prices were in line with the difference in shrinkage except for the lot under 2 inches in length.

The firm handling the wool in Boston praised the method of packing, saying that it aided materially in selling the clip.

The woolgrower obtained valuable knowledge of the exact amounts of wool of various lengths he had for sale, and the resulting value differences. This knowledge was a valuable incentive to the grower to cull and improve the breeding of his sheep. This same type of test was continued on a number of clips in 1949, 1950, and 1951 with the same results.

In 1951 there was evidence that some of the buyers were taking advantage of transportation savings made possible by this method of packaging wool. When they purchased large clips of wool that had these 3 or 4 sorts, they shipped the different sorts directly to the processors, who used each particular sort instead of shipping all lots to the central wool market. This cut down their freight and handling charges.

This method is being recommended by the warehouses, which have found it to be a very effective method of selling.

NEW MEXICO, 1949

Estimating Grease Wool Shrinkage at the Ranch

This study was undertaken to find means of calculating a reliable estimate of shrinkage that the wool producer can use on the ranch, so that he can calculate a reliable market price for his wool.

Previous experiments have shown that the amount of clean wool a sheep produces is closely correlated with its body weight and staple length. Another factor that influences the amount of wool is the num-
ber of fibers growing on a given unit of body surface. The number of fibers plus the size (skin area) should give a good measure of amount on a given area, if length is held constant. To measure this amount on a given unit of area, a volume gauge was devised that measures the comparative resistance of the amounts of wool on the same size area, between sheep. The hypothesis upon which this procedure is based is that, if three wool-producing factors (body weight, wool length, and amount on one unit of surface) could be measured, and the individual effect of each determined, a close estimate of total clean wool produced by a sheep could be found. If this could be done, shrinkage of wool could be easily calculated. The only procedure needed would be to weigh the sheep, measure the length of wool, and use the volume gauge, before shearing. The clean-wool production indicated by these measurements would then be divided by the amount of grease wool actually sheared to obtain the percentage of clean wool.

To test the above hypothesis, herds of rams and herds of ewes were selected that represented wide differences in breeding, wool grade, body size, age of sheep, length of wool, geographic area, and wool shrinkage. All sheep were weighed individually before shearing, wool length was measured, and volume of wool on one unit of area was determined. These sheep were then sheared, the fleeces were weighed, and the whole fleeces were individually scoured to obtain the actual amount and yield of clean wool from each sheep.

From these data two formulas were developed to estimate clean-wool production. One set of relationships involved use of body weight and wool length. In this set 8 pounds' variation from average body weight had a clean-wool equivalent of 0.2 pounds, and one-eighth inch of unstretched wool. The second set involved use of body weight, wool length, and wool volume on one unit of skin surface. In this set 4 pounds of body weight, 2 units of volume, and one-sixteenth inch of staple length each had an equivalent of 0.16 pounds of clean wool.

If these calculations prove to be accurate, they may be very useful in the cooperative marketing of small clips of wool where the problem of equitable price determination has been a big obstacle because of large differences in shrinkage that are hard to determine on graded piles made from small clips.

Except for 5 of the 36 groups or herds used, the estimates based on body weight and wool resistance measurement did not increase reliability of the estimate. There is, however, indication that they may be a valuable measurement when a more accurate gauge is perfected and when further statistical study is made to give proper balance between the three measurements.
A study of the five herds that are over 3 percent of the array of data shows the following:

**Ram herd No. 7** The rams in this herd had their bellies sheared at breeding time.

**Ram herd No. 11** was the only herd of purebred Merinos in the study, as was Ram herd No. 12 of purebred Corriedales. Both these herds were under 2 years old and had been fed fattening rations for 12 months. Possibly further study of these two breeds will indicate a separate scale.

**Ram herd No. 1** in 1949 had been on starvation range.

**Ram herd No. 4** The 13-month yearlings had a body weight of 143 pounds, which is much higher than most rams of this age. Possibly yearlings of this weight should be pushed farther up the scale, since this group gives a close estimate when the 2-year-and-over scale is used.

**Ram herd No. 5** was composed of 7-year-old ewes past their normal production age and weighed just one week before lambing, which gave them a weight of some 15 to 20 pounds above normal weight.

When these herds are left out of the final analysis, the other herds give the following results:

**Ram Herds**

- 7 herds missed the estimated average yield by less than 1 percent
- 4 herds missed the estimated average yield by less than 2 percent
- 3 herds missed the estimated average yield by less than 3 percent
- 1 herd missed the estimated average yield by less than 4 percent

**Ewe Herds**

- 10 herds missed the estimated average yield by less than 1 percent
- 3 herds missed the estimated average yield by less than 2 percent
- 1 herd missed the estimated average yield by less than 3 percent

**NEW MEXICO, 1950**

1. **Relative Values of Fine-ram and Fine-ewe Wools**

This experiment was undertaken to ascertain if any market-value difference existed between fine wool from rams and from ewes.

A representative range herd of some 4,000 ewes and 130 rams was selected.

Wool for the test was obtained by taking whole sacks equally spaced from the entire ewe and ram clips.

These fleece were taken to the New Mexico Experiment Station Wool Laboratory, where they were graded and sorted by a P.M.A.
The grease wool was then shipped to the Pioneer Worsted Co. at New Braunfels, Texas. It was scoured and made into tops in the two separate lots—ewe and ram wool. The relative values of each lot were based on the final qualities of the Tops (Table 12).

### TABLE 12—COMPARISON OF FINE-WOOL RAM AND FINE-WOOL EWE SORTING OF GREASE FLEECE

<table>
<thead>
<tr>
<th></th>
<th>Ram</th>
<th>Ewe</th>
<th>Percentage of each kind</th>
<th>Amount ewe percentage is over ram percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pounds</td>
<td>pounds</td>
<td>Ram</td>
<td>ewe</td>
</tr>
<tr>
<td>Total grease wool</td>
<td>435.26</td>
<td>562.55</td>
<td>79.35</td>
<td>11.75</td>
</tr>
<tr>
<td>64-70 Staple</td>
<td>345.38</td>
<td>66.10</td>
<td>4.38</td>
<td>65.68</td>
</tr>
<tr>
<td>64-70 Fr. Comb.</td>
<td>19.05</td>
<td>369.49</td>
<td>.093</td>
<td>.516</td>
</tr>
<tr>
<td>Shin locks</td>
<td>2.32</td>
<td>.093</td>
<td>345.38</td>
<td>19.05</td>
</tr>
<tr>
<td>Defective Bellies</td>
<td>39.86</td>
<td>105.30</td>
<td>9.16</td>
<td>18.72</td>
</tr>
<tr>
<td>Bellies and greasy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tags</td>
<td>25.19</td>
<td>15.13</td>
<td>5.79</td>
<td>2.69</td>
</tr>
<tr>
<td>Stained</td>
<td>0</td>
<td>.30</td>
<td>0</td>
<td>.533</td>
</tr>
<tr>
<td>Paint</td>
<td>1.97</td>
<td>.15</td>
<td>.453</td>
<td>.0266</td>
</tr>
<tr>
<td>Tags</td>
<td>1.49</td>
<td>5.99</td>
<td>.342</td>
<td>1.065</td>
</tr>
<tr>
<td>TOTAL</td>
<td>435.26</td>
<td>562.55</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

In sorting the two kinds of fleeces, the ram wool was practically all of staple length, while the ewe wool was nearly all French Combing. There was one-half of 1 percent more shin locks from the ram wool, one-half as large a percentage of defective Bellies, about twice as many greasy Tips, no Stained wool, and above one-third as many Tags.

The sum of all the off Sorts, shin locks, defective Bellies, Bellies and greasy Tips, Stained, Paint, and Tags is 16.27 percent for the ram wool and 23.52 percent for the ewe wool. Thus, as result of fleece sorting, it was demonstrated that ram wool turned out a higher percentage of staple grade and about one-third less off Sorts (Table 13).

Results of the combing test shows definitely that the clean wool from the ram fleeces was superior to the ewe wool, for it produced a larger percentage of higher-priced Tops, a larger percentage of Noils, and a lower percentage of waste. The larger amount of Noils may have come about because the ram wool was long enough to use in the Noble Comb, while the ewe wool required the French Comb. (Noble Combing produces more Noils than the French Comb.)

As far as the values of the ram and ewe wools are concerned: the ram wool is superior in practically all cases in both the sorting and the combing processes. It is therefore more valuable in the clean state, as shown by a $2.39 clean value, compared with a $2.21 clean value for the ewe wool.

As grease wool the difference in shrinkage and yield must be considered when determining value. The ram wool had a shrinkage
TABLE 13—SCOURING AND COMBING RESULTS. ONLY THE STAPLE AND FRENCH COMBING SORTS WERE COMBED

<table>
<thead>
<tr>
<th></th>
<th>Ram wool</th>
<th>Ewe wool</th>
<th>Percent based on clean wool</th>
<th>Percent based on grease wool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease wool—lbs</td>
<td>366</td>
<td>446</td>
<td>84.31</td>
<td>28.18</td>
</tr>
<tr>
<td>Clean wool—lbs</td>
<td>118</td>
<td>171</td>
<td>81.70</td>
<td>31.32</td>
</tr>
<tr>
<td>Tops —lbs</td>
<td>99.47</td>
<td>139.7</td>
<td>15.60</td>
<td>5.03</td>
</tr>
<tr>
<td>Noils —lbs</td>
<td>18.40</td>
<td>19.20</td>
<td>3.77</td>
<td>1.23</td>
</tr>
<tr>
<td>Waste —lbs</td>
<td>4.49</td>
<td>8.16</td>
<td>4.77</td>
<td>1.83</td>
</tr>
<tr>
<td>Value of Tops</td>
<td>$3.07</td>
<td>$2.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of Noils</td>
<td>1.24</td>
<td>1.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of waste</td>
<td>.74</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total value per lb. of processed wool</td>
<td>2.39</td>
<td>2.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value per pound of grease wool</td>
<td>.7705</td>
<td>.8473</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ram—wool shrinkage—67.66—yield—32.34
Ewe —wool shrinkage—61.66—yield—38.34

of 6 percent more than the ewe wool. This difference in shrinkage made the ram wool in the grease have a value of 77.05c per pound, while the ewe wool had a value of 84.73c per pound. These last grease-value figures are probably most important to the New Mexico wool-grower, since he sells his wool by the grease pound. On April 1, 1950, the ewe wool from this clip sold for 65c a grease pound, ranch price, and the ram wool went with the clip at one-third off the ewe-wool price, or 42.5c per pound for the ram wool. Actual yield of the ewe wool of 38.34 percent and a grease price of 65c gives a clean ranch price of $1.70 per pound.

The ram wool had a clean pound value of 8 percent over the ewe wool because of better grade and processing qualities; hence it should have been worth $1.84 per clean pound, ranch price. A yield of 32.34 percent would give it an actual ranch grease value of 59.51c. This is an increase of 17.0c from the price paid.

These data indicate that ram wool should be sold on basis of its actual grade and shrinkage rather than the usual one-third off of the ewe-wool price.

2. Scouring Off-sorts Before Selling

This study was made to find a better market for Tags, Crutchings, off-sorts, and wool shrinking above 75 percent.

Parts of the Tag lots of two clips were purchased, scoured, and marketed as clean wool. The price received by the rancher for the other parts of his Tag lot was used as a basis of comparison.
The skirts and the defective belly wool of one lot of ewe wool and one lot of ram wool was scoured and marketed as clean wool. The purchase price for comparison of this grease wool was that of the whole-fleece price received by the rancher for his fleece wool.

Results of this study follow:
1. Saving in marketing costs by shipping as clean wool is directly proportional to clean yield.
2. In New Mexico the inferior wool, Tags, and skirts from some sorted fleeces are generally thrown in with the main clip at prices that vary considerably between clips. In general, with no accurate price determination, a good seller or trader may get a little more for his Tags than the average, but the general custom is to have an area price for all Tags regardless of actual value. The fine-ram wool is nearly always discounted one-third in weight, then sold for the same price as the ewe wool.
3. There was little direct relationship between yield of clean wool and the price paid per grease pound for this kind of wool on the ranch, as shown by the following data (Table 14):

**TABLE 14—COMPARISON OF ACTUAL VALUE AND PRICE PAID FOR 100 POUNDS GREASE WOOL IN BOSTON**

<table>
<thead>
<tr>
<th></th>
<th>No. 1 Tags</th>
<th>No. 2 Tags</th>
<th>No. 3 Skirts</th>
<th>No. 4 Skirts</th>
<th>No. 5 Short</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of grease wool—lbs.</td>
<td>100.</td>
<td>100.</td>
<td>100.</td>
<td>100.</td>
<td>100.</td>
</tr>
<tr>
<td>Weight of clean wool—lbs.</td>
<td>30.0</td>
<td>18.70</td>
<td>43.0</td>
<td>55.20</td>
<td>26.0</td>
</tr>
<tr>
<td>Grease cost in Boston</td>
<td>$ 19.00</td>
<td>$ 27.00</td>
<td>$ 70.00</td>
<td>$ 48.30</td>
<td>$ 55.00</td>
</tr>
<tr>
<td>Boston scoured value of 100 lbs. clean</td>
<td>162.00</td>
<td>178.00</td>
<td>154.00</td>
<td>158.00</td>
<td>185.00</td>
</tr>
<tr>
<td>*Boston scoured value minus cost of scouring of 100 lbs. clean</td>
<td>159.25</td>
<td>175.25</td>
<td>151.25</td>
<td>155.25</td>
<td>182.25</td>
</tr>
<tr>
<td>Boston value of grease wool based on clean wool and yield</td>
<td>47.78</td>
<td>32.77</td>
<td>65.04</td>
<td>85.70</td>
<td>47.39</td>
</tr>
<tr>
<td>Difference between Boston actual cost and actual value of grease wool</td>
<td>+28.78</td>
<td>+ 5.77</td>
<td>- 4.96</td>
<td>+ 37.40</td>
<td>- 7.61</td>
</tr>
<tr>
<td>Cost of 100 lbs. of grease wool scoured in Boston and sold as scouring wool in Boston</td>
<td>21.75</td>
<td>29.75</td>
<td>72.75</td>
<td>51.05</td>
<td>57.75</td>
</tr>
<tr>
<td>Cost of 100 lbs. of grease wool scoured in N. Mex. and sold as scouring wool in Boston</td>
<td>19.41</td>
<td>26.40</td>
<td>71.56</td>
<td>50.94</td>
<td>55.05</td>
</tr>
<tr>
<td>Actual value of 100 lbs. grease wool scoured and sold as scouring wool in Boston</td>
<td>48.46</td>
<td>33.29</td>
<td>66.22</td>
<td>87.22</td>
<td>48.10</td>
</tr>
</tbody>
</table>

*Scouring cost of 100 lbs. of grease wool—$2.75—either N. Mex. or Boston

4. In general, results indicate that these off-sort lots of wool at
present show little relationship between actual value and prices paid. It would indicate that, if sorting is to be done in the West at the ranch or warehouse, the marketing of off-sorts in the scoured form would be advantageous.

**General Conclusions of the Work for 1948, 1949, and 1950 at the New Mexico Agricultural Experiment Station**

1. Skirting at the shearing shed by a wool grader or by shearers was done to satisfaction of the buyer. It showed no more return to the grower than selling his clip in Original Bags as whole fleeces. One of the greatest marketing difficulties was found to be the lack of established prices for the different sorts. Local buyers knew nothing about values other than that of whole fleeces, and would not venture to buy any of the skirted wool or sorts. Such buyer resistance due to lack of knowledge has also been evident whenever any new method of grading or packaging wool has been attempted. Past and present experiences show that values can only be established by continued uniform packaging until markets can establish price values. Since this project requires considerable detailed work of more intricate nature, it is not adapted to cooperative work where the grower has to assume possible loss and unaccustomed expense, with doubtful advantage.

2. Grading herds with wool of uniform fineness by length classes has proved very successful. Buyers agree that it is worth while, and they become very competitive in buying when large clips are packaged in this manner. Their only objection is to lots below 5,000 pounds. This practice has been used for some 8 to 10 years by many growers so that buyers now recognize and know its values. It has increased the wool income from 2c to 6c a grease pound per clip.

3. Table grading of clips of varying fineness and length grades has, on the whole, been of advantage. Here again the buyers object to small lots. They also do not see advantage in grading too closely for fineness and would prefer that larger lots be made by putting low Fine with ½ Blood, or high ¾ with ½ Blood, or 62's with Fine when there is a small number of fleeces of some particular grade.

   When prices are low and there is a dull market, graded clips have sold more readily than ungraded.

4. Scouring and selling as clean wool the Tags, skirts, and heavy-shrinking short wool demonstrated the fact that, under present marketing practices, these types are not sold on their true values in the grease state.
5. Fine ram wool was found to be worth more per pound if scoured and the Tops were of higher value than those made from ewe wool. There was no evidence that fine ram wool should be docked one-third of the price of ewe wool because of alleged poorer quality.

Estimated shrinkage at the ranch by using body weight and length of wool as measures of clean wool has proved accurate within about 2 percent.

OREGON, 1948

Objective this year was to study the value of skirting and grading at the shearing shed.

Aside from the usual equipment used at shearing, a slatted skirting table (4' x 10'), clothes baskets, grading bins, and brooms were provided.

In process of shearing, the belly wool was separated from the main fleece, gathered in one of the clothes baskets, and later placed in the bin for Bellies by the fleece tier. The main fleece was placed in a basket and carried to the skirting table by the fleece tier. Fleeces were not tied but were skirted and graded. Whenever a grading bin had sufficient quantity, it was sacked and marked. At all times the shearing floor was swept clean of Tags. Two clips totaling 30,459 pounds were included in the project this year. The Fine and ½ Blood grades were sold on the open market and the ¾ Blood, ¼ Blood, and low quarter Blood grades were sold through the C.C.C. The off-sorts amounted to 12.8 percent for one clip and 14.1 percent for the other before sale. Core-shrinkage tests were made by P.M.A. on all grades.

The cooperators in this project realized 6c per grease pound more than they were offered at shearing time. Because of the erratic condition of the wool market, this is not a good comparison. Wool prices rose rapidly after shearing.

In comparison of two lots of Fine and ½ Blood wool from yearling ewes, one skirted and graded lot netted 59c per grease pound and the Original-bag lot netted 58c. This is an advantage of 1c from skirting and grading. Each lot of yearling ewes consisted of 450 head. They were of the same breeding and had grazed on the same ranges. Both lots of wool sold on the same day and were handled by the same wool warehouse.

The total cost of the skirting and grading was 0.8c per grease pound. Where possible, the skirted and graded wools were followed through the mill that purchased them. These mills reported that the grading was satisfactory but that the skirting was not entirely so in that the paint brands had not been completely removed. They were of the opinion
that it was not possible to remove these paint brands completely at the shearing shed.

OREGON, 1949

Objectives this year follow:

1. To determine feasibility of grading wool at the shearing shed.
2. To determine acceptability by mills of grading done at the shearing shed.
3. To determine costs of shed grading and the factors affecting these costs.
4. To determine advantage of scouring clothing wools before sale.
5. To determine advantage of scouring pre-shearing crutchings and shearing shed Tags before sale.

Aside from the usual equipment used at shearing, a slatted grading table (4' x 5'), two portable sacking frames, grading bins, clothes baskets, and brooms were provided. In addition to the regular shearing crew and help, a grader and one or two helpers were provided.

This year the fleeces were not skirted but were tied in usual manner, including the Bellies. The fleece tier delivered the fleeces to the grading table and the grader helper or helpers threw the graded fleeces up to the sacking frame.

At all times the shearing floor was swept clean to prevent accumulation of Fribs, Tags, and other off-type wools from being tied in with the fleeces. Use of the slatted grading table eliminated a large part of the Fribs from the fleeces as they were being graded. All the sheep included in this project had been crutched before lambing, hence there were no hard Tags. Black sheep were separated out before shearing and shorn last, at one end of the shearing floor. The graded Combing and French Combing wool was sold on the core test provided by the P.M.A. All Clothing wools, preshearing Crutchings, and Tags were scoured before sale. A memorandum of understanding outlining the duties of the cooperator, the wool handler, and the Oregon Agricultural Experiment Station was used. In this memorandum the cooperator designated the one who was to handle his wool. Fortunately all chose the same handler. This permitted combining the grades of one cooperator with like grades of other cooperators, making in every grade sizable lots which would attract the wool trade.

Of seven cooperators in the project this year, six situated in Baker County were known as the Eagle Valley Wool Pool; the seventh was independent, situated in Wasco County. Because of some differences in the marketing of the pool and that of the Wasco county cooperator, the results of these two lots of wool are given separately.
Eagle Valley Wool Pool

Included in this pool there were 106,989 pounds of wool. The Fine French grade (38,755 lbs.) sold on the open market. All other grades were sold through the C.C.C.

No comparison for prices for shed-graded wool and Original-bag wool of this pool was obtained.

The Fine French wool went to an eastern mill, which reported that a thorough job of grading had been done. The mill also remarked that this lot of wool was freer of Stains and Tags than any lot of domestic wool they had ever handled. Their sorting report showed that this lot contained only one one-hundredth of 1 percent of Stained and Tags. The U. S. Testing Co. core-tested this wool on arrival at mill. They reported a shrinkage of 55.5 percent. The core test in Portland made by the P.M.A. was 55.7.

The 3/8, 1/4, and Low 1/4 Blood wools of this pool were purchased by a worsted mill in the Portland area. They reported that the grading was satisfactory. There was no advantage in scouring the Clothing wools before sale as cost of scouring was greater than the advantage gained.

In the case of the Crutchings and Tags, there was distinct disadvantage in scouring. One cooperator sold his Crutchings and Tags unsoured for 18c per grease pound. The others realized a net of 28.49c after paying all charges incident to scouring.

Cost of grading the Eagle Valley Pool, including wages of grader and helpers and meals, ranged from a low of 0.45c to a high of 1c per pound. Grading costs at each shed were affected by the following factors: (1) number of shearers, (2) speed of shearers, (3) weather conditions, and (4) shed facilities.

Wasco County Cooperator

This clip consisted of 67,883 pounds of wool of which 30,377 pounds were graded at the shearing shed and 37,506 pounds were sold as Original-bag wool. This clip was fine breeding, as our grading report showed that 98 percent of the wool graded Fine. It therefore definitely would classify as an Original-bag clip.

Both the shed-graded lot and the Original-bag lot sold at the same time in January 1950 and through the same handler. The shed-graded lot sold for 55.24c per grease pound and the Original-bag lot for 54.09c. This is an advantage of 1.15c per grease pound due to the shed-grading of a Fine clip.

Cost of shed-grading, including the wages of one grader and two helpers and meals for these three men, was 0.3c per grease pound.
In this clip one grader and two helpers had no difficulty in handling
the wool from 12 shearers.

The pre-shearing Crutchings and Tags from this clip sold for the
equivalent of 38.02c net per grease pound. At sale time, unscoured
crutchings and tags were selling for 20c per grease pound.

OREGON, 1950

Objectives, materials, methods, and cooperators were the same as
for the year 1949.

Because of publicity given in the Eagle Valley Wool Pool by the 1949
grading project, this wool was in keen demand. Early in the season,
buyers offered high prices on the basis that it was to be graded again un-
der the WM-5 Project. The wool this year was sold before shearing,
which, of course, was not entirely satisfactory from the standpoint of the
grading project. We did get comparison of the sale of this shed-graded
wool with that of comparable Original-bag clips sold at the same time
and produced in the same locality. This year, only the Crutchings and
Tags were scoured before sale.

Eagle Valley Wool Pool

This pool consisted of 104,179 pounds of grease wool. Three of
the clips were of fine breeding and three were from crossbred bands
producing medium grades of wool. The Fine clips sold for an average
of 61.43c per grease pound and one comparable Fine Original-bag clip
sold for 58c. This is an advantage of 3.43c per grease pound due to
shed grading. The three medium clips sold for an average of 59.88c
per grease pound and three comparable Original-bag clips averaged
55c. The advantage in this case, due to shed grading, was 4.88c per
grease pound.

Wasco County Cooperator

This clip consisted of 81,568 pounds, of which 25,968 pounds was
graded at the shearing shed and 55,600 pounds was sold as Original-bag
wool. We did not get good comparison of the returns from these two
lots of wool, as the cooperators sold the O.B. wool in May and did not
permit sale of the graded wool until December. The wool market rose
rapidly from May until December. The Original-bag wool sold for
60.21c per grease pound in May and the graded wool sold for 93.21c
in December. This 33c advantage was due in the main to a rise in the
wool market.

The Crutchings and Tags of the seven cooperators were combined
and graded into Fine and medium grades before scouring. The Fine
Crutchings and Tags netted the growers 31c per grease pound and the medium grade, 34.5c. These prices were considerably higher than the prevailing price of unscoured Crutchings and Tags.

Shed-grading costs this year ranged from 0.37c to 0.58c and for the seven clips averaged 0.43c per grease pound.

**Summary of Work for 1948, 1949, and 1950**

1. Skirting of fleeces at shearing shed was not satisfactory because of the impossibility of completely removing the paint brands.
2. Cost of skirting was 0.8c per grease pound.
3. In one small test, skirting and grading netted 1c more per grease pound than a similar lot not skirted and graded.
4. All mills contacted reported that the grading done at the shearing shed was satisfactory. In this connection, it should be borne in mind that the cooperators were selected on basis of their shed facilities. In most shearing sheds in Oregon, shed grading cannot be done satisfactorily because of lack of facilities.
5. In 1949, comparison of 30,377 pounds of shed-graded wool with 37,506 pounds of Original-bag wool showed advantage of 1.15c per grease pound in favor of shed grading. In 1950, advantage in favor of shed grading was 3.43c per grease pound for the Fine clips and 4.88c for the medium clips.
6. Cost of shed grading ranged from a low of 0.3c to a high of 1c per grease pound with an over-all average for the two years of 0.52c. Grading cost at each shed was affected by the following factors: (1) number of shearers, (2) speed of shearers, (3) weather conditions, and (4) shed facilities.
7. In one year's test, couring of Clothing wool before sale did not pay. Cost of processing exceeded the advantage gained.
8. Scouring of Crutchings and Tags netted the growers from 10.4c to 14.5c per grease pound more than the prevailing prices of these off grades, sold unscoured.

**TEXAS, 1948**

Object of this work was to determine feasibility of grading wool at shearing pens and marketing on basis of quality. Sutton County was selected since it is centrally situated in the Edwards Plateau—the principal wool-producing region of Texas.

Arrangements were made with wool-warehouse officials to make contacts with ranchers for their cooperation in the study.

Very little additional shearing equipment was needed to conduct this work as compared with ordinary shearing practice. Frames to accommo-
date three to five bags were used so that fleeces could be bagged immediately after grading. Over 90 percent of the wool from this area is 64’s and higher in quality; hence the grading operation is simple when compared with the mixed clips of the Northwest. Constant sweeping of shearing boards and very careful picking up of fleeces enabled the help engaged in typing the fleeces to keep up with shearers and the grader.

The graded wool was classed as follows:
- Fine Staple—2½”-3½” length (unstretched)
- Fine Fr. Comb.—2”-2½” (unstretched)
- Fine Clothing—1½”-2” length (unstretched) and including all tender fleeces.

Clippings is the term given the wool sheared from the sheep in January before lambing.

Tags are the product swept from shearing boards during the regular shearing operation in May and June.

There were 59 wool clips graded; the summary follows (Table 15):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Pounds</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple</td>
<td>345,504</td>
<td>50.0</td>
</tr>
<tr>
<td>Fine French Combing</td>
<td>270,079</td>
<td>39.1</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>75,506</td>
<td>10.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>691,089</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

There were 48 clips of ungraded wools with a weight of 389,126 pounds for comparative purposes.

This accumulation of 1,000,000 pounds was sold to one buyer on a single day, and it was possible to obtain comparable price data on the graded and ungraded lines.

Tags and Clippings were sold at 17½c and 25c, respectively, for both the graded and ungraded wools.

The average price received for the graded wool was 80.2c with a high of 86.6c and a low of 70.5c. The ungraded line brought an average price of 75.5c with a high of 83c and a low of 60c. The gross difference between graded and ungraded lines was 4.7c per pound in favor of the graded.

Expense of grading was 0.2c per pound.

Good demand was indicated for Texas Fine 12-months’ wools, properly graded and prepared for market, when offered as separate qualities (grades).
Grading at shearing pens has important educational value in that the rancher may obtain valuable information in selecting a more profitable type of sheep to raise.

There was marked trend for the wool to improve in length of staple as the lots increased in size; however, there were notable exceptions.

Reaction of the manufacturer to quality of grading and preparation was very favorable.

**TEXAS, 1949**

Work this year consisted of obtaining additional data on feasibility of grading wool at shearing pens, marketing on basis of quality, and making a survey of the Texas wool-warehouse system.

Facilities and methods employed were essentially the same as those used in the 1948 work.

The 79 clips of wool graded as follows (Table 16):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Pounds</th>
<th>Percentage of total</th>
<th>Percentage of graded wool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple</td>
<td>651,802</td>
<td>52.4</td>
<td>58.9</td>
</tr>
<tr>
<td>Fine French Combing</td>
<td>386,270</td>
<td>31.1</td>
<td>34.9</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>68,610</td>
<td>5.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Fine Tags</td>
<td>56,120</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Fine clippings</td>
<td>79,951</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,242,753</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There were 54 clips of ungraded wools totalling 336,898 pounds for comparative purposes.

Marketing of wool during the 1949 season was not steady. It was impossible to make satisfactory price comparisons as was the case with the 1948 wools, where they moved to one buyer on a single day. However, from available data the graded wools brought 2c more per pound than did the ungraded line.

Expense of grading was 0.28c per pound.

Data were gathered from Texas warehouses to determine extent of marketing wool on quality basis.

**TEXAS, 1950**

Experiments were continued to determine feasibility of grading wool at shearing pens and marketing on basis of quality. Work was also done to:
A. Complete analysis of data on Texas Wool Warehouse System and prepare it for publication.
B. Make analysis of wool prices in Sutton County Area to determine price/quality relations.
C. Develop quality index to be used in evaluation of individual wool clips in this marketing work.

The facilities and methods employed were essentially the same as those used in 1948 and 1949.

Seventy-five clips graded as follow (Table 17):

<table>
<thead>
<tr>
<th>Grades</th>
<th>Pounds</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple</td>
<td>513,328</td>
<td>53.9</td>
</tr>
<tr>
<td>Fine French Combing</td>
<td>307,695</td>
<td>32.3</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>131,667</td>
<td>13.8</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>952,690</strong></td>
<td>100.0</td>
</tr>
</tbody>
</table>

The ungraded line was made up of 93 clips which totalled 423,360 pounds.

The year 1950 was very unusual in that the beginning of the season was exceptionally slow, but wool finally began moving, and prices accelerated to record highs. This condition made it impossible to obtain satisfactory price comparisons between graded and ungraded wools. A major portion of the wool accumulation sold during the 30-day period starting June 10. The Fine Staple and Fine Fr. Combing wools brought 85c and 75c, respectively, and ungraded wools averaged 75c. The Fine Clothing line brought 68c on June 2.

Expense of grading was 0.2c per pound.

Higher prices for the graded wools still indicate good demand for Texas wools when graded and when well put up for market.

Approximately 8,000 pounds of wool from the Fine Staple line processed at the Station Scouring Plant, giving average yield of 50.4 percent.

Effect of staple length on fleece weight from 17 random wool clips gave the following results (Table 18):

<table>
<thead>
<tr>
<th>No. of fleeces</th>
<th>Grade and length</th>
<th>Average weight fleece—grease basis</th>
<th>Lbs. gr. basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,493</td>
<td>Fine Staple</td>
<td>8.2</td>
<td>94,461</td>
</tr>
<tr>
<td>5,928</td>
<td>Fine Fr. Comb.</td>
<td>7.2</td>
<td>42,453</td>
</tr>
<tr>
<td>2,101</td>
<td>Fine Clothing</td>
<td>6.3</td>
<td>13,154</td>
</tr>
<tr>
<td><strong>19,522</strong></td>
<td>****</td>
<td><strong>150,068</strong></td>
<td>****</td>
</tr>
</tbody>
</table>
Practice of sorting sheep with emphasis on greater staple length brings higher returns to the grower. A test was conducted on the clips from 28 ranchers who practice sorting sheep for longer wool as compared with 47 clips where such practice is not followed. Results follow (Table 19):

<table>
<thead>
<tr>
<th>No. of clips</th>
<th>Amount of wool</th>
<th>Money</th>
<th>Average price per pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>47 DO NOT sort sheep</td>
<td>555,872</td>
<td>$418,470.34</td>
<td>75.3c</td>
</tr>
<tr>
<td>28 DO sort sheep</td>
<td>396,818</td>
<td>321,893.70</td>
<td>81.1c</td>
</tr>
<tr>
<td>75</td>
<td>952,690</td>
<td>740,364.04</td>
<td>77.7</td>
</tr>
</tbody>
</table>

(A summary of results in this work covering 1948-49-50 has been published.*

The manuscript on the Texas Wool Warehouse survey has been published.†

An article on price/quality relationships in connection with improved production and marketing practices has been approved for publication.

A quality index for wool is in process of development.

**UTAH, 1948**

During spring 1948 a study was conducted in which three sampling methods were used to determine wool shrinkage of a clip from approximately 1000 range sheep. These methods follow: (A) Side Sample: small samples of approximately one-third pound were removed from the region of the side of the fleece as it was shorn. These samples were sacked individually, weighed, and then scoured in the wool laboratory. (B) Composite Samples: small handfuls of wool were withdrawn at random and made into a composite sample. The composites were made from the same fleeces that had been side-sampled, the bag of wool being the unit. The composite samples were also scoured in the wool laboratory. (C) Core Test: each individual bag of wool was core-tested by a representative of P.M.A. Shrinkage determinations were made by the U.S.D.A. Denver Wool Laboratory.

Ten bags representing the wool that had been sampled by the above methods were shipped through the National Wool Marketing Corporation to Camden, New Jersey, and the entire bag lot was scoured by the Eavenson and Levering Co. Shrinkage values were obtained on each bag.

* Texas Agricultural Experiment Station Progress Report No. 1363.

— 49 —
Results of the study show that individual side samples gave shrinkage estimates correlated more closely with the whole-bag results than did any of the other methods. Shrinkage estimates obtained from the composite samples were in closer agreement than were those obtained from the core-test method. This is as would be expected since the core test is not designed for sampling small lots; neither is it expected to give reliable shrinkage estimates on individual bags.

It is interesting to note that, in general, the whole-bag shrinkage values were slightly higher than the individual side-sample values. These in turn were slightly higher than the shrinkage estimates based on the composite sample.

UTAH, 1949

In this study, wool from two bands of sheep was graded at the shearing corral by a P.M.A. grader to determine feasibility of grading wool at time of shearing and to determine the value of local grading and marketing of shorn wool. One of the above clips of wool consisted of 3,246 fleeces that were graded at a portable shearing corral in Southwestern Utah. The other clip, consisting of 4,972 fleeces, was graded at a portable shearing shed about 20 miles northwest of Kemmerer, Wyoming. The study indicated that it is possible to grade wool at shearing time in portable corrals. In providing necessary equipment for grading, some thought must be given to type and size of shearing crew and to arrangement of shearing corral. Provision must be made for keeping direct sunlight away from the grading table and for protection from wind and dust. It is important to have enough grading bins of proper sizes to provide space for all possible grades in the clip. Bins should be large enough to hold more than one bag of wool. In this particular study it appeared that seven shearers is the maximum number that can be handled by one grader at a portable shearing corral. It is possible that this number could be increased if facilities were improved and more assistance given to the grader.

The volume of wool involved in this study was too small to yield information concerning acceptance by the wool trade of graded wool as compared with ungraded wool. The cooperators did, however, make the following observations: The coarser grades of wool were sold very soon after reaching Boston. If the wool is variable and the market sluggish, there is possibility of selling parts of each graded clip soon after arrival at market. Slow-moving wools do not hold up sale of other grades. Sale of part of a clip reduces storage costs.
In 1950 a study was conducted to determine what percentage of the fleece is belly wool and off-sort wool in range ewes of Columbia and Rambouillet breeding. Approximately 1,000 fleeces were studied; the Belly wool and other off-sorts were taken out and weighed separately. Results showed that the belly wool made up approximately 5.5 percent and the other off-sorts 6.3 percent of the fleece weight. There was very little difference in these values for fleeces from Columbias and Rambouillets.

Another study was conducted in cooperation with the P.M.A. in which the wool from one large operator was graded and core-tested. The wool was divided into three groups according to brand designation of the bands and location of the grading. Group 1 consisted of 11,111 sheep that were sheared and the fleeces graded at a portable shearing corral. Group 2 consisted of 3,232 sheep which were handled in similar manner at another location. Group 3 with 6,054 sheep was sheared at a portable corral and the sacked wool then hauled to a ranch warehouse for grading.

In all three groups approximately one-tenth of the fleeces were left ungraded to be used in comparing marketability of graded and ungraded wool.

Soon after shearing and grading, the wool was shipped to warehouses near Boston, Massachusetts. The larger lots were core-tested and shrinkage determinations made. The wool was displayed in the warehouses and inspected by numerous buyers from mills and topmakers. Grading was satisfactory to all wool buyers.

The wool market was very slow and sluggish at the time this wool was offered. Wools of all types did not command a ready market. The wools included in this study were sold to the Prouvost Lefebvre Mills on a clean-weight basis as determined by core tests. Clean wool prices were:

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple</td>
<td>$1.75</td>
</tr>
<tr>
<td>Fine French</td>
<td>1.70</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>1.60</td>
</tr>
<tr>
<td>½ Blood</td>
<td>1.60</td>
</tr>
<tr>
<td>⅛ Blood</td>
<td>1.40</td>
</tr>
</tbody>
</table>

The ungraded wool was sold on a clean-weight basis for comparable prices.

In this particular study no special premium was paid by the wool buyers for the graded wool. But it is believed that the prices received did not reflect the true market values of the wool. The sluggish market, along with obvious reluctance among the buyers to pay a premium for the graded wool, limited the value of the study.
WYOMING, 1948

The following tests were designed to find if the skirting and grading of Wyoming wools would return profit to the woolgrower.

The Wyoming Cooperative Wool Marketing Association with cooperation of the Wool Department of the University of Wyoming graded and skirted these clips at the Walcott shearing shed. From 36,509 sheep 322,945 pounds of grease wool was sheared. The National Wool Marketing Corporation sold the wool in Boston, Massachusetts.

All lots of these clips have been sold. Sales of the various lots extended from May 14, 1948, until May 1949.

Preparation and marketing costs follow (Table 20):

<table>
<thead>
<tr>
<th>Clip No.</th>
<th>For skirting only</th>
<th>Extra labor for skirting</th>
<th>Grading, freight, handling, etc.</th>
<th>Total charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.406</td>
<td>0.130</td>
<td>6.861</td>
<td>7.397</td>
</tr>
<tr>
<td>2</td>
<td>0.406</td>
<td>0.130</td>
<td>6.916</td>
<td>7.452</td>
</tr>
<tr>
<td>3</td>
<td>0.406</td>
<td>0.130</td>
<td>6.854</td>
<td>7.390</td>
</tr>
<tr>
<td>4</td>
<td>0.406</td>
<td>0.130</td>
<td>6.859</td>
<td>7.395</td>
</tr>
</tbody>
</table>

These total charges include a theoretical charge for skirting of 0.406c per grease pound provided free to the grower by the University of Wyoming. Average marketing costs for the different classes in the clips were as follows:

Total Cost per Pound Grease Basis

- Fine and 1/2 Blood sold on open market .................. 6.05c
- 3/8 Blood and coarser grades sold to C.C.C.................. 7.55c
- Miscellaneous and Tags sub sorts sold in scoured form to C.C.C .................. 11.33c

Results of these experiments follow:

1. Actual cost for grading was 0.275c per pound of grease wool; actual cost for skirting, 0.406c. Extra labor required for skirting was 0.130c. Thus the total extra cost for grading and skirting above the cost of shearing was approximately 0.811c per pound of grease wool.

2. The Fine and 1/2 Blood graded and skirted lots were sold for from 5c to 9c per pound, clean basis, more than similar unskirted wools. These lots were sold on basis of core-test shrinkage. The graded and skirted medium lots were sold for a premium of 4c per pound, clean basis, granted by the C.C.C.

3. In order to compensate for cost of skirting it would have been neces-
sary to obtain the following increases in price on clean basis for the main grades.

- Fine ........................................... 4.90c per pound
- \( \frac{1}{2} \) Blood ................................... 4.47c per pound
- \( \frac{3}{8} \) Blood ................................... 2.76c per pound
- \( \frac{1}{4} \) Blood .................................... 1.83c per pound

4. The graded and skirted wools were satisfactorily prepared for manufacturing purposes according to reports received directly from the processors.

WYOMING, 1949

Objectives for this year were to experiment with wool preparation further and to market the prepared wools under a competitive system.

In 1949 the Wyoming Cooperative Wool Marketing Association cooperated with the Wool Department of the University of Wyoming in preparing for market three clips (1, 2, and 3) being shorn at Walcott, Wyoming.

Preparation consisted of separating from the fleeces the Tags and stained breech wools and packing them under this designation. The coarse breech wools, when present, were also removed and placed in their respective medium and coarse grades with the fleeces. The locks from the Tags and Stained sorts and odd pieces from the shearing floor were packed as locks. The yearling wool was packed separately and branded yearling. The Tags and Stained sorts and the locks were subsequently scoured before they were offered for sale. Ram fleeces were mingled and packed with the ewe fleeces. All fleeces were graded according to quality and length. On November 30, 1949, at the request of the growers concerned, the Fine and \( \frac{1}{2} \) Blood lines from five clips were offered for sale by sealed bids in Boston. Other Fine and \( \frac{1}{2} \) Blood graded and detagged lines and five lots of Original-bag wools from three other clips were also included in this sale. Total weights offered were as follow:

- Five experimental clips ........................................ 366,028 pounds
- Graded and detagged clips .................................... 525,640 pounds
- Original-bag clips ........................................... 92,753 pounds

Total weight offered ........................................ 984,421 pounds

Results of this work follow:

1. Total marketing costs per grease pound were as follow (Table 21):
Clip 4 was machine shorn at rate of 13.28 sheep per man hour, and clip 5 was blade shorn at rate of only 9.45 sheep per man hour.

2. The 3/8 Blood and 1/4 Blood lines in clips 1, 2, and 3 were sold to the C.C.C. at average net clean values to the growers of 102.47c per pound for the 3/8 Blood staple and 88.17c per pound for 1/4 Blood staple. For clips 4 and 5 the average net clean values to the growers were 99.39c per pound for the 3/8 Blood staple and 92.22c per pound for the 1/4 Blood staple.

3. On basis of core-test shrinkages the selling-bid prices on the five experimental clips as against the selling-bid prices on the graded and detagged clips by grade were as follows (Table 22):

<table>
<thead>
<tr>
<th>Grade</th>
<th>5 experimental clips</th>
<th>Graded Clips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In grease</td>
<td>Clean</td>
</tr>
<tr>
<td>Fine Staple and Good French Combing</td>
<td>53.22</td>
<td>139</td>
</tr>
<tr>
<td>1/2 Blood Staple</td>
<td>52.32</td>
<td>131</td>
</tr>
</tbody>
</table>

Thus, although the experimental clips brought higher grease prices, the graded clips realized higher clean values.

4. Other results of the sealed-bid sale follow:
   a. Between 80 and 90 percent of the lots offered were sold at highest prices bid.
   b. Twenty different firms submitted bids on the wools offered. Of these 10 were wool dealers, 9 were topmakers, and 1 was a worsted spinner.
   c. The nine topmakers submitted the highest bids on 99.8 percent of the wools offered for sale; the wool dealers submitted the highest bid on only 0.2 percent (1 lot) of the wools offered.
   d. The highest bids made by the wool dealers were on an average 8.01c per grease pound BELOW highest bids made by the manufacturers on the same lots.
   e. The range of bids on the UNCORED lots was 1.88c per grease pound greater than the range of bids on the CORED lots (7.92c vs. 6.04c.)
f. On an average, the CORED lots sold for 1.59c per clean pound more than the UNCORED lots (138.25c vs. 136.66c).
g. For a total of 17 core-tested lots, the buyers' estimates of shrinkage were obtained. Core shrinkage for each lot was printed in the official catalog of the wools offered in the sealed-bid sale. For 4 of these 17 lots the buyers' estimates of shrinkage were identical with core shrinkage. For the remaining 13 lots the buyers' estimates were all greater than the core shrinkage by range of 0.1 percent to 2.8 percent. On an average the buyer's estimate of shrinkage was 0.81 percent greater than the core shrinkage. (It seems strange indeed that wool buyers' estimates are very close to the core shrinkages when they are aware of the core shrinkage before they make their estimate. If they do not know the core shrinkages their estimates tend to cover a comparatively wide range.)

5. Opinions concerning preparation of the five experimental clips were obtained from the three manufacturers who bought the bulk of these clips at the sealed-bid sale. Their opinions are summarized as follow:
   a. The wools were "put up beautifully." In other words, degree of preparation of these wools was entirely satisfactory.
   b. The grower should grade his wool before selling but he should not skirt the fleeces.
   c. Tage and Stained wools should be removed from the fleeces.
   d. Clips were graded into too many lines.
   e. The second largest buyer of these experimental wools stated, "The nearer the preparation can approach the Australian system the better. This (the experiment) is a step in the right direction."
   f. The third largest buyer stated that growers should be entitled to 8 to 10c per pound, clean basis, more for graded and skirted wool than for Original-bag wool; and that nearly all wool should be graded before sale.

6. Studies were made in the wool laboratory of qualities and staple lengths within each grade. Conclusions reached were as follow:
   a. There was definite tendency for graders to grade on the Fine side for grades of ½ Blood and coarser.
   b. Yearling wools were graded finer than ewe wools.
   c. Level of fineness was maintained within each grade throughout the grading period.
   d. The shorter grades (French Combing, Clothing) were found to be finer in fiber diameter than the longer-stapled grades.
e. The length grades made by different graders were very similar and were maintained throughout the grading period.

f. In general, the staple lengths were longer than the accepted requirements for the respective grades.

WYOMING, 1950

In the 1950 shearing season 448,378 pounds of grease wool from six major clips in Southern Wyoming was used. In this year, fleece preparation was simplified considerably at the shearing pens.

The clips were prepared by (a) separating the Tags and Stained wools from the fleeces on the shearing floor, then (b) tying the fleeces on the floor, and finally (c) grading the fleeces on a table placed at one end of the shearing shed. The Tags and Stained were swept into bushel baskets and periodically inspected and emptied into the Tags-and-stained bin. Any locks found during inspection were graded and thrown into the appropriate fleece grade. This method was applied to the Walcott clips (Nos. 1, 2, and 3) in 1950 and found to be perfectly satisfactory when done correctly. Type of labor was fairly reliable although a certain amount of supervision was necessary.

Clip No. 8 was sheared and prepared in a limited floor space. Since shearing took place very early in the season for Wyoming (April 12 to 16), there were few heavy tags in these fleeces.

It was decided again to attempt to measure the effect of preparation in the four main clips. Accordingly, during shearing of each clip 15 bags were packed of the ungraded fleeces as they came from the floor. However, as the Tags had already been removed by the boys on the floor, they were added to the 15 bags in the form of “rings”, one or two of which were packed with the fleeces in each bag.

These 15-bag lots were considered representative of the respective clips, as several bags were packed from each band. No yearling fleeces were included in these 15-bag lots.

Before shearing started in 1950, all participating growers agreed (a) to sell their prepared wools by sealed-bid sale on the central market and (b) to scour the Tags-and-stained sort before offering it for sale. Unfortunately, these plans were not carried out because of abnormal conditions prevailing in the wool market during late spring, summer, and fall of 1950.

Five of the clips were sold on the central market and one clip was sold locally. Those on the central market were sold as separate prepared lines at various times. For this reason it was impossible to obtain
A direct comparison between prices paid for the control (15-bag) lots and prices for all remaining prepared lines in the clip.

However, comparisons which can be made will be found in the following compilation (Table 23):

**TABLE 23**

<table>
<thead>
<tr>
<th>Clip No.</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
<th>Column 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55.66c</td>
<td>52.20c</td>
<td>53.99c</td>
<td>52.21c</td>
<td>$1.95</td>
<td>$1.80</td>
</tr>
<tr>
<td>2</td>
<td>53.46c</td>
<td>55.04c</td>
<td>50.01c</td>
<td>48.35c</td>
<td>1.90</td>
<td>1.84</td>
</tr>
<tr>
<td>3</td>
<td>72.98c</td>
<td>68.09c</td>
<td>71.30c</td>
<td>67.75c</td>
<td>2.71</td>
<td>2.57</td>
</tr>
<tr>
<td>4</td>
<td>59.77c</td>
<td>58.61c</td>
<td>63.06c</td>
<td>61.36c</td>
<td>1.72</td>
<td>1.89</td>
</tr>
</tbody>
</table>

In column 2 are given the net grease prices the grower received for the 15-bag lots of unprepared wools.

In column 3 are listed the net prices for all prepared lots in each clip sold between May 29 and December 30, 1951. All lots were sold except the 3/8 Blood staple lot of clip 2, for which gross valuation of $1.00 per grease pound was established on January 6, 1951, in order to close the experiment.

Column 4 contains the net grease prices of the prepared lines sold the same day as the 15-bag lots.

Prices in column 5 are the same as in column 4 except that deductions have been made for tags. In other words, the prices in column 5 are net to the grower for graded fleeces with the Tags left in.

Listed in column 6 are the clean-basis prices received in Boston for the control lots and for the prepared lots sold on the same day. These clean values were determined by core-test shrinkages of the various lots involved.

Points of interest to be noted in the above summary are as follow:

a. Net prices received for the control lots (Column 2) were higher in three clips out of four than prices for the comparable prepared lots both with and without Tags included (columns 4 and 5).

b. For clip 7 the price for the control lot (column 2) was lower than average prices of the prepared lots both with and without
Tags (columns 4 and 5). In this case the prepared lots sold on the same day as the control lot were the Fine and $\frac{1}{2}$ Blood wools.

c. In clip 2 the prepared lot, Fine Average French Combing, sold for 3.45c a grease pound less than the control lot on the same day.

d. For clip 1 the prepared lots, Fine Staple and Good French Combing and $\frac{1}{2}$ Blood staple, sold for less than the control lot by 1.67c a grease pound on the same day.

e. For clip 3 the prepared lots, Fine Staple and Good French Combing, Fine Average French Combing and $\frac{1}{2}$ Blood Staple, sold for less than the control lot by 1.68c a grease pound on the same day.

f. On the clean basis (column 6), as determined by the core test, the control lots of three clips sold by 15c (clip 1), 6c (clip 2), and 14c, (clip 3) more than the prepared lots. However, in clip 7 the control lot sold for less than the prepared lots by 17c per pound, clean basis.

g. In column 3 will be found the grease prices per pound of all lots in each clip with exception of ram, yearling, and black lots. Also of interest are the clean prices paid by manufacturers for the control lots as contrasted to the prices paid for the prepared lots on the same day in the Boston market (Table 24):

<table>
<thead>
<tr>
<th>TABLE 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clip No.</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

It seems strange that unprepared wools with tag "rings" in the bags could have realized such high values in comparison with graded lots with the tags removed. At time of sale the handler did not have the core-test shrinkages for many of the lots and did not reveal to the buyers the core-test shrinkages which he had.

— 58 —
Original-bag Clips

Clips 6 and 8 were graded for quality and length to prove need for grading this type of clip.

Clip 6

Net returns per grease pound to the wool grower follow (Table 25):

<table>
<thead>
<tr>
<th>Prepared lot</th>
<th>Percentage of clip</th>
<th>Net price per grease lb. (cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Staple and Good French Combing</td>
<td>16.1</td>
<td>61.7</td>
</tr>
<tr>
<td>Fine Average French Combing</td>
<td>38.8</td>
<td>55.0</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>17.7</td>
<td>55.4</td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>7.5</td>
<td>63.9</td>
</tr>
<tr>
<td>½ Blood Clothing</td>
<td>5.7</td>
<td>55.9</td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>5.4</td>
<td>55.8</td>
</tr>
<tr>
<td>½ Blood Clothing</td>
<td>3.6</td>
<td>56.4</td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>2.5</td>
<td>55.8</td>
</tr>
<tr>
<td>Tags</td>
<td>2.1</td>
<td>13.6</td>
</tr>
<tr>
<td>Black wool:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Fine</td>
<td>0.2</td>
<td>37.9</td>
</tr>
<tr>
<td>(2) Medium</td>
<td>0.2</td>
<td>37.9</td>
</tr>
<tr>
<td>(3) Low</td>
<td>0.2</td>
<td>37.9</td>
</tr>
</tbody>
</table>

This clearly demonstrates the differences in prices received for the prepared lots in a clip considered to be Original-bag.

Range in price for the prepared lots, not including the black lots, was 8.9c a grease pound. It is true that not all lots were sold on the same day. Nevertheless, had the clip been sold unprepared at shearing time, a flat price would have been paid for the entire clip, with customary deductions for the Black and Tags.

Clip 8

All the main grades of this clip were sold at the ranch soon after shearing (May 10) for a flat price. The remaining lots were sold 3½ months later (August 28) for various prices. The data are as follow (Table 26):

<table>
<thead>
<tr>
<th>Prepared lot</th>
<th>Percentage of clip</th>
<th>Net price per grease lb. (cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Good French Combing and Staple</td>
<td>19.4</td>
<td></td>
</tr>
<tr>
<td>Fine Average French Combing</td>
<td>39.8</td>
<td>52.3</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>18.6</td>
<td></td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Tags</td>
<td>1.6</td>
<td>24.1</td>
</tr>
<tr>
<td>Fine Black</td>
<td>0.8</td>
<td>45.7</td>
</tr>
<tr>
<td>Fine rams</td>
<td>2.1</td>
<td>51.4</td>
</tr>
<tr>
<td>Medium rams</td>
<td>1.5</td>
<td>59.9</td>
</tr>
</tbody>
</table>
The only figures which show the differing values of the various main grades are the clean values for the lots which were core-tested for shrinkage. These data follow (Table 27):

**TABLE 27**

<table>
<thead>
<tr>
<th>Prepared lot</th>
<th>Core-test shrinkage</th>
<th>Price per pound, clean basis, at Boston, based on 52.33 cents per grease pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Good French Combing and Staple</td>
<td>64.1</td>
<td>1.57</td>
</tr>
<tr>
<td>Fine Average French Combing</td>
<td>65.8</td>
<td>1.65</td>
</tr>
<tr>
<td>Fine Clothing</td>
<td>67.9</td>
<td>1.76</td>
</tr>
<tr>
<td>½ Blood Staple</td>
<td>62.0</td>
<td>1.49</td>
</tr>
</tbody>
</table>

These figures show a spread in equivalent clean values of 27c per pound, clean basis.

Sale of this clip at the ranch for a flat price for the main grades rendered its experimental value practically nil.

**Marketing Costs**

Marketing costs per grease pound for all clips were found to be as follow (Table 28):

**TABLE 28**

<table>
<thead>
<tr>
<th>Item</th>
<th>Clip 1 (cents)</th>
<th>Clip 2 (cents)</th>
<th>Clip 3 (cents)</th>
<th>Clip 6 (cents)</th>
<th>Clip 7 (cents)</th>
<th>Clip 8* (cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total marketing charges</td>
<td>5.02</td>
<td>4.93</td>
<td>5.54</td>
<td>5.12</td>
<td>5.00</td>
<td>0.17</td>
</tr>
<tr>
<td>Grading cost</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
</tr>
<tr>
<td>Extra labor cost</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.54</td>
<td>0.54</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL MARKETING COST</td>
<td>5.89</td>
<td>5.80</td>
<td>6.41</td>
<td>6.33</td>
<td>6.21</td>
<td>0.84</td>
</tr>
</tbody>
</table>

* 94% of this clip was sold at the ranch

Marketing charges ran from 4.93c to 5.54c per pound; the grading charge was calculated to be 0.67c per pound; the extra labor cost was estimated to run from 0.20c to 0.54c per grease pound.

**Wool Measurement Studies Made of the 1948, 1949, and 1950 Clips in the Wyoming Wool-preparation Project**

During the skirting and grading process at the shearing sheds in 1948, 1949, and 1950, samples were taken for diameter and length measurement studies from the bins after the wools were graded for quality and length into their respective lots. These samples consisted of a number of individual staples taken randomly from the main grades at
2-hour intervals. However, it was not always possible to obtain samples of sufficient staple numbers of all grades made, because of lack of volume in the coarser grades and in the grades of shorter length. All staples taken for each grade of a clip each year were pooled; thus composite results by grade were obtained. In 1949, each 2-hour-interval sample was treated separately in effort to learn the variability, if any, in the grades made throughout the grading of a clip. The interval samples were then pooled in order to obtain the composite results for 1949. Interval-sample data for 1949 are not included in this report, but results obtained from them will be treated in the conclusions (page 68).

Four clips were sampled at Walcott in 1948 and three of the same clips were sampled both in 1949 and 1950. These clips are referred to in the text as clips 1, 2, 3, and 4. All the Walcott clips for the 3-year period were handled by the same grader (No. 1). In 1950, three additional clips were included in the project, two of which were from the Wamsutter area (clips 6 and 7), both being handled by the same grader (No. 2). The third clip, No. 8, was from the Medicine Bow Region and was handled by grader No. 3.

In 1949 a certain commercial grader who seemed to be qualified was employed to grade three clips in the project. The grades made by this operator were found to be so different from current trade requirements and so unacceptable to the mills that most of these lines were reclassified and several were regraded. Data derived from the original grades made by this grader have not been included in this paper because it was felt that his incompetence would have prevented his employment commercially in this capacity. Hence it was not regarded fair to the other qualified commercial graders to include the data derived from his work.

Data are now complete on all of the clips sampled during the 3-year period and are included in this report.

**Diameter and Spinning-count Studies**

Fiber fineness measurements were made by the wedge short-fiber method. These measurements were compared with existing fineness standards for wool top instituted by the American Society for Testing Materials (A.S.T.M. Designation D 472-47T).

**Stretched-staple-length Studies**

Length of staple of all samples was measured on a stretched basis to the nearest millimeter. The stretched-length standards used were
those adopted from C.C.C. requirements and used for instructional purposes at the University of Wyoming (Table 29).

<table>
<thead>
<tr>
<th>Grade</th>
<th>Staple (mm)</th>
<th>French Combing (mm)</th>
<th>Clothing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>63.5 and over</td>
<td>63.4 to 38.2</td>
<td>38.1 and below</td>
</tr>
<tr>
<td>½ Blood</td>
<td>69.9 and over</td>
<td>69.8 to 44.6</td>
<td>44.5 and below</td>
</tr>
<tr>
<td>¾ Blood</td>
<td>76.2 and over</td>
<td></td>
<td>Below 76.2</td>
</tr>
<tr>
<td>¼ Blood</td>
<td>88.9 and over</td>
<td></td>
<td>Below 88.9</td>
</tr>
<tr>
<td>Low ¼ Blood</td>
<td>101.6 and over</td>
<td></td>
<td>Below 101.6</td>
</tr>
<tr>
<td>Common and Braid</td>
<td>101.6 and over</td>
<td></td>
<td>Below 101.6</td>
</tr>
</tbody>
</table>

General conclusions drawn from these fiber-measurement studies follow:

A. In general, the diameter measurements of the visual grades for ewe and ram wools corresponded favorably to the A.S.T.M. classification based on fiber diameter. However, the ewe lots of ½ Blood and coarser handled by one grader measured out to be on the Fine side of the grade.

B. Diameter measurements on the yearling wools showed marked tendency for the visual-estimate grade for fineness to be coarser than the micron limits of the standards. This was especially true in the lots of ½ Blood and coarser.

C. There were differences between clip grades of fineness according to the measurements. These differences may be due to difference in wool type between clips, however, rather than to difference in the graders' fineness requirements.

D. The visual estimate for grade of fineness and grade length was relatively consistent from time to time throughout the grading period of a clip for all graders in 1949; i.e., once the grader had started his lines and had wool in the bins as a guide, his grades varied little.

E. The shorter grades Fine Clothing, Fine French Combing, and ½ Blood Clothing showed tendency to be finer than the staple wools of these grades.

F. As the grades increased in fiber diameter, variability (C.V.) also generally increased.

G. There were a few small differences in the visual estimates for grade length between graders when based on the measured length.

H. The staple lengths between years for the same clips corresponded closely for the 3-year period.
1. Little difference was noted between the ewe and yearling grade lengths by clip for the various visual grades, although the yearling wools were generally shorter than the ewe wools. The yearling ewes were 11 months of age when shorn.

J. All clips included in the study were accepted as prepared at shearing shed by the trade, except the grades made in three clips by the incompetent grader as noted above. These wools were regraded before they were offered for sale.

Variables with which one is confronted in pursuing a study between graders, clips, and years and within clips, and which produce difficulties, are as follow:

1. Lack of scoured-wool micron-limit standards.
2. Lack of objective tests for attributes (type, color, etc.) other than fineness and length which influence the grader's judgment.
3. Difficulty involved in securing sufficient number of graders at one time to work alternately on the same clips.
4. Difficulty of switching graders around so that they could work alternately on the same clips. Large distances between clips and the relatively short shearing period are limiting factors.
5. Difficulty of obtaining the same graders over a period of three or four years.
6. Uncontrollable changes in market demands which may influence the grader between years.
7. Lack of a sufficiently accurate and practical laboratory method for determining wool fineness. The micron limits within some counts are so narrow that expedient laboratory fineness techniques allow overlapping which, along with sampling errors, obscures grading differences.
8. Difficulty in securing a representative sample in the grades of shorter length due to insufficient volume. Then, too, when staples are taken one is not dealing with units of the population which are, in reality, whole fleeces.
9. Inconsistency of making up lines for various clips. Some clips require more lines than others since they have different percentage compositions by grade. With these differences there are always one or two "catch-what-is-left-over" lots and it most likely will not be the same lots for every clip.
INTRODUCTION

RM:c Project No. 93, "Improved Preparation of Wool Clips at Ranches, Concentration Points, and Warehouses and Processing of Experimental Lots", was initiated early in 1948. Objectives were to determine (1) economic advantages of various methods of preparing the domestic wool clip for market; (2) advantage to growers of marketing wool in some processed form; and (3) economic feasibility of selling woolen-type wools, Tags, and off-sorts in a scoured state.

GENERAL PLAN OF WORK

Arrangements were made for cooperation with representative wool growers through 9 western state experiment stations which, in 1947, had initiated a regional wool-marketing research project, WM-5. P.M.A. agreed to provide technical help for the grading, to core-test the graded lots for shrinkage determination, and to obtain information from buyers regarding acceptability of the preparation work. The respective experiment stations agreed to arrange for cooperation of representative growers and to keep all necessary records.

1948 PROGRAM AND RESULTS

Cooperative work covered grading and skirting of two clips in Idaho, two in Oregon, and one in Montana. Two clips were skirted by the shearers at cost of 5c per fleece. The other clips were skirted on the grading table. The Oregon Experiment Station had developed a memorandum of understanding with cooperating growers and with a Portland handler, covering the various phases of the preparation and marketing program. The same handler also had agreed to receive and market the Idaho wools. One phase of the program was for this handler to combine any identical lots from each of the clips, if this appeared expedient. Since the fine grades of wool were in good demand at that time, the Fine and Half-Blood wools from the four clips were combined for sale in the open market.

One complicating problem in carrying out the marketing research in 1948 was that wool prices in the spring and early summer were such
that for certain grades and qualities they were below the Government price-support level. Consequently, determination of economic feasibility of improved preparation could not be made for those grades sold to the Commodity Credit Corporation, since not only wool prices but preparation premiums were established by the Government. For example, in that year premiums ranging from 7c per clean pound for 60's and finer to 5c per pound for 46's and coarser were paid for skirting. Another complicating factor in 1948 was that the clips involved in the program were too small to provide check lots of Original-bag wool. Moreover, with such small clips the individual graded piles necessarily were quite small.

No specific determination of returns from superior preparation was possible even for the Fine and 1/2 Blood wools sold in the open market. However, the handler estimated a net gain of 1c per grease pound for the preparation work done on these wools. For the wools sold to the C.C.C., it was estimated that a net gain of approximately 1c per grease pound would have resulted if the grading, skirting, and other preparation work had been paid for at commercial rates. This gain is based upon sale of Tags and off-sorts in the grease. Actually, these items were scoured before sale to C.C.C. with an estimated gain on this operation of approximately 15c per grease pound.

The Montana clip was consigned to a local handler. No data were obtained regarding returns from improved preparation, partly because check lots were not made available and also because of the highly fluctuating market prices over the period when the wools were sold.

**1949 PROGRAM AND RESULTS**

It was agreed by the cooperating experiment stations and the P.M.A. that no skirting of fleeces would be undertaken in 1949, since any premiums involved already were determined if the wools might be sold to the C.C.C. It also was agreed that only growers who had adequate facilities for grading would be accepted as cooperators and that check lots to be sold as Original-bag wool would be provided for each clip.

On basis of the plans made, P.M.A. participated in the grading of seven clips in Oregon, two each in Idaho, Utah, and Wyoming, and one each in Colorado and California.

Results of the work in 1949 fell short of expectations, primarily because the wool market became quite active in late summer and early fall, in consequence of which some of the cooperating growers failed to carry through the marketing of their clip on basis of the understanding originally developed by the state experiment stations. One grower
sold his clip before the grading was completed and another sold both the graded and ungraded portion at a flat price per grease pound, even before results of the core tests were available. In the case of some clips, the handlers did not cooperate and as a result only fragmentary information was obtained. Complete data were obtained for several clips with respect to cost of ranch grading, and some information was obtained on quality of work done and acceptability of ranch grading by manufacturers. Costs varied from 1/3c to slightly less than 1c per grease pound, with an average of approximately 1/2c. This covers all extra charges involved in grading, including $20 per day* for the grader. However, it does not include travel expenses for the grader from his station to the ranch.

Sales data were obtained for only a few of the clips, and since most of these were small, no check lots had been provided. Hence returns from extra preparation could not be determined. Two of the clips were sold at a sealed-bid sale in Boston along with 16 other clips. Even in this case, however, exact comparative data could not be obtained, since adequate and accurate information on clean yield and relative quality of the various wools could not be determined.

Some of the mills which acquired the graded wools were interviewed and in all cases it was apparent that the quality of the grading work on ranches was quite satisfactory. However, in the case of two clips, a question had been raised by one prospective buyer regarding quality of the work done. As a result portions of the clips were regraded in a Boston warehouse. It is not at all certain that this regrading was necessarily due to poor quality of the ranch grading. It is quite possible that the buyer found the wools too fine for his particular needs. Another buyer may have found the grades made quite satisfactory. The question of market price obtainable is another matter.

Scouring of Tags and off-sorts from some of the graded clips resulted in net gain to growers. In one case, this gain was reported to be 3c per grease pound for Tags, 26c for Crutchings, and 25c for Bellies.

1950 PROGRAM AND RESULTS

Cooperative work in 1950 was confined to one clip each in Colorado, New Mexico, and Wyoming, three in Utah, and seven in Oregon. In Colorado, two quite similar clips were involved in the program, but since both were fairly small, one was graded on the ranch and the other was used as a check lot. The ungraded clip was sold for 73c per grease pound, while the graded wool brought 72c per pound. On clean basis

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* This figure was used in calculating grading costs for all clips in 1949 and 1950.
the graded clip brought $1.33 and the ungraded $1.23 per pound.

Direct comparison of returns between graded and ungraded clips in Oregon was not possible since the lots were too small. However, comparison made with Original-bag clips, said to be of similar quality, indicated a net return from grading amounting to 2.7c to 4.9c per grease pound. The Tags and Crutchings were sold as scoured wool at an estimated net gain of approximately 10c per grease pound for these items.

Results in New Mexico indicated an average net gain of $\frac{1}{2}c$ to $2\frac{1}{2}c$ per grease pound from grading fine-wool clips for length.

The Utah wools were sold to one manufacturer at a flat price per grease pound, including the check lots.

The approximate gain to Montana growers from selling one carload of Tags and off-sorts as scoured wool was estimated at 10c per grease pound.
SUMMARY AND CONCLUSIONS

The following conclusions from the marketing research work in 1948 to 1950, inclusive, can be drawn: (1) Ranch grading can be done cheaply and effectively if proper facilities are available. (2) Determination of net returns to growers from improved preparation on ranches is very difficult to make in absence of control over the wool from time of shearing until time of sale. (3) Ranch grading and skirting is of considerable educational value to the growers involved since they become acquainted with grades and comparative values of their clips. (4) Ranch grading offers opportunity for the flock owner to do more effective culling. (5) A more merchantable product is obtained if the clip is well prepared, although the experiments did not provide data to show the financial gains which might accrue. (6) Tags and off-sorts can be separated readily on the ranch at time of grading and, since these portions of the clip always have been subjected to the heaviest discounts, it appears to be advantageous to market them in some processed form. (7) Many growers do not have proper facilities, such as bins, adequate lighting, good floor, and grading tables to do a creditable skirting and grading job and for blending the wools properly. (8) Weather is a hazard in ranch preparation of clips; if the crew is idle for several days, this has material influence on operating costs, especially if the grader and helpers are paid by the day and if board is furnished free. (9) It is of doubtful value to skirt and grade small clips, since the individual grades or lots become too small to be of interest to most buyers. (10) Crossbred clips probably should be graded before sale whenever the quantity of wool is sufficient to establish adequate selling lines. (11) Black wool sheep should be shorn last and efforts made to keep all Black and Grey as well as Stained fibers out of the main lines. (12) Mills generally prefer the skirting done on a grading table by an experienced operator, rather than by a shearing crew. (13) Cooperation from handlers of the experimental clips is essential if the research program is to be successful. (14) Determination of comparative returns from different clips and from different methods of preparation can only be as accurate as the visual estimates of relative quality of the wools involved.