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DIFFERENCE IN WEIGHT BETWEEN RAW AND CLEAN WOOLS ⁴

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1. PURPOSE OF THE INVESTIGATION ³¹

This investigation was made (1) to obtain some definite knowledge as to the shrinkage of some of the foreign raw wools imported into this country, (2) to ascertain the shrinkage variation in two samplings of the same fleece, and (3) the difference in shrinkage between two fleeces of the same breed of sheep which were grown in the same section of country. Raw wool may contain from 15 to 80 per cent of grease and dirt, according to the breed of the sheep from which it is shorn, the kind of food upon which the sheep has lived, character of the country with reference to grass, sand storms, climatic conditions, and many other causes. The knowledge of the shrinkage is an important factor in purchasing, as it affects the price to be paid and the quantity of clean wool to be expected after scouring.

2. MEANING OF THE TERM "SHRINKAGE" ³⁴

The term "shrinkage," as used in this paper means the total loss, by weight, of all grease and dirt taken out when the wool is scoured.

3. SOURCE OF MATERIALS ⁷

The fleeces employed in this investigation were secured from the Departments of Agriculture of ¹ South Australia and New Zealand through the courtesy of the Commercial Museum of Philadelphia.

¹ The wool was selected by the School of Mines wool expert in the ordinary commercial way, is representative of the staple, and is in nowise to be regarded as an exhibit of the State's best wools, the fleeces being taken from bulk and packed without any further handling.

4. METHOD OF SAMPLING FLEECES^{v9}

Entire fleeces were not tested, but large handfuls of wool were selected from 10 different parts of each. The samples thus obtained were drawn from parts well distributed over the whole fleece (not including the skirts) and therefore gave the average. Then one-half of each handful was placed together as one sample and is designated as "A" and the remaining portion of the sample marked "B" and held for further reference.

5. METHOD EMPLOYED IN EXTRACTING THE WOOL GREASE AND DIRT

The extraction of the grease was accomplished by scouring in warm water containing pure olive-oil soap, thoroughly washing out the soap, and then extracting the remnant grease with ether. The loss in weight of the original raw wool by these processes is therefore called the shrinkage and the pure wool fiber remains.

6. WEIGHINGS^v

All determinations of weight, both upon the raw and thoroughly cleaned samples of wool were made in an atmosphere of 65 per cent relative humidity at 70° F temperature.

7. COMMERCIAL PRACTICES^{v3}

The usual method of determining shrinkage is for expert buyers to estimate by the appearance and the feeling. In commercial scouring there remains between 1 and 3 per cent of the wool grease; therefore, to arrive at the shrinkage which would obtain in ordinary mill practice from 1 to 3 per cent must be subtracted from the shrinkage results shown in the tables of this paper.

8. SUMMARY OF RESULTS^{v1}

1. The 49 fleeces herein described were carefully sampled and thoroughly cleansed of all grease and dirt, the results showing shrinkages from 19.5 to 54 per cent, according to the breed of sheep.

2. In the South Australian wools the greatest shrinkage difference between two determinations upon samples drawn in the same manner from the same fleece was 3 per cent, while for the New Zealand wools the largest difference was 6 per cent. These differences were calculated on the basis of raw-wool weight. This percentage variation within individual fleeces seems large, especially when the sampling was performed as described in the begin-

ning of this article. If a sample had been drawn from one part of the fleece and another had been drawn from an entirely different place, greater percentage variations would undoubtedly have occurred.

3. The difference in shrinkage between two fleeces of the same breed of sheep grown in the same location was found to be as great as 9.5 per cent. The results of such tests upon 13 different breeds of sheep showed a mean variation of 4.5 per cent in the shrinkage.

TABLE 1

Weight of Fleece, Shrinkage, and the Percentage of Difference Between the Two Samples A and B Selected From the Same Fleece

SOUTH AUSTRALIAN WOOLS

Class of sheep	Weight of fleece	Percentage shrinkage			Percentage shrinkage of fleece
		Sample A	Sample B	Difference	
	Pounds				
Lincoln merino come back.....	8.0	45	45	0	45
Lincoln merino half-bred.....	11.4	46	44	2	45
Leicester merino half-bred.....	6.4	40	40	0	40
Medium merino.....	8.4	40	40	0	40
Strong merino.....	10.6	38	39	1	38.5
Lincoln merino half-bred.....	7.8	38	38	0	38
Leicester merino half-bred.....	7.3	37	37	0	37
Fine merino.....	6.8	36	36	0	36
Medium merino.....	6.0	34	36	2	35
Lincoln merino come back.....	5.1	33	34	1	33.5
Strong merino.....	6.3	33	33	0	33
Fine merino.....	5.3	33	33	0	33
Romney merino half-bred.....	5.8	31	31	0	31
Lincoln full-blood.....	12.1	30	30	0	30
Romney marsh pure.....	8.1	27	28	1	27.5
Leicester full-blood.....	9.8	28	27	1	27.5
Romney merino half-bred.....	5.5	26	27	1	26.5
Leicester full-blood.....	11.6	26	26	0	26
Romney marsh (pure).....	7.1	23	22	1	22.5
Lincoln full-blood.....	13.3	19	22	3	19.5

TABLE 1—Continued
NEW ZEALAND WOOLS

Class of sheep	Weight of fleece	Percentage shrinkage			Percentage shrinkage of fleece
		Sample A	Sample B	Difference	
	Pounds				
Merino ewe 64's.....	9.6	53	55	2	54
Strong combing merino ewe 60's.....	9.6	51	51	0	51
Strong combing merino ewe 60's.....	8.7	51	49	2	50
Half-bred hogget 50's.....	11.8	49	48	1	48.5
Fine combing merino ewe 64's.....	8.7	48	47	1	47.5
Fine combing merino ewe 64's.....	8.4	46	46	0	46
Romney hogget ewe 44's.....	13.1	47	43	4	45
Corriedale ewe 50's.....	11.9	39	39	0	39
Three-quarter bred hogget 46's.....	*5.6	37	37	0	37
Lincoln ewe 48's.....	15.0	36	34	0	35
Half-bred ewe hogget deep 56's.....	8.2	34	35	1	34.5
Three-quarter bred hogget.....	6.3	35	33	2	34
Romney ewe 46's.....	7.5	32	34	2	33
Half-bred ewe 50's.....	*12.1	32	32	0	32
Romney hogget 46's.....	12.1	28	33	5	30.5
Cross-bred ewe 40's.....	10.0	29	31	2	30
Corriedale hogget 50's.....	13.6	33	27	6	30
Romney ewe 44's.....	16.4	28	28	0	28
Half-bred hogget 56's.....	*10.5	28	28	0	28
Cross-bred hogget 46's.....	*8.0	31	25	6	28
Cross-bred Romney Lincoln ewe 48's.....	7.0	27	28	1	27.5
Cross-bred Romney Lincoln lamb medium 46's.....	2.2	28	26	2	27
Romney ewe 46's.....	12.1	25	26	1	25.5
Cross-bred ewe 46's.....	5.1	24	24	0	24
Cross-bred hogget 44's.....	*10.0	24	24	0	24
Cross-bred Romney Lincoln lamb (strong) 40's.....	2.0	21	22	1	21.5
Half-bred ewe 50's.....	5.7	22	20	2	21
Cross-bred Romney Lincoln lamb (fine) 48's.....	1.9	20	21	1	20.5
Lincoln ewe 36's.....	15.7	21	18	3	19.5

NOTE.—The figures marked with an asterisk (*) denote fleeces which were skirted.

The data in Table 2 are given to show that two fleeces of the same breed of sheep may have a marked difference in shrinkage. This difference in the random samples recorded in the table reached as high as 9.5 per cent. Each fleece was in good condition, was not selected to give wide variations of shrinkage, but simply chosen at random to ascertain whether appreciable differences occurred.

TABLE 2

Variations in Shrinkage in the Same Breed of Sheep

Table of Shrinkages of Two Fleeces Each of 13 Breeds of Sheep Showing that Fleeces Selected at Random May Exhibit a Wide Variation in Shrinkage Even in the Same Breed

Class of sheep	Percentage shrinkage			Average shrinkage of both fleeces
	First fleece	Second fleece	Difference	
Strong combing merino ewe	51	50	1.0	Per cent 50.50
Fine combing merino ewe.....	47.5	46	1.5	46.75
Lincoln merino half-bred.....	45	38	7.0	41.50
Leicester merino half-bred.....	40	37	3.0	38.50
Medium merino.....	40	35	5.0	37.50
Strong merino.....	38.5	33	5.5	35.75
Fine merino.....	36	33	3.0	34.50
Cross-bred Romney Lincoln ewe.....	35	27.5	7.5	31.25
Romney merino half-bred.....	31	26.5	4.5	28.75
Romney ewe.....	31	25.5	6.5	28.25
Leicester full-blood.....	27.5	26	1.5	26.75
Lincoln full-blood.....	30	20.5	9.5	25.25
Romney marsh (pure).....	27.5	22.5	5.0	25.00

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