

Canterbury :—

- (1) Breeding experiments to ascertain relation between birth-coat of lambs and subsequent fleece-characters.
- (2) Experimental feeding trials.

Details of the work and of the progress made to date are set forth in the extracts from reports prepared by the Directors of both Colleges.

Reviewing the situation as a whole, very satisfactory progress has been made. Continual contact with the breed on which we are working has given us a very fair appreciation of the existing state of affairs, the general practice in the matters of culling for wool and mating, the extent to which faulty wools occur, and more particularly the relative importance of the various faulty types. The systematic examination of Romney wool which has been in progress has already shown an even greater variation both in structure and yolk content than might have been expected, and a degree of complexity which it will take some considerable time to unravel. The progress already made, however, promises well. Dr. Dry is following very closely the development of the fleeces of a large number of stud lambs of parents whose wool has been critically examined as to type and faults. The close observation throughout their lives of the fleeces of these animals carrying sound wool, particularly if combined with differential treatment, should give valuable information of the extent to which wool may be influenced structurally, if at all, by factors other than heredity. The more immediate application of this particular work will be an indication of the extent to which lambs can be culled at an early age—for example, ram lambs at docking. The breeding experiments in hand, which are analytical rather than synthetical, in so far as wool-characters are concerned, though slow, will throw some light in the course of time on the inheritance of the individual characters chosen for study. With the completion of work on technique and methods which is also in hand, several other promising lines of attack can then be commenced.

The main problem which is being kept steadily in mind is, of course, an explanation of the appearance of wool of various degrees of medullation, and the various experiments of a biological nature all converge on this point.

The work of Messrs. Scrivener and Sutton has been confined very largely to the development of technique. The necessity for this will be apparent, since the problem of yolk is being tackled from an entirely new angle—its relationship to fibre-type and the management of the sheep. The work of Dr. Dry will fit in well with this investigation, since it would seem that at least the finer stages of this work must carefully take into account, when selecting animals for use, the wool-types which Dr. Dry is segregating. The results obtained so far are very interesting, and in some cases distinctly surprising. They indicate the importance of investigating this quite unknown field and of possessing a more complete knowledge of the fundamentals of wool-production.

Chemical investigations commenced into the nature of wool-yolk had, in the absence of references to previous work done elsewhere, to be along entirely new and original lines. Other investigations are reported to have given no indication as to the conditions under which the wool was grown. No record could be found in the literature on wool investigation as to whether yolk can influence type and quality of the fibre, or whether the amount and nature of yolk is merely incidental to the production on the animal of a certain type of fibre. The fact that a flock of sheep of a suitable nature was available at the College has rendered the inauguration of such an investigation obvious and possible. The question of proper sampling of wool, which is absolutely fundamental to any course of investigation, still needs further work before entirely reliable results can be assured. For the purposes of these investigations it was decided, after giving careful consideration to all information available, to take samples of wool from the middle of the side. There are two outstanding points which have real significance in this sampling—(1) the correspondence between producing sheep at the same time, and (2) the reliability of wool from the side as a sufficient indication of the condition of the whole fleece of the Romney.

Yolk or wool-grease consists of two main groups of substances—(a) the more complex organic compounds of the nature of wax, which are soluble in ether, and (b) the constituents of an inorganic nature, such as potash salts, which are insoluble in ether but soluble in hot water. This immediately suggested a means of detecting major differences in the composition of samples of yolk from different sources. This method had previously been used by Wilson (*Journal of Textile Science*, December, 1926), who divided raw wool into the following constituents: clean fibre, wool-fat, potash salts, soil, and moisture. On trial the apparatus described by Wilson was not found to be suitable for our purpose, but with slight modifications of the practical details this method of examination of wool has been used in all our experiments. In order to avoid confusion due to different definitions of such terms as “wool-fat,” “suint,” &c., we propose to use the following terms:—

Moisture: Loss in weight when wool is dried at 105° C.

Ether extract: That portion of the dried greasy wool soluble in dry ether.

Water extract: That portion of ether-treated wool soluble in hot water.

Insoluble matter: All impurities remaining after treatment with ether and water.

Clean fibre: Wool previously extracted with ether and water, from which all remaining impurities are removed by further scouring with hot water and hand picking.

On reaching this decision samples were accordingly taken from four Romney fleeces showing as wide differences as possible in yolk content, as determined by handling and visual observation. These were subjected to the above treatment, with the following results:—

Description of Sample.	Moisture.	Ether Extract.	Water Extract.	Insoluble Matter.	Clean Fibre.	Total "Yolk."	Total.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
1. Harsh and dry ram's fleece, 40's	14.43	6.43	5.69	4.54	63.77	12.12	99.86
2. Dry, ewe's fleece, 46's	14.60	8.46	8.39	4.54	63.75	16.85	99.74
3. Heavy-condition ram's fleece, 40's	16.13	4.10	7.18	2.45	69.79	11.28	99.65
4. Heavy-condition ewe's fleece, 46's	16.74	8.11	13.80	5.17	54.54	21.91	98.36