

particular sheep was at the four successive samplings 8.5, 5.8, 11.1, 10.9. It is doubtful, therefore, if much reliance can be placed on the above general conclusions. This serves to emphasize the necessity for taking a large number of sheep over a long period of time in order to eliminate these individual variations.

The figures obtained are being subjected to statistical treatment as far as possible to determine to what extent they may be taken as being significant, but we are not yet in a position to present a critical report of the result.

Since commencing the above experiment eight further sheep have been included, bringing the total number up to forty-eight.

From the results of analysis of samples up to shearing-time it cannot be concluded that the only effect of covering is to prevent washing-out of yolk by rain. It may be argued that covering produces abnormal conditions of yolk or sweat production. In order to test this point, and since the best method of protecting the fleece from the weather without producing an abnormal flow of yolk must be determined before any further work can be undertaken, a second experiment was designed. Forty more sheep were selected from the same line of 300 two-tooths, conforming as closely as possible to a definite type. Samples of the wool were taken from each sheep in January. Twenty of these sheep were then covered, and the whole forty are being run together. All these animals are run into the wool-shed at nights, and also, in the event of rain, during the day. While in the shed they are provided with bedding, hay, turnips, and water, so that if it is necessary to keep them in for several days their condition should not suffer. In this way the uncovered sheep are as effectively protected from the weather as the covered sheep, the only variable factor being the temperature effect or other abnormality due to wearing a cover. This treatment will be continued until the end of April, when further samples will be taken and the effect thus measured.

By means of these two experiments, three methods of treatment can be compared, viz. :—

- (a) Uncovered sheep exposed to weather.
- (b) Uncovered sheep sheltered during rain.
- (c) Covered sheep.

This experiment will also furnish valuable information on the type of distribution of figures within an even line of forty similar sheep.

Thus eighty-eight sheep are under close observation on the College farm. To date some 200 samples have been analysed, and 350 further samples will be dealt with before the experiments are concluded.

The main conclusion to be drawn from the work done so far, both here and in other centres, is that the most important need is for more accurate information of a fundamental character concerning the production and distribution of yolk in the fleece. To attempt to build up any schemes for more extended work without first clearing up these fundamental points would be waste of time.

The development of the biological side of wool research will provide knowledge of precise scientific methods of measuring the characters of the wool-fibre, and if at the same time definite knowledge concerning yolk (for which service we have splendid facilities) can be provided, the way would be paved for a great deal of work which would prove of the greatest assistance to the industry as a whole. Though from the nature of the work, including as it does so many uncontrollable biological factors, the results so far are not able to yield reliable conclusions, yet the gradual but definite progress made has convinced us that the field is a fertile one and capable of profitable development. Such development must be slow with painstaking attention to detail.

It is not easy to prophesy what turn the development of the work will take, but it is apparent that out of the present experiments will arise points for further trial and suggestive lines of attack on the major problem. There are, in addition, several investigations which have seemed of the first importance, involving the use of some of Dr. Dry's experimental breeding-flocks, for instance—

- (1) Differences in yolk characteristics in the various well-defined types of Romney fleece.
- (2) Correlation of yolk characteristics with presence of sweat and sebaceous glands.
- (3) Seasonal changes in yolk content in different well-defined types.
- (4) Distribution of yolk in different parts of the fleece.
- (5) Lateral flow of yolk.

It is anticipated that future work will not necessitate such frequent samplings in all cases, and this will enable more animals to be kept under observation.

It will be realized that the practical difficulties associated with the continuous covering of sheep are not inconsiderable, especially as the animals in the original experiment are being kept under conditions of ordinary farming practice. From the experience gained considerable improvements have been made in the design of the covers and in the methods of securing the covers both before and after shearing. The covers were made of a light material in order to inconvenience the sheep as little as possible, and the material naturally suffers with continual exposure to the weather all the year round. Replacements and repairs have been frequently necessary, but it is anticipated that with the experience gained the cost of maintenance of the covers will be considerably reduced.

BIOLOGICAL WORK.

The problems involved in the biological work on wool have been discussed at Wool Research Committee meetings and a scheme of work has been finalized. After a preliminary survey of the situation, certain lines of study were decided upon as foundation work upon which future advances in a number of directions could be based. The present report is a general statement of progress to date. The report deals largely in generalizations of a preliminary nature, for often the material—the wool, for instance, on the 1929 crop of lambs—has not reached a suitable stage for evaluation for certain