

(d) *Payment for Milk for Cheesemaking* (Dr. F. H. McDowall).—The full report of the investigations on the cheese yielding capacity of milk and its relation to the method of payment for milk for cheesemaking has now been published. The report contains a review of all the various systems of payment for milk; a study of the factors affecting yield of cheese, including butterfat and casein losses in the whey; a comparison of the cheese-yield data published by other workers with the data presented in the report; and a general discussion of the suitability of a system of payment for milk for cheesemaking based on its cheese yielding capacity, with and without the application of a deduction of $\frac{1}{4}$ d. per gallon of milk to correct for variations in the cost of manufacture of cheese from milks of different compositions. The "costed cheese" system of payment was used in three factories during the 1935-36 season, and by one factory during the 1936-37 season. The method was found to work satisfactorily. In addition, during the 1935-36 season, in co-operation with the directorates and managers of some seventeen cheese factories, an extensive trial was undertaken to study the application and implications of the system over a wide range of conditions. This trial yielded valuable information on the extent of underpayment and overpayment on the present butterfat system of payment. The proportion of the payout requiring redistribution among suppliers was surprisingly small, but in a number of factories the underpayment for the most part fell on a few individuals of the panel suppliers, and in these cases the degree of underpayment was very appreciable. In one factory on the present butterfat basis a supplier was underpaid to the extent of £136, or 13·8 per cent. of his gross receipts. From the point of view of this supplier the butterfat system cannot be regarded as satisfactory, although for the factory as a whole the total amount of redistribution of payout amounted to only £273, or 0·83 per cent. of the total payout.

(e) *Milk Supplies to Cheese Factories* (Dr. F. H. McDowall).—The steady decrease in average annual yields of cheese per pound of fat at many factories, due to the rise in average fat content of the milk-supplies, presents a problem of considerable importance. Hitherto, on the butterfat system of payment for milk for cheesemaking, emphasis has been laid on the production of butterfat instead of the production of cheese, and breeding has been directed wholly towards high butterfat production. Cows at present in dairy herds may be regarded as the result of the adoption of this system of breeding. During the past year a study has been made of the average annual cheese yielding capacity of cows. From certificate-of-record summaries of milk yields and composition, both in New Zealand and in America, and from figures compiled by Mr. A. H. Ward, of the Herd Recording Department of the Dairy Produce Board, the average annual cheese production of cows of different breeds has been related to the percentage of fat in their milk. The results indicate that with the cows at present available, the high-testing cow within a breed produces, on the average, as much or possibly somewhat more, cheese per cow than does the low-testing cow within that breed. The basis of breeding of cows for cheese production requires an extensive investigation from the standpoint of genetics. An inquiry into the possibility of breeding for high casein production as well as for high fat production is particularly desirable.

(f) *Effect of added Water in Milk on the Yield of Cheese* (Dr. F. H. McDowall).—An investigation of the effect of added water in milk, in proportions as high as 20 per cent., has confirmed previous conclusions that the addition of water to normal milk does not affect the yield of cheese obtained. The quality of cheese, however, made from watered milk is lowered. Moreover, adulteration of milk for cheesemaking with added water causes increased costs of manufacture and danger of contamination through use of water of inferior quality. Thus factory managers and directorates are justified in exercising a stringent control over their milk supplies.

BUTTERMAKING INVESTIGATIONS.

(a) *Feed-taint Investigations* (I. L. Campbell and others).—The investigation of feed flavour in cream was continued during the 1936-37 season with six stall-fed and twelve grazing cows. As in the previous seasons, the work was carried out in collaboration with the staff of the Grasslands Division of the Plant Research Bureau. White clover, subterranean clover, perennial rye-grass, and Italian rye-grass were individually fed to the indoor cows from September till November in order to determine the extent, if any, to which these pasture species exert an influence on the flavour of milk and cream. Subsequently an attempt was made to define the percentage of white clover that may be safely included in a daily ration of perennial rye-grass and white clover without causing a clover taint in cream produced by cows so fed. The indoor group of cows was turned out to pasture at intervals to determine whether confinement of the animals to stalls exerted any effect on the experimental results.

The "outdoor" group of cows was first grazed in lots of three on swards of pure perennial rye-grass, perennial rye-grass and white clover, Italian rye-grass, and Italian rye-grass and red clover, in order to determine the influence of these grasses and mixtures of grasses and clovers on the flavour and composition of milk of animals grazing on them. Arrangements were thereafter made to study the influence on the flavour and production of milk of moving animals, at least four hours prior to milking, from tainting to non-tainting feeds and from abundant feed to bare pasture.

Results: The species trials confirmed the conclusions drawn from previous work—namely, that white clover, subterranean clover, and broad red clover all produce taint in cream, while pure perennial and Italian rye-grass do not exert any influence on flavour.

The relative degree of feediness produced by white and subterranean clovers was determined by feeding the same percentage of them to different stall-fed cows. Subterranean clover caused more feediness in the first two weeks of the trial, while white clover produced the greater effect in the following two weeks. The change in degree of intensity was probably due to the fact that the subterranean clover rapidly increased in maturity during the feeding period, while the white clover remained luscious.