

An examination of the recorded taint figures shows a marked seasonal variation in intensity of taint. In the grazing groups, flavour from white-clover swards was relatively pronounced in September and October; it fell off markedly early in November, became more pronounced at the end of the same month, and continued at a moderately high level to the end of February. A similar trend was recorded for the broad red-clover swards to the end of November, but little flavour was produced on these from December onwards, when this feed had reached a mature stage of growth.

When the percentage of clover in a ration of perennial rye-grass and white clover was varied it was found that the intensity of the taint produced in the cream was directly proportional to the percentage of white clover in the feed at any one time. It was found that at this time, under the conditions of the experiment, approximately 50 per cent. of white clover in the ration was the "critical" percentage—below this percentage cream quality was not seriously affected; above this percentage cream quality was impaired. The critical percentage above which taint was produced varied, as indicated above, with the time of the year and the stage of growth of the feed; early in the season it was as low as 30 per cent., while later it rose to 50 per cent. and then to 80 per cent.

Seasonal variation in intensity of taint is illustrated by the following examples. During one week in January one of the stall-fed cows yielded cream free from taint although fed continuously on 80 per cent. to 90 per cent. white clover. Cows fed 60 per cent. of the same clover in October under identical stall-feeding conditions produced cream with higher degrees of feed taint than cows getting 90 per cent. to 100 per cent. clover in January and February. Cream produced by cows grazing on 40 per cent. white clover in October was as highly tainted as that from the same cows grazing on 80 per cent. white clover in February and March. Two cows grazing on 80 per cent. white clover in June yielded cream with a moderately strong flavour. It is accordingly suggested from evidence available at the present time that rate of growth and stage of maturity are important factors in connection with this variation.

No significant difference was shown in taint production when cows were changed from stall feeding to outdoor grazing of the same feed.

Evidence accumulated during the investigation indicates that intensity of taint in cream produced by cows varies with different cows fed on identical feeds and suggests that cows vary considerably in their ability to reduce or eliminate from their system the undesirable taint-producing elements in the feed.

The importance of the time elapsing between the consumption of tainting foodstuffs and milking is well recognized. In this connection data relating to the quantity of fodder eaten at various times throughout the day by stall cows was collected. The consumption of feed between midnight and morning milking-time was very low, and the cream produced in the morning was free from taint. On the other hand, relatively heavy consumption of tainting foods at midday intensified taint in the evening cream, while lower consumption at this period and again prior to milking reduced it. These observations agree with Levy's conclusions.

When the grazing animals were moved from non-tainting (rye-grass) to tainting (rye-grass and clover) pasture within four hours of milking-time a pronounced taint was observed in their cream; conversely, taint was nearly eliminated when the animals were moved at this time from tainting to non-tainting or very bare pastures. The information available from these trials indicates that production is unaffected by this management. The removal of animals from tainting to non-tainting or bare pasture at a time greater than four hours before milking is thus a practical measure for mitigating if not eliminating feed taint on badly affected farms.

*Relation of Feed to Milk Composition and Properties of the Butterfat* (Dr. F. H. McDowall, G. A. Cox, and J. D. Sargent).—The milks from the cows fed under the above controlled conditions have been analysed regularly and samples of the butterfat have been collected at intervals. Changes in the composition of the milk have not yet been sufficiently studied to merit report. The results of the butterfat analyses do not indicate any correlation between the type of feed consumed by the cows and the iodine value, saponification equivalent, Reichert-Meissl number, and the softening point of the butterfat. There is indication, however, of some correlation between the average weekly minimum air temperatures and these values for butterfat, but, because of a lag between changes in temperature and values, the observation needs further study before it can be accepted as definite.

(b) *Neutralization of Cream for Buttermaking* (Dr. F. H. McDowall).—This subject has been under investigation, as opportunity offered, for a number of years. The study has now been completed, and the reports on the work are either published or in the press. The experiments have shown that some of the anomalous results encountered in practice have been due to variations in the carbon dioxide content of the cream when delivered at the factory. Other anomalies have been due to the peculiar quality of the cream causing precipitation of calcium phosphate during the pasteurization process, and resulting in a reduction of the degree of neutralization achieved by the sodium bicarbonate added. The influence of the carbon dioxide retained in the cream on the acidity of the neutralized cream has also been demonstrated. For neutralization to very low acidities it is necessary to depend on the calculation of amount of neutralizer to be added, since the retention of carbon dioxide in the cream renders unreliable any estimation of acidity in the pasteurized cream. The relation of acidity in cream to pH of butter and to the keeping quality of butter has also been studied. It has been shown that soda flavour tends to appear in butter made from cream neutralized to a pH above 7.2 to 7.4. There does not appear to be any necessity for the production of butter with a pH figure above 7.0, and, on the other hand, it appears undesirable that butter for export under New Zealand conditions should have a pH below 6.5.

(c) *Butterfat Losses in Buttermilk* (Dr. F. H. McDowall).—A report on this subject has been prepared, in collaboration with Mr. W. H. Udy, of the New Zealand Co-operative Dairy Co., Hamilton.