

In order to determine the possibility of taint being introduced into the blood by absorption of gases from the lungs and thence conveyed to the udder, a cow was made to breathe turpentine fumes just prior to milking. A powerful oil-of-turpentine taste and odour was immediately observed in the milk produced.

(i) *Elimination of Feed Taints by Processing Cream* (E. A. Beatson, J. O'Dea, and J. D. Sargent).—Experiments carried out in the present dairying season clearly show that clover taint can be almost completely removed from affected cream by the process known as "vacreation." This term is now well known in New Zealand, but is new to other countries except Australia. It has been introduced by Murray Deodorisers Co., Ltd., makers of a machine called a "Vacreator," which, in successive steps at increasing degrees of vacuum, pasteurizes, deodorises, and partially cools cream. Vacreation cannot be regarded as a substitute for the production of cream free of clover taint, but it can be accepted as a useful supplement to farming methods of overcoming this defect. This treatment of cream results in a higher loss of butterfat than does ordinary pasteurization, but this slight loss is offset by the higher grade of butter produced. The addition of a trace of starter to vacreated cream slightly enhances the grade of butter produced therefrom, but great care is necessary to ensure that the acidity of the butter does not fall below pH 6.5, otherwise its keeping-quality is impaired.

(j) *Unsalted Butter* (W. J. Wiley).—The experiments outlined in the previous report on the effect of acidity on the keeping quality of unsalted butters have been completed. At 65° F. and 40° F. deterioration caused by bacterial action was not delayed by the presence of acid in the butter. At 0° F. and 14° F. the greatest deterioration was observed in butters made from creams ripened to pH 5 (i.e., about 0.4 per cent. acidity). Butters from cream acidified to the same acidity by addition of pure lactic acid did not deteriorate to the same extent. The fat of the butters from ripened cream (pH 5) showed notable oxidation after cold storage, whereas that from the acidified cream did not. It has been found that even the experienced grader is unable to detect acidity in butter when this acidity is produced by the addition of pure lactic acid. The detection of acidity in butter by a grading on the senses is therefore dependent on the detection of the by-products of acidity production, such as diacetyl. Since these substances are still present in a butter from neutralized cream it is obviously difficult to assess the actual state of acidity in a highly flavoured butter without the assistance of a determination of the pH or of the titratable acidity of the serum. The investigation has not supported the views advanced by some workers in other countries that unsalted butter is more stable when acid and made from ripened cream than when neutral.

(k) *Starters for Butter* (G. A. Cox, W. J. Wiley, and H. R. Whitehead).—A start was made during the later part of the season on attempts to prepare good butter cultures from mixtures of known organisms. Hitherto all the butter-starters used in commercial practice have been fortuitous mixtures of several types of streptococci and it has been impossible to preserve consistently a good culture in a constant state for any length of time or to reproduce the characteristics of a good culture once they were lost. It would obviously be an advantage if we were able to mix two or three stock cultures of single strains (these cultures retain their characters indefinitely) and obtain regularly a desirable butter-starter, even if such a starter retained its characteristics only for a limited period.

The work opened up the whole question of the relationship between the organisms in a culture, the diacetyl produced by the culture, and the flavour of the butter. The adoption of a recently described colorimetric method for the estimation of diacetyl made it possible to carry out the necessary determinations on starter, cream, and butter much more quickly than was possible by the older methods. It is too early as yet to say whether progress is possible along the lines visualized, but already some interesting observations have been made which suggest that the usual methods of evaluating a starter for butter-manufacture are sometimes misleading. Starters apparently do not behave quite in the same manner in cream as they do in milk.

(l) *Oxidation Changes in Butter* (W. J. Wiley).—Some experiments have been carried out to determine whether temperature of pasteurization has any influence on the susceptibility of butterfat in butter to oxidation changes during storage. The butters made from creams treated under different conditions of pasteurization are now in storage and await further examination.

MYCOLOGICAL PROJECTS (DR. T. R. VERNON).

(m) Mycological investigations commenced last year with a study of the condition of New Zealand butter and cheese arriving on the London market. This study revealed a generally high standard, marred occasionally, however, by mould deterioration. It was realized that although the amount affected by moulds was comparatively small it was of greater importance commercially than one would expect. A large number of samples were examined to determine the types of organism present and the frequency of their occurrence. This work is now being continued in New Zealand and a systematic study is being made of the fungi liable to contaminate dairy-produce. To date the work suggests that while a certain amount of atmospheric contamination may be unavoidable (without recourse to the air-conditioning of factories) the organisms responsible for deterioration come mainly from the factories themselves.

Mould on paint-work in factories is not only unsightly but is an important source of contamination. Experiments on paints show that moulds develop rapidly on oil-bound water paints, penetrating the paint film and obtaining nutrition from the wood below. Gloss paints are more resistant and enamels most resistant. If, however, gloss paint or enamel paint is applied to a moulded surface, particularly under damp conditions, moulding may occur. Experiments are in progress with various types of paint with a view to increasing resistance to mould-attack. The cheaper paints and washes may be made resistant by the addition of fungicides.

The possibility of reducing mould-growth on cheese by better air-conditioning in the curing-rooms is being investigated.