

*Reconstitution of Butterfat to Butter.*—Some trials have been made in the reconversion of dry butterfat to butter. It has been found that the use of a centrifugal homogenizer to emulsify the butterfat with skim-milk before churning in a butter-churn gave butter that rapidly turned fatty. By use of suitable baffles in the uptake pipe of the vacreator it has been possible to produce an adequate emulsification in the vacreator itself. The resultant creams when churned gave a butter with a cooked-fat flavour, but of excellent keeping-quality even under high temperature conditions. Arrangements are in hand for the trial of reconstitution by the margarine process.

*Butter and Cheese Spreads.*—Work has been continued on the problem of finding a suitable butter substitute for use in tropical countries. The use of beef stearine as a hardening agent has been discontinued because of the accompanying animal flavour. Beeswax (4 per cent.) has been found to give a spread with satisfactory properties, but the supply of beeswax is limited. The only available alternative appears to be hydrogenated peanut-oil. In Australia the use of hydrogenated butterfat has been abandoned in favour of hydrogenated peanut-oil. Trials are at present being made of two batches of beeswax spread forwarded to the tropical areas.

A cheese spread made by admixture of dry butterfat with good-quality cheese has excellent promise, and arrangements are now well under way for a trial of production on the pilot-plant scale.

*Land-cress Taint in Cream and Butter.*—Work on this problem during the past year has given a clear indication that the benzyl isothiocyanate present in land-cress (*Coronopus didymus*) is not the cause of the peculiar "land-cress" taint in the butter from cows consuming land-cress. Garden-cress contains the same glucoside, and the benzyl isothiocyanate can be isolated from it in exactly the same way as for land-cress. When garden-cress was fed to cows in quantities of up to 7 lb. per feed, there was no sign of typical land-cress taint in the milk even after four successive days of the trial.

Land-cress, on the other hand, gave the taint in one day. It has been confirmed that land-cress taint does not always appear in the cream and butter from cows consuming land-cress. A herd of forty cows was grazed on a land-cress-infested paddock for six weeks during the 1943 spring without the appearance of any land-cress taint in the butter. It is clear, therefore, that the causal agent of the taint has yet to be isolated, and that the passage of the taint into the milk is related to the general condition of the cow or to some other unknown factor.

*Iodine Value and Melting-point of Butterfat.*—An attempt is being made to establish whether the previously reported fall in iodine value of butterfat in the late spring and rise in the autumn is due to feed changes, variations in plane of nutrition of the milking cows, or to lactation changes. Cows at different stages of lactation and on different planes of nutrition in the same herd are being used for the trial.

*Starters for Cheese-manufacture.*—The principles laid down in previous years for protection of starter culture from infection with bacteriophage have proved to be sound. During the past year many isolated starter-rooms have been built at commercial cheese-factories, and continued experience has shown that single-strain starter cultures can be maintained free from infection over long periods where isolation together with aseptic handling is practised. Simpler systems of protecting starter cultures against phage infection, which may obviate the need of much of the expense involved in building starter-rooms, are under trial. The most promising of these is one devised by Mr. C. S. Martin, an Instructor in the Dairy Division of the Department of Agriculture. Success in the maintenance of starter cultures themselves has, however, disclosed other avenues of infection of cheese-vats with phage. Failure in acidity-production in cheese-vats can be caused by (i) phage infection of the starter itself (prevented in a large degree by isolated starter-preparation rooms); (ii) phage infection of the equipment in the factory; (iii) phage infection of the milk-cans arising from carriage in them of cheese-whey back to the farms.

Several instances of the two latter types of infection have been encountered. Infection of the factory equipment is easily remedied either by heat treatment or chemical disinfection. Infection of the milk with whey by way of the milk-cans is not so easy to avoid if the farmer insists on continuing to carry whey in the cans. The trouble caused is spasmodic in occurrence, and it obviously depends on the farmers' thoroughness in cleaning the milk-cans from day to day. Assuming that the carriage of whey in milk-cans will continue, three methods of avoiding trouble from this source have been investigated:—

- (a) Pasteurization of the whey as it runs from the cheese-vat. The whey was heated to 190° F. and subsequently cooled to 90° F. in a regenerative plate pasteurizer. A temperature of 190° F. in a flash pasteurizer is needed for the certain destruction of bacteriophage. It was found that protein from the whey was rapidly deposited on the heating-plates on the pasteurizer, so that the heating efficiency was rapidly lost and the plates were subsequently very difficult to clean. The idea of using such a pasteurizing treatment was abandoned at least for the present:
- (b) Treatment of the whey after its passage through the separator with hypochlorite solution. If sufficient amounts of hypochlorite are used it is possible to prevent the further development of bacteriophage in the whey and thus reduce enormously the concentration of phage in the whey carried home by the farmer. Trials of this system of whey treatment are still proceeding, including pig-feeding experiments, to determine whether chlorinated whey has any adverse effect on pigs existing on a whey and meat-meal diet:
- (c) The use day by day in rotation of four or five different single-strain starter cultures, the strains selected being susceptible to distinct specific phages. This means that on any given day in the cheese-factory the starter culture in use in the cheese-vats is immune from attack by the phage or phages which may be present in a significant concentration in the milk as a result of failure to sterilize the factory equipment or the suppliers' milk-cans.