Neutralizer.—It has been shown, too, that great care has to be exercised in the use of the optimum amount of neutralizer, in order to avoid neutralizer-flavour troubles. It has been demonstrated that unexpected differences in flavour occur when the same neutralizers are added to what looks like identical lots of cream; these results consequently require further investigation.

Colour Changes in the Surface of Butter on Storage.—It has been shown that the development of a deep-yellow or primrose colour in the surface layer of butter on storage is due to the evaporation of moisture and consequent concentration of the natural colouring-matters. The use of moisture-proof wrappings, combined with efficient sealing of the open ends of the wrapper, is a preventive measure. The development of a bleached colour which is accompanied by a tallowy flavour is already well known to be a chemical change and one of the first stages in deterioration.

Cheese.

Openness.—It has been demonstrated now beyond all doubt that openness in cheese textures cannot be attributed to any single factor, and that this defect is due to a series of contributory factors operating singly or in combination, among which are milk-supply, starter, manufacture, and curing of cheese. It has also been proved that a number of causes popularly put forth cannot be justified as the fundamental cause of the defect—*e.g.*, pasteurization, milk-test, type of hoop, type of cheese-press, &c. In order to overcome some of the difficulties met with it has become essential to make a scientific study of a part of the manufacturing process, which is still an art. This is naturally a slow and complex piece of research. The incidence of openness can be reduced by employment of particular care in all parts of the cheesemaking process, but in the present state of knowledge it cannot be entirely eliminated.

Starters.—A simple test to determine the vitality of cheese-starters has been elaborated, and this is proving very effective in assisting cheesemakers to select appropriate starters from day to day. It has been shown that by avoidance of weak starters it is possible to reduce to some extent the degree of openness occurring in cheese. In this connection there is need for improvement in the facilities available for preparing starters, holding them at constant temperatures in cheese-factories. Some work is also being followed up on the question of utilizing starters for modifying cheese-flavour.

"*Non-acid Milk.*"—A bacterium which is responsible for causing the condition known as "non-acid milk" has been isolated. Although its source has not been determined, the isolation of it and knowledge of its characteristics marks a very important advance in the practical control of development of acidity in the cheesemaking-process. Pasteurization and sterilization of affected milk, while capable of destroying the germ, is not able to destroy the substance produced by the germ. These processes actually accentuate the condition. The substance produced by the germ is extremely toxic to the starter organisms, and exerts an influence when present even to a small extent. A point of particular interest is that the causal organism belongs to the "lactic streptococci" group. This is the first recorded instance of an organism producing a substance toxic to another of the same group. The germ responsible for the non-acid condition is markedly restrained by reducing the temperature of the milk as quickly as possible after milking to at least 65° F. The extent to which this germ occurs throughout the Dominion and the part it plays in causing "slow" vats cannot be gauged, but it is possibly more widespread than is generally realized.

Mammitis and "Slow" Vats.—Curd made from raw milk received from a cow badly affected with mammitis is slow in developing acidity, and this condition prevails for some time after the mammitis itself has disappeared. In this case the trouble can be detected by the methylene-blue test or the microscope, and overcome by pasteurization.

Other Factors causing "Slow" Vats.—Investigations have shown that the individuality of the cow and the herd both play very important parts in the rate at which acidity develops in milk. There is some unconfirmed evidence that milk of high butterfat content develops acidity at a slower rate than that naturally lower in fat. From evidence which is accumulating it seems also that long spells of dry weather, accompanied by the use of dry feed, restrains development of acidity. In such circumstances the casein content of the milk is lowered and cheese-yield is depressed, but after a fall of rain, and when grass-growth again commences, the milk in the vats resumes its normal rate of acid-development.

Milk-quality.—Experiments have proved definitely that pasteurization of milk is not conducive to the production of open-textured cheese, and when milk not properly cooled, or milk not of the highest quality has been used, the great advantages of pasteurization are revealed. Though cheese from pasteurized milk is slower in developing cheddar flavour than that from high-grade raw milk, it would be deemed unwise to revert to the manufacture of cheese from raw milk until this milk had been raised in grade well above suspicion. It has been ascertained that the range of temperatures for pasteurizing should be kept between 150° F. and 165° F. and the higher the grade of the milk the lower should be the temperature employed.

Milk Composition.—The composition of the milk is much less important than its grade. Abnormal milk is distinctly harmful; for example, even 15 per cent. of discoloured milk from cows affected with mammitis when added to normal milk will result in the production of "stinker" flavour in cheese, even though the discoloured milk has been pasteurized.

High-testing milk requires more starter than that of lower test, in order to allow development of acidity to take its normal course. Various technical reasons make it more difficult to make good cheese from very high-testing milk than from normal milk. Pockets of fat occur in cheese made from raw milk, but this defect does not appear when pasteurization has been resorted to. Cheese, too,