

in commercial practice. (It is possible that in cases where the milk quality is low the addition of a reasonable number of desirable lactobacilli may not lead to any improvement in the quality of the cheese, on account of the larger number of undesirable organisms present in the milk.) The only objection to the use of this procedure in commercial practice is the difficulty necessarily experienced in propagating pure cultures of lactobacilli under factory conditions. Accordingly, an investigation is being made of convenient ways in which strains of lactobacilli can be incorporated in cheese without the necessity for any specialized technique. One of the most promising methods lies in the blending of suitable types of lactobacilli with the starter. A number of cheesemaking experiments with the use of three such composite starters have been carried out this season, but as many of the cheeses have not yet been examined at maturity, a definite statement as to the results obtained cannot be made at present.

(3) *By making certain modifications in manufacturing details.* In view of the important effects of variations in manufacturing procedure upon cheese quality, many cheesemaking experiments have been conducted during the past season with the object of working out the optimum manufacturing conditions for certain single-strain starters. This work, which is not yet complete, is expected to yield also valuable information on the selective influence of different making conditions upon the growth in cheese of the various types of lactobacilli originally present in the milk. Indeed, it is conceivable that certain manufacturing modifications may be found to encourage the growth of desirable types of lactobacilli to such an extent that artificial inoculation of the cheese milk with these types may not, in normal practice, be necessary.

(c) *Payment for Milk for Cheesemaking* (Dr. F. H. McDowall).—As a result of investigations carried out during 1934–35 an alternative system of payment for milk for cheesemaking—viz., the “costed cheese” system—was devised, involving payment on the basis of weight of potential cheese delivered by each supplier, with a deduction at a determined rate per 10 lb. of milk delivered to cover the “milk costs,” or those costs dependent on the volume of milk handled. The weight of potential cheese was determined from the “cheese test” of the suppliers’ ten-day composite samples, which was read from a table giving cheese tests corresponding to milks of all ranges of fat and casein (Walker) tests. The system of payment provided an equitable distribution of the returns from the manufacture of cheese, and the allocation of costs provided an accurate apportionment of the costs of manufacture of cheese from each individual milk-supply. The yearly pay-outs calculated on the “costed cheese” system would thus be a correct division among the individual suppliers of the proceeds of the year’s working of the cheese-factory. Following on the publication of the data on which the new system was based, it seemed desirable that some information should be available as to the actual degree of unfairness of the present system of payment on butterfat content. Through the co-operation of the directorates and managers of some seventeen commercial factories a trial of the “costed cheese” system was made during the months of October to March, 1935–1936. The examination of the results of this investigation has been completed in the year under review, and a report giving the data is ready for publication. It was found that, with costs of manufacture properly allocated, the extent of unfairness in the present system of payment on butterfat was not as great as had been thought. The total pay-out for the seventeen factories during the time the investigation was in progress was £284,760, and of this amount £2,570, or 0.90 per cent. of the total, would have required redistribution according to the “costed cheese” system as compared with the “straight fat” system of payment. Of the 531 individual suppliers, 24, or 4.5 per cent. of the total, were underpaid to the extent of more than 4 per cent., and 26, or 5 per cent. of the total, were overpaid to the extent of more than 4 per cent. of their pay-out for the year. For the great majority of the suppliers, therefore, (481 of the 531, or 90 per cent.) the “straight fat” system gave a distribution of proceeds accurate to within £4 per £100 of pay-out. The degree of unfairness for some individual suppliers was quite appreciable, involving in some cases underpayment and in other cases overpayment, to the extent of 10 per cent. of the pay-out for the year. From the point of view of these suppliers the present system is definitely inequitable. The investigation has provided the industry with data necessary for a rational decision as to whether a change in the system of payment for milk for cheesemaking is desirable. The “costed cheese” system has been shown to be practicable. It has been in use as a basis of payment in one commercial factory for the past two years and has given satisfaction.

(d) *Storage of Cheese at Low Temperatures* (Dr. F. H. McDowall).—The temperature of storage of cheese has an important effect on the rate of ripening of the cheese. Some investigations have been made of the effect of freezing temperatures of storage on the quality of cheese. It was found that cheese could be stored quite successfully at 31° F., at which temperature a steady but slow maturation took place. The cheese held at this temperature did not suffer any deterioration in quality. Storage at 14° F.—i.e., below the freezing-point of the cheese—caused a disruption of the texture of the cheese and the development of an unpleasant tallowy flavour. This flavour disappeared to some extent when the cheese was held at 45° to 50° F. for some time after removal from cold storage. Storage of cheese at 31° F. has been shown to be a useful and perfectly satisfactory method of prolonging the life of the cheese.

(e) *Acidity in Cheesemaking* (R. N. Dolby).—A study has been made of some factors influencing the rate of acid development in the cheese-curd, and an attempt has been made to relate these to the quality of the resultant cheese. In all the cheesemaking experiments during the season under review the successive operations have been timed by pH measurements on the curd instead of by acidity determinations on the whey. It has been shown previously that acidity determinations on the whey retained during the later stages of the cheesemaking process are unreliable. The measurement of pH, on the other hand, gives a true indication of the state of acidity in the curd. The experiments were so planned as to provide some indications of the most suitable conditions for