GENERAL.

(*a*) *Cleansing-powders for use in Dairy Factories* (F. H. McDowall).—A study has been made of the alkaline powders in use for the cleaning of dairy equipment. In the main these have been found to consist of one or more of the following substances: sodium bicarbonate, sodium carbonate (soda ash), caustic soda, sodium metasilicate, trisodium phosphate, and soap. The prepared mixtures are thus made up of the raw alkaline materials well known to commerce. It has been shown that a considerable reduction in costs could be effected at the factory by purchase of the raw alkalis instead of the prepared mixtures. It is considered that the factory workers have been greatly handicapped in the efficient use of the cleansers by the lack of information on the composition of the mixtures *e.g.*, there has been a widespread wastage through the admixture of a cleanser containing caustic soda with a cleanser containing sodium bicarbonate. The sodium carbonate formed as a result of the chemical action between these two compounds could have been purchased as soda ash at one-third of the price paid for the mixture. In addition, the sale of a cleanser containing a high proportion of caustic soda without any warning to the user must be regarded as dangerous. Several formulæ for mixed cleansers are being proposed, and factories are recommended to buy the raw alkalis and prepare the mixtures in stock solution as required, or, alternatively, to buy the prepared mixtures to a specified composition. Some attention has been given also to the methods of applying cleansers to the various types of equipment, and to the improvement in the efficiency of can-washing machines.

(*b*) *Dairy Factory Costs* (J. F. Tasker).—During the year an analysis was made of the 1937–38 manufacturing and marketing costs of a group of forty-nine buttermaking companies scattered throughout the Auckland and Wellington Provinces. The companies covered ranged in production from 110 tons up to 4,830 tons for this season, and altogether produced approximately 70,000 tons of butter—*i.e.*, about one-fifth the total Dominion production and over half that of the Auckland and Wellington Provinces. The companies were grouped according to their production for the season into classes of 500 tons. The unit used was the pound of butterfat.

The study showed that, on the average, total costs steadily decreased as production increased, but that the rate of fall decreased with increased production. Manufacturing charges, repairs and maintenance costs, and depreciation showed a close relationship to volume of production, while cream-collection costs and factory to f.o.b. charges showed practically no connection with this factor. Overhead charges were shown to be affected indirectly by volume of production.

The greater part of the differences in the costs of the small and the large creameries arose from differences in manufacturing charges, and these in turn were affected mainly by variation in manufacturing wages. The study also indicated that the optimum size of the average creamery from the point of view of costs was from 2,000 tons to 2,500 tons.

(*c*) *Dairy Factory Drainage* (P. O. Veale).—In an attempt to get definite information on the volume and composition of drainage from different types of dairy factories there was recorded during the year the daily volume of drainage discharged at different times during the day at three cheese-factories, two butter-factories, and one casein-precipitating station in Taranaki. There was also estimated at regular intervals the volume of water flowing in the streams into which the drainage was discharged. From composite samples of the drainage there were determined pH value, acidity, total solids, organic nitrogen, oxygen absorbed from permanganate in four hours, and five-day BOD (biochemical oxygen demand). Bacteriological and chemical examinations were made of samples drawn from the streams into which the drainage was discharged at points above and below the drainage outlet. The work is not yet completed, but data of great interest to the industry have been collected. This is the first time data of this kind have been collected in New Zealand. They indicate that the volume and type of drainage from New Zealand cheese-factories differs from that reported on by workers overseas. The data also indicate that the drainage from butter-factories differs markedly from the drainage from cheese-factories. A detailed report on this will be prepared and published at the conclusion of the investigation.

(*d*) *Casein* (W. R. Mummery).—A survey has been made of the international trade in casein during recent years. A study has also been made of the extent to which rennet and lactic casein are used in different industries, and of the different methods for precipitating and treating casein in different countries and particularly in New Zealand. A successful effort was made to contact all local users of casein, with a view to extending the local demand for this product. Advice has been given to several manufacturers on the preparation of adhesives containing casein, and work is in progress to help local manufacturers out of difficulties. Attention is also being devoted to increasing the use of casein in the manufacture of paints for particular purposes, the possibility of making casein plastics in New Zealand, using casein in sheep dips, and in various other ways.

(*e*) *Dairy Husbandry* (S. L. Green).—During the year several lots of milking animals have been grazed separately on pastures consisting of (*a*) perennial rye-grass, (*b*) perennial rye-grass and white clover, (*c*) cocksfoot, and (*d*) cocksfoot and white clover. Daily records have been made of the milk produced by all experimental animals, and from three-day composite samples the milk of each cow has been analysed for its fat content, solids-not-fat, total protein, and lactose. In addition, the milk of each cow has been examined at the Wallaceville Veterinary Laboratory, Department of Agriculture, for the presence of mastitis, by leucocyte assessment at weekly intervals and by cultural examination at monthly intervals. Also Dr. Cunningham, of the Wallaceville Animal Research Station, has determined the calcium and magnesium in the blood of each experimental animal. Since the animals have not yet completed their lactation for the year, results cannot be studied in detail, but it is noteworthy that although they have been milked by machinery now for two years none of these animals have been affected with mastitis. The production of all the animals has been normal.