

## REPORTS OF RESEARCH COMMITTEES OF THE COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

### DAIRY RESEARCH INSTITUTE.

*Dairy Research Management Committee.*—Mr. A. Morton (Chairman), Professor H. G. Denham, Messrs. T. C. Brash, A. H. Cockayne, G. A. Duncan, H. E. Johnson, A. Linton, C. A. Marchant, A. J. Murdoch, J. Murray, W. M. Singleton. Secretary: Dr. E. Marsden. Director: Professor W. Riddet.

The Committee held meetings during the year at approximately two-monthly intervals. At each it reviewed in detail research work in progress and projected at the Institute, gave careful consideration to matters affecting the advancement of dairy research in New Zealand, and accordingly made recommendations to the Research Council. The Committee suffered a serious loss during the year through the passing of one of its members, Mr. Q. Donald, who had been one of the Research Council's representatives on the Committee since its inception. The contribution of Mr. Quentin Donald to the work of the Committee was warmly acknowledged by both the Committee and the Institute staff. The Research Council appointed Mr. H. E. Johnson, Tokaora, to fill the vacancy on the Committee.

*Research Work.*—Material progress was made during the year towards the solution of many problems affecting the manufacture of dairy products and the production and composition of milk.

Cheesemaking investigations related mainly to studies on starters and the isolation and classification of bacteria influencing the ripening of cheese. In past reports the importance of devising methods of preserving the vitality of cheese starters has been emphasized, and it has been shown that the sudden loss of vitality is commonly caused by the action of bacteriophage. During the present year very important observations have been made as to the means by which starters become contaminated with phage, and steps have been taken to apply these findings in dairy-factory practice. The influence on cheese quality of employing selected single strains of lactic organisms as cheese starters has been carefully examined. At the request of the New Zealand Co-operative Dairy Co., and with the financial and whole-hearted assistance of the company, an effort was made at their Eureka cheese-factory to determine whether starter failures could consistently be avoided and whether the use of single-strain cultures could improve the quality of cheese. The Massey Agricultural College very kindly loaned the services of Mr. T. Jensen, B.Agr.Sc., to superintend this work, and he worked at the Eureka factory from October, 1938, until February, 1939. Considerable time has been devoted to the isolation and classification of those organisms in Cheddar cheese which affect its ripening, because it has been shown that some strains are the primary cause of "slit" open texture, a defect causing much New Zealand cheese to be classed as first grade instead of finest. The work now completed provides a valuable foundation for determining the common sources of these organisms and methods of controlling their numbers in produce, so that finally some practical methods of avoiding slit openness may be evolved.

Complementary to the work of the Dairy Board herd-recording department and the Department of Agriculture in determining the incidence of mastitis in herds under group herd test by using the bromthymol blue test, an extensive investigation was made of factors affecting the bromthymol blue test, of changes in the composition of milk coincident with a positive reaction to bromthymol blue, and of the influence on cheese quality of employing milk reacting to this test. Mr. P. O. Veale, M.Sc., Hawera, took part in some of this work, for which he was given a grant.

Work on butter problems was pursued in a number of projects. Rapid methods of estimating butterfat losses were compared; the respective parts played by acidity, starter organisms, pasteurizing temperature, and the flavouring substance diacetyl in the oxidation of salted and unsalted butter held in cold storage were worked out; the role of starters in affecting the flavour of New Zealand butter was demonstrated; and changes in the diacetyl production of starters were studied. Some progress was made with the identification of the substance in land cress that imparts an objectionable flavour to cream and butter; a study was made of methods of assessing the hardness of butter, and these were used in a preliminary series of trials designed to obtain definite information on manufacturing procedure affecting the body of butter. Working at Minnesota University, where he held a Commonwealth Fund Scholarship, Dr. C. R. Barnicoat completed his research project on the "Chemistry of incipient oxidation defects in butter." On the basis of this work and of his other publications he was awarded the Ph.D. degree. Preliminary to a study of factors accounting for variation in the quality of butter made in different districts, samples of butter produced in several localities have been examined at monthly intervals, in particular for details of the characters of the fat.

A series of mycological investigations were carried out to determine the commonest sources of contamination of dairy products with moulds and to devise methods of reducing this contamination to a minimum.

In collaboration with the Grasslands Division of the Plant Research Bureau, projects have been continued to determine the food value for milking-animals of certain common New Zealand pasture plants, and in particular to ascertain the effects of these on the production and composition of milk. (This work was extended this year to study also the influence of grass ensilage.) With the assistance of the Wallaceville Veterinary Laboratory, a study was also made of the influence of continuous feeding of perennial rye-grass, and perennial rye-grass and white clover, respectively, on the health of dairy cattle while in milk and dry. Various other projects of lesser importance were undertaken.

The following statements prepared by officers in charge of the projects give a brief account of the progress made. More detailed information on some of these is contained in published technical communications, a list of which is given at the end of this report.