variations in atmospheric temperature. Consequently they have not yet reached a stage to be reported on. Although it takes a long time to arrive at definite conclusions in this class of research work, this work in itself is extremely important, as no subsequent treatment of milk will restore the good lost by lack of sufficient care at the time of production.

Throughout the whole season milk delivered to the dairy factory has been carefully graded in the Bacteriological Laboratory by several methods, and much information has been collected concerning the value of these for ordinary dairy-factory use. Both the direct microscopic count (Breed method) and the reductase methylene blue test have been found to be sufficiently reliable for the grading of cheese milk to be paid for at differential rates. In the present state of development of the New Zealand dairy industry the reductase test is possibly more applicable than the direct count. The choice of one of these two tests is less important than the immediate need for the introduction of payment for cheese milk on grade. Experience with milk produced in the Massey Agricultural College milking-shed, which is no more elaborately equipped than others on well-managed farms, shows that pure milk can be produced without additional labour and expensive equipment, if proper care is taken. Examination of milks supplied to factories also shows that some farmers provide good milk, while the poor standard of others reduces the average quality of the factory supply below a satisfactory standard. A penalty imposed on the suppliers of poor-quality milk, and regular farm instructions, would considerably assist in raising the average quality of factory raw supplies.

A very interesting and important observation was made by Mr. H. R. Whitehead in regard to the carrying-out of the reductase test. He showed that exposure of the coloured samples of milk to light while the test is being carried out hastens the rate of discolorization. Accordingly, equipment provided with an inspection-glass to observe when samples are decolorized should not be used. He has also shown that, under certain conditions, organisms may not stain properly when smears of milk are prepared for examination by the direct-count method.

OTHER WORK CARRIED OUT BY THE INSTITUTE.

Further studies in progress include (*a*) the effect of certain organisms on the vitality of starter organisms; (*b*) the bio-chemical characters of pure cultures of starter organisms; (*c*) the daily variation in the fat-casein ratio of milk of the Massey Agricultural College herd; (*d*) the resistance of certain cements, coating-materials, and flooring-materials to the action of milk, buttermilk, and whey; (*e*) improved methods of daily analysis; (*f*) the collection of information regarding the disposal of dairy-factory sewage; and (*g*) changes in temperature of butter with changes in temperature of the surrounding atmosphere.

Throughout the dairying season, starter cultures were supplied to factories in all parts of the Dominion at a very moderate cost.

Samples of milk, butter, and cheese of known history were supplied to Professor Malcolm, of Otago University, for research work on the nutritive value of these products.

WORK CARRIED OUT BY THE LABORATORY OF THE TARANAKI CO-OPERATIVE DAIRY FACTORIES.

Mr. P. O. Veale, research chemist to the Taranaki Co-operative Dairy Factory, collaborated with the Institute in trials affecting the pressing of cheese and methods of packing cheese-hoops. In independent studies he compared the usefulness of the reductase test, direct count, coliform test, and fermentation test for the grading of milk for cheesemaking. He has also made, during the past season, a study of the economics of standardizing milk under ordinary factory conditions and devised a method of standardizing milk, based on the total ratios of the milk and fat test.

WORK OF THE NEW ZEALAND CO-OPERATIVE DAIRY COMPANY LABORATORY.

Mr. W. H. Udy, chemist in charge of this laboratory, has also collaborated with the Institute in trials on methods of packing cheese-hoops, and on the effect of pasteurization of milk on the texture of cheddar cheese. In independent studies he has examined the extent of losses of butterfat in buttermilk, and is making a close investigation of the unavoidable losses. He has shown that some factories are experiencing a loss of £1 per ton of butter manufactured more than other factories.

FORMATION OF A NEW ZEALAND DAIRY SCIENCE ASSOCIATION.

At the instigation of members of the staff of the Dairy Research Institute, a New Zealand Dairy Science Association was formed in August, 1929, and the first meeting of the association was held at the Massey Agricultural College. The members include all those engaged in dairy science in the Dominion, and its formation promises to bring into closer touch, with a view to assisting all branches of dairy manufactures, all those with that common interest.

PUBLICATIONS.

The following publications were issued during the year:—

"Standardized Cheese and Cheese-analysis," by Dr. F. H. McDowall.
"Metals for Dairy Machinery," by Dr. F. H. McDowall.
"Flooring-materials for Dairy Factories," by Dr. F. H. McDowall.
"Packages for Dried Skim-milk and Dried Buttermilk," by Dr. F. H. McDowall.
"Pasteurization of Milk by Electricity," by Dr. F. H. McDowall.
"Production of Graded Milk in England," by H. R. Whitehead, M.Sc.

Others are ready for publication.