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

DAIRY RESEARCH.

Advisory Committee: Hon. Sir George Fowlds (Chairman), Mr. A. Morton, Mr. T. A. Winks, Mr. W. Iorns, Mr. Dynes Fulton, Mr. Q. Donald, Professor H. G. Denham, Dr. C. J. Reakes, Mr. W. Singleton. Director of Research, Professor W. Riddet.

Investigations, which were referred to in the report for the year 1929–30, affecting the manufacture of cheese, were continued in the dairying season 1930–31, and trials on the use of starter in the manufacture of export butter were carried out. At the outset of the experimental work in 1929 special attention was devoted to the causes of "openness in texture," but as investigations have progressed it has become increasingly evident that consideration of this is inseparable from the study of cheese quality in general. Special attention, however, has been devoted to factors affecting texture, body, and flavour.

The removal of the laboratories in March, 1931, from temporary accommodation to better-appointed and more commodious quarters in the new Science Building of the Massey Agricultural College, has been a great improvement, and will greatly assist in the carrying-out of more intricate and extended laboratory investigations.

Types of Openness.

The appearances of mechanical, slit, and fermentation openness were described in detail in last year's report. During the present year it has been conclusively shown that slit openness does not necessarily coincide with the line of junction of milled curd particles; it just as frequently arises within the particles of curd packed in the cheese-hoops before pressing, and has no connection with the pieces of curd cut by the curd-knife. It generally starts to develop when the cheese has been three or four days on the curing-room shelves, and thereafter takes a fairly definite course of development, running at one end more or less parallel to the end and thereafter forming indefinite sectors of a circle with a centre in the direction of the line of application of pressure in the cheese-hoop. The defect is more accentuated in "sweet" or "overmoist" cheese than in "acid" or "normally made" cheese, but it is apparent that its development is a physical reaction of the chemical condition of the curd at the time of hooping. This in turn undoubtedly is dependent on the many biochemical changes occurring in the making process, and, in particular, on the individual and combined influences of the state of the cheese solids in the raw milk, the starter, and any extraneous organisms that may be present in the milk. These questions are being closely studied.

Practical Cheesemaking Experiments.

Whilst fundamental work is absolutely essential to the placing of cheesemaking on a scientific basis, it takes considerable time to obtain results which have direct application to practice. Thus straight-forward cheesemaking experiments which have a direct bearing on cheese quality have been carried out since the inception of experimental work. A detailed account of some of these was given in the annual report for the year 1929–30. The results of others completed since that time are reported hereunder.

Experiments on the Effect of Pasteurization of Milk on Cheese Quality.

A detailed statement of the methods adopted in carrying out this investigation was given in the last annual report. One hundred and nine pairs of cheeses were made from raw and pasteurized milk respectively. Most of these were exported to London, where they were examined by the London officers of the Dairy Division, at an approximate age of three to four months. The remainder were held in cold store at 50° F. in New Zealand from fifteen days old till they were four months old. When finally examined at three to four months none of the lots was really mature; but it was considered advisable to use grading at this age as a measure of quality, so that the treatment and results would be directly comparable with normal export produce. To secure information on the effect of holding for a longer period than the normal time taken to market export cheese, a certain number was held in store in New Zealand for a further period of two months. The following conclusions respecting cheese quality have been drawn from the experiment:—

(1) *Texture.*—The pasteurization of milk was not responsible for any type of openness. When openness appeared in the experimental makes the raw- and pasteurized-milk cheeses were affected alike. Pasteurizing temperatures of 165° F. and above resulted in very brittle curd, which lacked cohesion so much that difficulty was experienced in properly matting the curd. Yet the resulting cheeses were not open in texture; the grain of the cheeses, however, was coarse, and both body and flavour were badly affected.

(2) *Flavour.*—(*a*) With pasteurization of the milk by the regenerative flash method at temperatures between 150° F. and 160° F. the pasteurized-milk cheese graded better in flavour on the average at three to four months than the corresponding raw-milk cheeses, the average difference in sixty-eight cases being 0·7 points in a maximum of 50. The flavour of the pasteurized-milk cheeses was preferred in forty-one cases, and the raw in seven cases; in twenty cases equal scores for flavour were given.