

## THE NATIONAL INSTITUTE FOR RESEARCH IN DAIRYING

REPORT FOR 1963

THE average townsman rarely thinks of Britain as a country famous for dairying, and yet it possesses one of the biggest and best-organized dairy industries in the world. The milk it produces annually is worth about £400 million, and it supplies all the liquid milk and a proportion of the milk products consumed by the country's population of some 53 million people. Even in the early years of the present century, when dairying was not nearly so widespread or so intensive as it is to-day, the importance of research in such an industry was beginning to be appreciated, with the result that in 1912 a research institute in dairying was founded at Reading. In the first year or so of the Institute's existence the main members of the staff consisted of one chemist and one bacteriologist and the Government grant for maintenance was only £1,510. Little did the pioneers of these early days imagine that in about fifty years this very small new Institute would grow to such an extent that its staff, as listed in its report for 1963\*, would number more than 400, of whom more than 100 would be fully qualified in some branch of science.

As now constituted the Institute has ten main Departments: Physics; Chemistry; Physiology; Nutrition; Radiobiochemistry; Bacteriology; Chemical Microbiology; Feeding and Metabolism; Dairy Husbandry; Engineering. There are also an Experimental Dairy, a Statistics Section and one of the best libraries on dairying and related sciences in the world. In addition to this, the Institute is admirably situated, being surrounded by four farms of its own which provide it with three dairy herds and an area of more than 800 acres, all of which can be available for research.

The work done in the various Departments ranges from fundamental research of first-class quality in the basic sciences on which dairying depends to problems of immediate practical application in the dairy world. In a short article such as this it is impossible to cite more than one or two of the many topics that have been investigated so effectively in the past year.

As an example of the more fundamental type of work it may be mentioned that in the Physiology Department, for example, research is being done on the citric acid cycle in mammary tissue. Work with  $2\text{-}^{14}\text{C}$ -propionate has suggested that propionate enters the citric acid cycle as oxaloacetate, and it seems likely that the conversion of propionate to oxaloacetate is catalysed by soluble cytoplasmic enzymes and not by those of the mitochondria. This particular type of formation of the intermediates of the citric acid cycle could be an important step in the synthesis of fatty acids in the mammary gland. Then again, in important work by the Radiobiochemistry

Department on the part played by dietary fat in the formation of milk fat, experiments have been made in which dietary fat labelled with tritium has been given to the lactating cow. The results have shown that newly absorbed fat circulates in the plasma mainly in the form of lipoprotein triglycerides ( $\beta$ -lipoproteins), and that these particular lipoproteins are preferentially selected by the mammary gland from the lipids in the blood. It was found that the specific activity of the labelled triglycerides normally reached a maximum only some 6 hours earlier than the maximum was reached in the milk lipids, and it seems certain that dietary fat rapidly becomes available to the mammary gland in the form of these  $\beta$ -lipoproteins.

One or two examples of the more immediate practical aspects of the Institute's work may also be cited. In the Chemical Microbiology Department the use of gas chromatography for the assessment of milk quality is being investigated. By distributing a small sample of milk over the inner surface of a vertical tube through which a suitable entrapping gas is passed, the volatile compounds from the milk can be transferred to a chromatogram in about 20 sec, and it is hoped that it may soon be possible to inject the milk direct on to the chromatogram. In due course the method may become so rapid and informative that it would lead to the development of an acceptable chromatographic rejection test for milk of poor quality in creameries, a test which at present relies largely on the sense of smell of the operator on the creamery reception platform. An apparatus has been developed which indicates the time after renneting at which the viscosity of milk starts to change, and a torsionmeter has been devised which measures the rate of setting of milk in the cheese vat and gives a signal when the curd is of the right firmness for cutting. This latter instrument is already in use commercially. On the farming side, work has been done on factors which affect the amount of silage eaten by cattle, on the shape of cattle yards that require minimum amounts of litter and on an effective method of cleaning milking parlours. It is good to know that in one and the same Institute important work of a basic scientific nature proceeds alongside research on items of such immediate practical interest. Such a programme seems ideal for an institute of this type, which must always be actively concerned about the problems of the industry that it exists to serve, and yet which realizes that the practical problems of the future are most likely to be satisfactorily solved by making a thorough study of the basic scientific facts to-day.

About 130 papers on the work of the Institute were published by its staff in the year under review, and it received some 1,700 visitors. The Institute is certainly maintaining the high standard it has achieved over the years, and it richly deserves the high esteem in which it is held throughout the world. J. A. B. SMITH

\* University of Reading: National Institute for Research in Dairying. Report 1963. Pp. 172. (Shinfield, Berkshire: National Institute for Research in Dairying, 1964.) 7s. 6d.

## DEVELOPMENTS IN THE GAS INDUSTRY

SINGULARLY interesting developments have recently been taking place in the gas industry, which were referred to by Sir Henry Jones, chairman of the Gas Council, in a lecture to the Royal Society of Arts, entitled "The Gas Industry—To-day and To-morrow", on April 22. Furthermore, in Great Britain manufactured gas may within the lifetime of some of us be replaced by natural gas.

Of the changes that have occurred since 1949 there has been a reorganization of gas-making practice, and the

former number of some 1,050 gasworks has been reduced to about 300. Half the gas made is still produced by the carbonization of coal in progressively improved plants, but due to changing economics arising from the competitive prices of imported oil an increasing proportion of gas is now being made from oil or oil gases. In addition, in 1964, liquid natural gas is expected to be imported from North Africa. It will be carried in 12,000-ton cargo vessels from Arzew in Algeria, to Canvey Island on the Thames,