

Instrument Workshop

This Workshop was set up during the year in a separate room, after having operated for some months as a group in the Tool-room. The following are some of the more interesting jobs handled during the year and give an indication of the variety of the work :—

Portable manometer for measurement of velocity and static head in air ducts ; a fabric abrasion machine for testing motor-car upholstery fabrics ; a foot-measuring instrument for use by Standards Institute in New-Zealand-wide survey of dimensions of children's feet ; a balance for quick measurement of specific gravity of rubber and other materials ; equipment for rotating deflection coils round cathode-ray indicators of meteorological radar sets synchronous with aerial ; radio frequency coaxial line and components for radar equipments ; a form of periscope for viewing the pantograph of an electric locomotive from the cab while the locomotive is in motion.

In addition, the following apparatus, which is described under "Design," was built : molecular still, diffusion pumps, leak-detecting apparatus, surface pyrometer, portable potentiometer, and electron microscope.

FATS RESEARCH LABORATORY

Officer in Charge : Dr. F. B. SHORLAND

The Fats Research Laboratory was established in Wellington on 1st April, 1946, to conduct researches on fats of animal, vegetable, and marine origin, emphasis being laid on the nature of the fats themselves rather than on their characters as foodstuffs. Fats in the form of butterfat, tallow, wool-fat, linseed-oil, fish-oil, and whale-oil represent a considerable proportion of the actual and potential wealth of New Zealand, and it is felt that the projected researches will enable a more complete utilization and development of these raw materials. Up to the present time the main attention of the Laboratory has been focused, in close collaboration with the Dairy Research Institute, on the nature of the fats in dairy products, especially butter, although some attention has been devoted to various other fats of direct interest to New Zealand industries.

BUTTERFAT INVESTIGATIONS

The physical properties of butter, such as texture, are associated with the complex range of fatty acids present (fatty acid composition) and their mode of combination (glyceride structure), while the keeping-quality and aroma are largely dependent upon the minor constituents of the unsaponifiable and phosphatide fractions. The elucidation of these aspects of butterfat composition will undoubtedly provide a much more complete understanding of the nature of butter than has hitherto been possible.

For the present the work has been concentrated on the development of technique, using one sample of butterfat with a view to testing the accuracy of the methods used in anticipation of a comprehensive survey of the composition of New Zealand butterfats commencing this spring. The lines of investigation in progress may be divided into the following :—

Fatty Acid Composition of the Glycerides.—A series of eight analyses of a sample of butterfat showed that the standard deviation of the molar percentage of the saturated acids (C_4 – C_{18}) varied from 0.5 for C_{10} to 1.8 for C_{16} , while that of the unsaturated acids (C_{10} – C_{20}) varied from less than 0.1 for C_{10} to 2.6 for C_{16} .

A single analysis of each of two samples revealed significant differences in total $C_{16} + C_{18}$ unsaturated acids and in total saturated acids, but the differences observed between the individual acids were not significant.

Methods of analysis involving methanolysis or ethanolysis with sulphuric acid catalyst were not found to be more expeditious than the more conventional method involving separation of the volatile acids by steam distillation and esterification of the