

Investigations and Development.—Some of the investigations which have been successfully completed are as follows: efficiency of fireplaces, composition of natural gases, plate-glass stains, polishing-compounds, and impurities of carbide samples.

Frost-prevention and Frost-fighting.—Preliminary work has been done on this project in conjunction with the Dominion Physical Laboratory, and at the present time a detailed survey of temperature and air-flow condition is being carried out on the State experimental orchard at Earnsclough, in Central Otago. It is hoped to experiment locally with several designs of orchard-heaters, and probably an artificial wind machine.

Molecular distillation of fish-oils.—This industrial project is still under the technical supervision of the branch, and its successful operation under commercial conditions has given practical information which will assist in the design of the stills now in the process of development by the Dominion Physical Laboratory.

Air-conditioning of Commercial Greenhouses.—Several houses have been equipped with units to give temperature and/or humidity control.

Electroplating.—Seven cases of assistance to nickel, cadmium, silver, and chromium-plating firms have been handled, in conjunction with the Government Analyst. It is hoped to install small experimental plating-baths in the near future to facilitate process checking. Equipment for measurement of thickness of deposit is in the course of preparation.

BIOMETRICS SECTION

Officer in Charge: Mr. I. D. DICK

This being the first annual report of the Biometrics Section, opportunity has been taken to trace briefly the course of biometric and statistical work done in New Zealand prior to 1946. The late Dr. F. W. Hilgendorf first applied statistical methods to agricultural experience in New Zealand, and an article in the *New Zealand Journal of Agriculture* (Vol. 26, p. 354) records his analysis, the first recorded in New Zealand literature.

Hilgendorf's example was quickly followed by Messrs. M. J. Scott and A. W. Hudson in that order, and the latter, when Crop Experimentalist to the Department of Agriculture, used statistical methods in wheat, turnip, and potato trials, several of his papers appearing in the *Journal of Agriculture*. Both the Wheat Research Institute and the Fields Division of the Department of Agriculture still maintain and develop the example set by Hilgendorf and Hudson.

Both Hilgendorf and Hudson lectured on the elements of statistical method as applied to field trials at Canterbury and Massey Agricultural Colleges respectively. The next impetus to statistical research in New Zealand was the appointment of Dr. J. T. Campbell to Victoria University College. Dr. Campbell was trained in statistics at Edinburgh under A. C. Aitken, and it was through his activities and the growing realization amongst departmental officers that the present officer in charge of the Biometrics Section was appointed in 1939. Unfortunately, war conditions effectively prevented organization of the Section till 1946.

Reasonable progress has been made throughout the first year, although it will be another four years or so before the Section is operating really effectively. Work has proceeded along four major lines—the collection of an adequate library of technical literature, the recruitment and training of staff, the exploration of methods of handling extensive collections of data, and, finally, research and consultative work.

Arrangements have been made for an officer of the Section to study at Cambridge under Dr. Wishart for a further year on full pay. Another officer has been recently awarded a Shirlcliffe Fellowship by the New Zealand University. The Section has other mathematical graduates in view.

The third major activity was the exploration of possible methods of coping with the long and arduous computations which the Section is frequently requested to perform on extensive collections of data. Attention was turned to the possible use of a punched-card system, and accordingly the Section obtained possession of Powers-Samas equipment