CHEMISTRY SECTION.

REPORT OF B. C. ASTON, F.I.C., CHEMIST.

Visit Abroad.

During the year I obtained leave of absence and visited Great Britain and Denmark, as well as the Australian and South African States when *en route*. Altogether seven months (March–October) were taken up in this trip.

Many laboratories and institutions were visited and much information obtained bearing upon agricultural chemistry. The Society of Chemical Industry meeting at Leeds, the British Association meeting at Southampton, the Royal Agricultural Show at Chester, and the Royal Horticultural Show at Chelsea were attended. Full reports were furnished from time to time to the Director-General on the subjects under investigation. Some special lines of work were at the request of the High Commissioner, undertaken, and suggestions made by me were subsequently acted upon. By conference with the officers at the High Commissioner's Office and with the Imperial Government Department's officers much valuable information was also acquired. The subjects of inquiries were very varied, as the following list shows: (1) Inquiry into laboratory fittings, glassware, and apparatus; (2) Fertilizer Acts; (3) training of Government analytical chemists; (4) agricultural soil research; (5) dairy research; (6) animal-nutrition research; (7) boric acid in butter; (8) containers for butter; (9) rodent-destruction methods; (10) condition of the New Zealand exhibits at the Imperial Institute; (11) the nitrogen question, and the possibility of the successful exploitation of nitrogen manures and other compounds manufactured by means of hydro-electric power in New Zealand; (12) New Zealand dyes from Native plants; (13) soil research.

Iron-hunger (Bush Sickness) in Ruminant Stock.

Probably the greatest good attained by the writer's seven months' furlough was in discussing this malnutrition disease and obtaining the approval of high authorities to the theories advanced by this Section to account for the trouble known previously as "bush sickness." The theory that this is caused by direct deficiency of iron in the natural herbage, although published some two years ago, has not met any serious criticism from professional sources.

At the last Rotorua Agricultural Show the exhibit of stock raised at the Department's Mamaku Farm created great interest, mingled with some incredulity. It seems from letters received from practical farmers having had long experience in this country, that the Department in its work at Mamaku is really creating astonishment in the minds of those who take the trouble to visit the farm, inspect the stock shown at the Rotorua Show, or really read the reports with intelligence and apply themselves to following out the advice given.

Soil Survey.

The soil survey of Rotorua County has been further advanced. Over 200 samples were collected by members of the staff and by the officers in charge of the topographical survey of the Rotorua district, whom I have to thank for much valuable assistance. It has now become possible to prepare a provisional soil map of the northern portion of Rotorua County, showing the different types of soil, and this map will shortly be published. Arrangements have been made to station Mr. Grimmett, of the Laboratory Staff, at Rotorua for six months, during which time it is hoped to obtain the samples required to fill in the gaps in the soil map and to extend the survey to the southern portion of the county.

In addition to the work in Rotorua County, the examination of the soils of the Wellington District has been carried a stage further, and a preliminary visit has been paid to Central Otago, where a soil survey of the fruitgrowing areas will be undertaken as soon as the necessary arrangements can be made.

A considerable amount of time was occupied in making an extensive series of analyses (fifty samples) of soils from the Samoan Crown estates, at the request of the Samoan Administration.

Investigation of Wheat and its Products.

The quality, or capacity to produce a good loaf, of flours obtained from local wheat varieties has been investigated further this year. Varieties differ considerably in quality, and though a certain variety may yield an excellent number of bushels per acre it is possible that the flour milled from that wheat may possess only medium breadmaking properties. Some thirty-two samples of different wheat varieties were tested during the year on this Section's experimental flour-mill. Most of these were grown at the Ashburton Experimental Farm, though several were obtained from Otago and other parts of Canterbury. Comparatively few of the more common varieties were received, the samples being generally of lesser-known wheats. Several of these were of considerable interest, especially the varieties Marquis, Red Fife, and Yeoman, which in the country of their origin produce bread of excellent quality.

The wheat yielding the greatest amount of flour was Hybrid W, which produced the excellent amount of 77·3 per cent. flour. This variety is said to be a possible rival to Victor, which it resembles. Victor, however, usually gives a flour of medium quality, as demonstrated by this Section in 1923, and since confirmed by practical bakers (*N.Z. Journal of Science and Technology*, 1925, vol. 8, p. 38). Outstanding varieties as regards yield of flour per bushel of wheat were Hybrid W, Zealand, and Essex Conqueror. As data on the milling and other properties of wheat are gradually collected it should be possible to obtain significant figures not only for provinces but eventually of each wheat-growing district. Chemical and experimental baking-tests were carried out by this Section and much useful information obtained. From the point of view of quality Essex Conqueror, for the third year