

Several bulk samples of pasture from cocksfoot experimental plots at Marton have been received for lipid constituents, including glycerides, waxes, and phosphatides. The proportions of these constituents have been shown not to vary greatly over the period of observation, and study of their composition is at present in progress. Knowledge of the lipid (ether soluble) constituents of grasses is important for the recognition of abnormalities in the composition of pasture collected from facial-eczema paddocks.

Investigation has been commenced of the yellow pigment responsible for discoloration developing in certain sheep carcasses after the animals had been slaughtered and kept in cold storage.

Concurrently with the pasture analyses a programme of soil moisture, nitrate, and ammonia determinations has been carried out on certain of the experimental paddocks. A feature that has emerged and which greatly complicates the work is the extreme variation in soil nitrate found at intervals of a few hours throughout a single day. This may change from a level as low as 10 p.p.m. in early afternoon to one of 80 p.p.m. two hours later.

Lamb Mortality: Canterbury.—As part of a co-operative scheme, chemical analyses are being carried out at fortnightly intervals on pasture samples from several farms in Canterbury which are under close observations by veterinary and fields officers. The same analytical programme is adopted as for the facial-eczema pastures, some useful comparisons being thereby made possible. The soils have also been submitted to the usual conventional analysis. As many factors such as weather conditions, handling of stock, parasitic infestation, &c., affect the incidence of lamb mortality, the significance of chemical work cannot become apparent until much data from various aspects has been assembled over several seasons.

Reporoa.—The investigation into alleged poisoning of live-stock from arsenic naturally occurring in soils and waters (see annual report for 1937-38) has been continued and a comprehensive report submitted to the Lands Department. This includes a map and tables showing the distribution of arsenic in soils, muds, and waters; ante- and post-mortem notes and figures for arsenic in the organs of some thirty-one cases of live-stock mortality; the arsenic content of series of urine samples both from healthy and ailing animals; the arsenic content of pasture samples and accounts of experiments conducted with cattle at Reporoa and Wallaceville. Sixty-five samples of muds and soils were collected. Muds varied in arsenic content from 0.0068 per cent. to 1.9 per cent. of As. Representative samples of the whole soil to 9 in. depth in pasture lands varied from 0.0008 per cent. to 0.525 per cent. of As. Thirty-nine samples of water from springs, streams, and surface depressions showed amounts varying from a trace to 2.6 grains of As_2O_3 per gallon. Arsenic in the mud deposits was present in different places, either in combination with iron in impure limonite (the arsenic readily soluble in dilute acid) or as sulphide combined with sulphur (insoluble in dilute acid). In some places up to 5 per cent. of orpiment and realgar was found in orange-yellow siliceous deposits.

Farmers were advised as to likely sources of arsenic intake on their farms so that they might take measures to minimize danger to stock.

The evidence from the live-stock experiments and the analyses of organs of dead animals, and of urine and other samples from live animals both healthy and ailing, is too complex for brief summary, but is being published in a technical journal.

The general finding was that arsenic is of widespread occurrence in the spring and drainage waters and the soils of the lower-lying portions of the Reporoa Settlement but that it is only responsible for a small annual mortality, together probably with a further but undefined amount of unthriftiness in live-stock.

Clean-growing pasture on arsenical soil contains normally too little arsenic to have any toxic effect, and crops such as oats are also harmless.

Farmers are recommended to fence off areas where arsenical springs occur or where the mud along stream edges or in depressions is strongly arsenical, to provide safe water, and not to graze recently flooded areas while the pastures are still muddy. It is considered that they will then have little trouble from arsenic poisoning.

Carcass Quality of Bacon Pigs.—As part of a series of feeding experiments undertaken at Ruakura to determine the influence of restricted feeding and the use of various supplements on the quality of bacon-pig carcasses, a large number of analyses of carcass fats have been carried out. The work includes the determination of the iodine value of the fat as an index of degree of saturation of the fatty acids and therefore of hardness, and quantitative determinations of the constituent fatty acids by distillation at low pressure.

Standards for Trace Elements in Pastures.—In co-operation with the Cawthron Institute and the Dominion Laboratory, work has been commenced to obtain some quantitative data on the occurrence of a number of elements which are present in traces in many pastures and in animal tissues but of the function of which, if any, little is known. Naturally healthy and productive pastures have been selected in several localities, and by means of movable enclosures clean samples are being obtained several times a year.

Cobalt and some other determinations are being made by chemical methods, and the samples are then handed over to the Dominion Laboratory for spectrographic analysis of the ash.

Grass Staggers.—During the short period in the spring when grass staggers was reported as prevalent an attempt was made to discover if the chemical composition of the pastures was influencing the course of digestion in such a way as to diminish the assimilation of magnesium. Studies were made of the acidity-alkalinity (or pH), and the content of soluble magnesium of the fresh contents of the alimentary canal in several cases where animals suffering from grass staggers were killed. No conclusions can yet be drawn as the number of cases available was too limited. It is hoped to continue this work next spring.