

CHEMISTRY SECTION.

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DEFICIENCY DISEASES OF LIVE-STOCK.

Bush Sickness.—Investigations in connection with bush sickness of ruminants have now become almost entirely academic in character. From a practical point of view the trouble may be said to be non-existent, or at least entirely preventable with the application of only slight modifications in ordinary sound farming practice. Whatever theoretical developments may take place, it is doubtful whether any remedial measure giving, in the hands of the farmer, safer, cheaper, or more certain results than the approved type of Ruatangata limonite (Reyburn's) used as a lick in equal parts with common salt, could be devised.

It must be remembered that other metal-salts besides those of iron—*e.g.*, arsenic—are capable of curing bush sickness in the individual ruminant, but there is no proof that any element known to be essential for nutrition except iron will prevent bush sickness in a series of generations as iron compounds do.

There exist large areas of border-line country where outbreaks of the sickness occur only in certain seasons (especially wet ones) or are confined to a percentage of young stock, where undoubtedly there exists great scope for extension in the use of limonite.

The amount of Reyburn's Ruatangata limonite distributed during the year for stock-lick purposes, 175 tons, shows an increase of about 15 tons over the previous year. In addition, considerable quantities of limonite from the Okaihau Quarries have been sold. No serious complaints about the quality or effectiveness of the limonite sold have been received. Samples of Reyburn's limonite submitted for analysis have shown little variation in composition or solubility. Although definitely good results were obtained with Okaihau limonite in field trials, there have been cases where farmers using limonite from that source have not been entirely satisfied, and have reported further improvement on changing to Ruatangata limonite. Some early consignments of Okaihau limonite showed marked variations in the solubility of the contained iron. In any case in which a farmer considers that his stock are not showing the maximum response to limonite treatment he should forward a sample of the limonite to the laboratory for analysis.

An interesting deposit of soft, high-grade limonite at Maketu, Bay of Plenty, was reported on and sampled for analysis. It was found to be sufficiently extensive to warrant quarrying for lick purposes. Analysis showed the material to have the very high solubility figure of 12.5 per cent. ferric oxide in the special sugar hydrochloric acid reagent, compared with 2.4 per cent. in the good Ruatangata limonite. Field-feeding trials with this limonite are fully warranted.

It is somewhat curious that in the Bay of Plenty District some farmers still continue to use large quantities of iron ammonium citrate in addition to the now almost universal use of limonite. Probably this is due, first, to the use of iron ammonium citrate having become so firmly established in this district prior to the introduction of limonite, and, secondly, to the initial supplies of limonite tried out in the Bay of Plenty being of the type later found to be ineffective. As departmental supplies are now becoming low it would be as well for farmers still desirous of continuing the use of iron ammonium citrate to make their own arrangements for its importation.

In view of the importance now being attached to trace elements in animal health and nutrition a number of limonite samples were examined for their content of zinc and cobalt soluble in decinormal hydrochloric acid. The following results were obtained :—

			Zinc. Parts per Million.	Cobalt. Parts per Million.
Ruatangata (highly effective)	..	..	3.0 to 3.3	5.9
Okaihau (good but variable in effect)	..	..	0.0 to 2.8	1.0 to 3.4
Puhipuhi (ineffective)	..	..	0.0 to 1.7	0.1 to 1.8

Samples of iron and ammonium citrate were found to vary in zinc content from nil to 50 parts per million and in cobalt from 6.8 to 8.6 parts per million. At the recognized daily dosage this would provide less than 0.015 mg. cobalt per sheep.

Analyses were made of various soils, pasture samples, and animal specimens from bush-sick and healthy areas for zinc and cobalt soluble in decinormal hydrochloric acid.

Soils.—The following table indicates the data relative to soils :—

COBALT IN SOILS (N10 HCl EXTRACTS).

(Values are given as p.p.m. cobalt on dry weights of soil.)

Bush Sick.				Non Bush Sick.			
Locality.		Lab. No.	p.p.m. Co.	Locality.		Lab. No.	p.p.m. Co.
Mamaku	..	W 932	0.10	Forest Lake - Frankton Jn.		D 18	0.33
Tokoroa	..	W 964	0.10	Invercargill	..	D 699	0.94
Kopaki	..	A 186	0.23	Miramar	..	E 382	0.56
Kaharoa	..	H 509 A	0.05	Waihou (Horahia)	..	E 655	0.93
Atiamuri	..	H 509 C	0.16	Hamarana	..	H 509 E	0.61
Average 0.13				Average 0.67			