

REPORT ON STOCK AND PASTURE INVESTIGATIONS IN THE NELSON DISTRICT, 1936-37.

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INTRODUCTION.

The spectacular results obtained with cobalt salts in the treatment of Glenhope bush-sickness has opened up a wide field of work. Animal experiments using cobalt salts in drench form have been continued at Glenhope and extended to the Moutere Hill country, where somewhat low figures for cobalt have been obtained in soil estimations.

Other methods of supplying cobalt to animals have likewise been investigated. A cobalt - common salt lick experiment has been established on Moutere Hills country, and the use of cobalt salts for pasture top-dressing has been put under test at Glenhope.

The very definite results obtained by the use of cobalt salts at Glenhope has raised the question whether cobalt supplies an actual deficiency or whether it acts in an indirect manner in improving the health of the animals. For the purpose of securing definite information on this point studies have been made of the cobalt status of animal organs from the Glenhope experiments and from healthy sheep grazed in other localities of the Nelson district.

In addition, attention has been directed to the cobalt status of healthy and sick pastures, and a start has been made in the determination of the cobalt status of different species of grasses and clovers and the influence of cobalt top-dressing on the intake of cobalt.

ANIMAL EXPERIMENTS AT GLENHOPE.

(a) *Drench Experiments.*—A group of five animals has now been receiving 8 mg. of cobalt weekly (as cobalt chloride) since 1st November, 1935. All the animals have remained perfectly healthy and show no signs of any detrimental effects as a result of this long-continued ingestion of cobalt. On 9th November, 1936, the control group in this experiment averaged only 66.2 lb. live-weight, while the corresponding cobalt group averaged 86.8 lb. Since that date to 14th April, 1937, the cobalt sheep have increased to an average weight of 100.4 lb. Several deaths have occurred in the control group, and the remaining animals showed symptoms of bush-sickness.

An older sheep has been receiving the cobalt drench since 4th September, 1935, and this season successfully reared a lamb. The ewe is in good condition.

These results indicate that at Glenhope, cobalt, without addition of other elements, is able to maintain sheep in health over an extended period.

(b) *Cobalt Top-dressing Experiment.*—Early in December, 1936, an area at Glenhope, known to be unhealthy in previous seasons, was top-dressed with cobalt chloride at 2 lb. per acre and with superphosphate at 2 cwt. per acre to obtain a pasture on which sick animals could be placed to examine the effect of a light top-dressing of cobalt on their health. On 22nd December, 1936, three sheep, definitely affected with sickness, were placed on this pasture. Symptoms of the ailment soon disappeared and considerable increases in weight were shown. Over the period 22nd December to 14th April these sheep have increased in weight by 27 lb. (average). The results are therefore quite promising.

(c) *Other Drench Experiments.*—The groups receiving a drench of an acid extract of Nelson soil and of an iron-free extract of Nelson soil since November, 1935, continue in good health. No deaths have occurred, and increases in weight comparable with those of the cobalt group have been shown.

The control group and that receiving a drench of hydrochloric acid have deteriorated badly this season. Two deaths occurred in each group. All the remaining sheep have been transferred to the cobalt-top-dressed area as they became sick.

ANIMAL EXPERIMENTS ON MOUTERE HILLS COUNTRY.

Four trials with hoggets or ewes and one with lambs, using the cobalt chloride drench, have been established on four farms on the Moutere Hills soil type. A lick experiment with cobaltized common salt has also been started. No definite results have yet been obtained as the trials only commenced in October, 1936.

COBALT CONTENT OF PASTURES.

Preliminary experiments conducted at the Institute have shown the ability of several pasture species to absorb relatively large amounts of cobalt when soluble salts of this element were incorporated into the soil. It was decided to investigate under field conditions (a) the cobalt status of different pastures on healthy and unhealthy country, and (b) the influence of cobalt salts on the intake of this element by pasture plants under different conditions of manurial treatment and on different soil types.

Experiments have been established on pakihi soil at Westport; on the Moutere Hills, and at Glenhope; at Appleby; and at the Marsden Research Farm, Stoke, to secure information on these points.

(a) *Healthy and Unhealthy Pastures.*—Samples have been available from several healthy pastures and from several unhealthy pastures. Glenhope (unhealthy) samples have shown only 0.03 p.p.m. to 0.07 p.p.m. of cobalt on the dry basis. Other unhealthy pastures have given figures within this range, whereas healthy pastures, especially from the neighbourhood of Nelson, have given a minimum figure of about 0.2 p.p.m. and a maximum of approximately 1 p.p.m. of cobalt on the dry basis. The cobalt content of unhealthy pastures does appear to be definitely low.

(b) *Influence of Cobalt Salts on Intake of Cobalt by Pasture Plants.*—A number of trials on several areas have been started, using applications of cobalt chloride ranging from 1 cwt. per acre down to