

MINERAL CONTENTS INVESTIGATIONS

The field trial commenced in the previous year has now been completed, and additional information has been obtained concerning the value of small applications of cobalt sulphate for the control of bush sickness at Sherry River.

Further examinations have been made of the experimental areas in magnesium-deficient apple orchards. Individual leaf analyses from manganese-deficient and other twigs have been continued.

Pot experiments to investigate the effects of potash and magnesium on a Nelson soil have been continued.

Cobalt Investigation.—As was reported last year, the trial at Sherry River to test over two seasons the value of applications of cobalt sulphate at 4 oz. and 8 oz. per acre showed that in the first season there was little to choose between the live-weights of the groups of sheep under the various treatments. In the spring of the second season (1944-45), however, the sheep on the cobalt-treated areas began to increase rapidly in weight, those on the area receiving 8 oz. cobalt sulphate in 1943-44 giving the greater increase. On the other hand, the animals on the control (no cobalt) area began to fall rapidly in weight. During the summer of 1944-45 all the animals on the areas increased in weight, although two deaths from bush sickness occurred on the control area. Maximum average live-weights were as follows: control, 91.7 lb. (at end of April); 4 oz. cobalt sulphate per acre, 111.4 lb. (at beginning of June); 8 oz. cobalt sulphate per acre, 122.0 lb. (at beginning of June). Later in the season all animals lost weight, those on the control area losing more than those on the cobalt-treated areas. At the last recording of live-weights on 29th September the average live-weights were as follows: control, 68.0 lb.; 4 oz. cobalt sulphate per acre, 103.4 lb.; 8 oz. cobalt sulphate per acre, 112.2 lb. Owing to the seasonal conditions no further live-weights were recorded before the sheep were shorn in the middle of November. The average yields of raw wool were as follows: control, 7.0 lb.; 4 oz. cobalt sulphate per acre, 7.9 lb.; 8 oz. cobalt sulphate per acre, 8.7 lb. These figures show that appreciable increases in wool yield were obtained following the use of cobalt sulphate. At the end of the trial all sheep on the treated areas were in fat condition. The higher rate of application of the fertilizer has been beneficial in increasing live-weight and wool clip sufficient to give a monetary return much greater than the cost of the cobalt salt employed.

During the course of the trial periodical samples of pasture were obtained for chemical analysis. In the earlier part of the trial the cobalt content of the pasture was increased twice and four times over that of the control for the 4 oz. and 8 oz. applications respectively. Later, the cobalt contents of the treated pastures tended to come closer together, but, with one exception, the treated pastures always showed at least twice the cobalt content of the dry matter of the control pasture, for which the average figure was 0.04 p.p.m. cobalt on the dry-matter basis. The cobalt contents of the pastures therefore correlate well with the responses of the animals as shown by their live-weights.

This trial has demonstrated that under the conditions at Sherry River a single application of cobalt sulphate at either 4 oz. or 8 oz. per acre will give good results with sheep over two seasons. The higher rate gave the better result both in live-weight increase and in yield of wool.

Magnesium Investigations.—Analysis of individual leaves from twigs of apple-trees has been continued for observation of variation of magnesium and potash contents. An improved Titan yellow method for estimation of magnesium down to 0.0025 mg. of magnesium has been found satisfactory. A description of this method has been prepared for publication.

Tissue Testing Method.—The methods of Carolus have been applied to apple, tobacco, and tomato leaves. While the methods for some of the constituents in the fresh tissue appear satisfactory, it was found that improvements in the magnesium and potash methods were desirable. These have been made. It is considered that the results now obtained are more reliable than by the original methods.