

## COBALT-CONTENT OF FERTILIZERS.

Seventeen samples of fertilizers comprising bone-dusts, blood and bone, Seychelles guano, North African phosphate, Nauru phosphate, Ephos phosphate, basic slag, and superphosphate have been examined for cobalt content. The highest figure obtained was 3.9 parts per million of cobalt in one sample of basic slag. For the most part the cobalt content of the fertilizers ranged between 0.2 p.p.m. to 0.5 p.p.m. of cobalt.

The analytical results indicate that the fertilizers in common use in New Zealand exert little effect in improving the cobalt status of unhealthy pastures. The higher figures for basic slags, however, are of interest in view of the opinion expressed by farmers that on certain pumice soils the use of basic slag for pastures has been associated with a reduction in stock ailment.

## COBALTIZED FERTILIZERS.

Laboratory tests have been made with a number of fertilizers and cobalt compounds or cobalt-containing materials with a view to the commercial production of a cobaltized fertilizer. The laboratory investigations have shown that there is no difficulty in making a cobaltized superphosphate, in which practically the whole of the cobalt is retained in a water-soluble condition. Cobalt chloride, cobaltite, and Rhodesian slag—containing 11 per cent. of cobalt—have all been used with success in the preparation of cobaltized superphosphate. By arrangement with Messrs. Kempthorne, Prosser, Ltd., Dunedin, the Dominion Fertilizer Co., Dunedin, and the Challenge Phosphate Co., Auckland, a total of 30 tons of cobaltized superphosphate containing approximately 0.20 per cent. cobalt was manufactured. No difficulty was experienced in the preparation of the cobaltized superphosphate, and the amount of water-soluble cobalt was over 85 per cent. of the total cobalt contained in the superphosphate. Arrangements have been made to test the value of the prepared cobaltized superphosphate for pasture top-dressing on farms in the volcanic-ash country of the North Island, in Southland, at Glenhope, Nelson, and on the pakihi lands at Westport.

In conclusion, mention must be made of the very valuable assistance rendered by all officers associated with the conduct of the cobalt investigations in the South Island. Dr. H. O. Askew has been in charge of all analytical work and, in addition, has supervised the field experimental work in the Nelson district. Dr. J. K. Dixon has been in charge of the field experimental work at Morton Mains, Southland, and has supervised the collection of pasture samples in the Southland and Ashburton districts. Acknowledgment likewise must be made of the generous co-operation of the Southland Frozen Meat Co., Kempthorne, Prosser, Ltd., the Challenge Phosphate Co., and the Dominion Fertilizer Co. in different aspects of the work. The conduct of the field-work has been greatly facilitated by the assistance of Mr. T. Blackmore at Morton Mains, Mr. N. McConochie at Glenhope, and Mr. C. Lemon at Westport.

## LEATHER AND SHOE RESEARCH ASSOCIATION.

Director: Mr. P. WHITE. Assistant Director: Mr. F. G. CAUGHLEY.

An important development during the year was the co-operation, for the purpose of research, of the leather-manufacturers and the boot and shoe manufacturers. As a result of the discussions by those interested, a Shoe Research Association was formed and linked up with the already existing Leather Research Association, the combined organization being given the title of Leather and Shoe Research Association.

One of the major advantages which may be expected to result from the combined Association will be a fuller mutual understanding of the difficulties and limitations under which the participating industries work. This is essential for success in two industries which are so intimately associated. If this result alone can be achieved the Association will have justified its existence.

The combined Association will facilitate a co-ordination of effort towards one common end. This is not possible to the same extent in two separate organizations each of which has to consider its own particular aspect. In addition, in two separate organizations there is liable to be a duplication of effort which it is hoped to be able to avoid in the combined Association.

In the comparatively short time in which the new organization has been in existence good work has been accomplished along the lines indicated. Leather research has been given a "shoe" bias, and shoe research is being developed with a "leather" bias where leather problems are concerned.

## LEATHER RESEARCH.

Advisory Committee: Messrs. A. E. Lawry (Chairman), C. Arlington, J. E. Astley, S. L. Wright, W. Donovan, F. Johnson.

The work carried out during the year was a continuation of that described in the previous annual report—viz., the examination of sole-leather in relation to its reaction to actual wearing conditions.

## HARDNESS OF SOLE-LEATHER.

As a result of the work it has been established that one important quality of sole-leather affecting resistance to water-absorption in wet weather is the hardness of the leather in the wet condition. As resistance to water-absorption and good wearing value go hand in hand for wet-wear conditions, hardness is also definitely correlated with the wearing-value of sole-leather. Hardness may be imparted to leather either by definite tanning processes or by rolling.