

POTASH-SUPPLY.

The shortage of potash salts owing to the main source of supply—Germany—having been cut off, and the export from Spain of recently discovered potash prohibited by the Spanish Government, may not be expected to influence New Zealand agriculture unduly for the few years that the war can last. In the meantime such direct substitutes as wood-ashes, stock-urine, stable manure, and flax-waste can be used where obtainable, and indirect potash fertilizers (which liberate potash from soil silicates), such as common salt, sodium sulphate, lime, and sulphate of lime (gypsum), may be used where direct substitutes are unobtainable. Laboratory experiments are still in progress with a view to discovering a direct substitute. Many analyses of wood-ashes have been made. (For further information see articles in the Department's *Journal* for July and October, 1915.)

LIME AND LIMESTONE.

The supply of cheap lime has occupied much of my attention, and I am pleased to report that the idea of developing the soft-limestone deposits of the Dominion is now receiving a thorough trial. Acting on my suggestion, the Fields Division of the Department and the Geological Survey have devoted some time to locating and drawing attention to the matter. The owner of one deposit of soft limestone in an arid region, after breaking up the freshly dug material on a floor, passing it through a rough screen, and, bagging it, has disposed of some 500 tons. The portion rejected by the screen, but of the same chemical composition, is thrown on one side and is carted away in bulk at a cost of a few shillings a ton by the farmers adjacent to the works. A sample of this was found to readily disintegrate when pressed between two boards, and would therefore weather readily on the land, especially after a few frosts.

Since my last report deposits of a very high grade of soft limestone have been located in the Wairarapa and at Taihape. In the former case I am assured by a reliable observer that the deposits are extensive, although unfortunately not near a railway. I hope when a convenient occasion offers to report more fully on both of these. The results of the samples analysed were highly encouraging. Further information on the subject will be found in those articles in the *Journal* dealing with this matter and with fertilizers generally, where the value of wood-ashes as a source of lime is also pointed out.

A large number of samples of limestone have been received from farmers and from officers of the Fields Division, and have been reported on as to their suitability for agricultural purposes. Included in these may be mentioned papa, which is merely a sedimentary deposit containing a little more carbonate of lime than usual in New Zealand soils. It is not likely to prove of any great value as a soil-dressing.

Richer than papa in carbonate of lime are the deposits of shells often found on coastal mud-banks or raised beaches, and several inquiries have been received with regard to this source of lime. Whether it would be profitable to use such deposits as limestone dressings must depend on the local conditions. Except for those farms very near the deposits it is doubtful if they could be profitably utilized.

Advice has been given to lime-manufacturers as to the requirements of farmers, and visits have been paid to various lineworks, including those at Te Kuiti, Mauriceville, Ward, and Manawatu Gorge, Woodville, Napier, and the Wairarapa deposits. Much time has been spent in consultation with various firms and with the officers of the Public Works Department concerning limestone-reducing machinery. As a result of my advice a prominent South Island firm has installed grinding-machinery for producing agricultural ground limestone. As to the precise form of machinery necessary for reducing limestone to a state suitable for agricultural purposes no general advice can be given, as the advice is likely to vary according to the stone it is desired to treat. Some stones appear excessively hard, but with very simple machinery, absorbing low power, are reduced very easily when thoroughly dried. Some limestones require no grinding, and may be applied as dug from the face; other limestones are so hard that it required heavy machinery; lastly, the siliceous limestones are hardest of all, and require the finest grinding to promote efficiency of the product.

A well-known firm which is agent for a pulverizer figured in the *Journal* has made the liberal offer to install their machinery, and take it away without charge if the production is not up to guarantee in quality and quantity. Where the stone is suitable for this machine no doubt the offer would be repeated. This machine is already installed in New Zealand, and could be seen by those interested.

At present the most favourable result with this machine has been obtained with a Canterbury limestone, which on a conservative estimate, including all possible charges, costs 4s. per ton to reduce to a powder, 86.5 per cent. of which passed through a sieve of twelve meshes to the linear inch—a satisfactory result.

Many complaints have been received from farmers concerning the difficulty, sometimes the impossibility, of obtaining supplies of lime or limestone, and of the cost of same, which might be due either to the initial price, the cost of cartage, or the freight in excess of the 100 miles free railage.

To those who contemplate erecting expensive reducing machinery I would, however, utter the warning that discoveries of soft limestone which need little or no pulverizing are becoming so common that it is likely to reduce the price which may be obtained for agricultural limestone (carbonate of lime).

The composition of limes and limestones sold to farmers has been the subject of some inquiry, and a report has been prepared which will shortly be submitted.