



FARM AND DAIRY



We Welcome Practical Progressive Ideas.

Trade increases the wealth and glory of a country; but its real strength and stamina are to be looked for among the cultivators of the land.—Lord Chatham.

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VOL. XXXV.

PETERBORO, ONT., FEBRUARY 24, 1916

No. 8

Lime and Lime Requirements of Ontario Soils*

A Concise Summary of a Farm Problem that Should Receive More Attention

THE two most variable factors affecting the composition of our soils are lime and organic matter; they are also the two most important factors affecting the productive capacity of the soil. A soil rich in lime is almost invariably strong and productive, and the animals consuming the crops it produces are usually thrifty, with plenty of bone. A soil rich in decaying organic matter is rich in nitrogen, carries a fair amount of available mineral plant food, has a good physical condition, and does not so readily suffer from drouth.

But, while an abundance of organic matter is desirable, the acids formed in its decay render the lime soluble and thus convert it into a form readily leached from the soil. Consequently, the better the land is farmed the faster will it lose its supply of lime. For this reason we find that generally speaking the longer the land has been farmed the poorer it will be in lime, and, when the lime is exhausted, the most active substance in neutralizing the acids of the soil is gone and soil becomes sour or acid.

Many Districts Need Lime

During the past season's work on the soil survey, we have had abundance of evidence that in many districts these changes have progressed far enough to render the application of lime necessary. In the course of the summer's work thousands of borings were made in the soils of the counties studied. In most cases the surface soil was acid to litmus paper, and there was not enough carbonate of lime present to cause any apparent effervescence when treated with acid until a depth of 30 to 24 inches was reached; in some cases there was none even at 40 inches. Our soils are apparently following the same general changes of those in the older lands, and our farmers will have to follow the practice long in vogue in these countries of returning lime to the land to replace that which has been carried away in the drainage water.

But soils that are deficient in lime not only become sour; they also change in their physical condition. The clays become sticky, waxy and difficult to work, and the sands become too loose and readily dry out. Lime improves the clays

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by rendering them more open and friable and the sands, more firm and compact. Lime also sets in motion many chemical reactions, whereby insoluble forms of potash and phosphoric acid are rendered available as plant food. Lime is essential to the life of the organisms that bring about the decay of organic matter as these cannot live and work in the presence of acid. Many domestic plants, particularly the legumes, can-

not grow in an acid soil, nor can the organisms that live in the nodules on these roots multiply and gather nitrogen from the air, neither can the various classes of bacteria that are now recognized as nitrogen-gatherers, carry on their work in a soil that is sour or acid. In these and many other ways lime is valuable in a soil, and when we remember that lime is one of the least costly of the materials that we may add to the soil, we have another reason why its use should not be overlooked.

As the term "lime" is generally used it may mean any one of a number of different compounds of calcium. It may not be out of place to describe some of the compounds that are being offered for sale. Lime, meaning the fresh lime, or quick lime, air-slaked lime, hydrated lime and ground lime-stone, are the common forms of lime offered for sale.

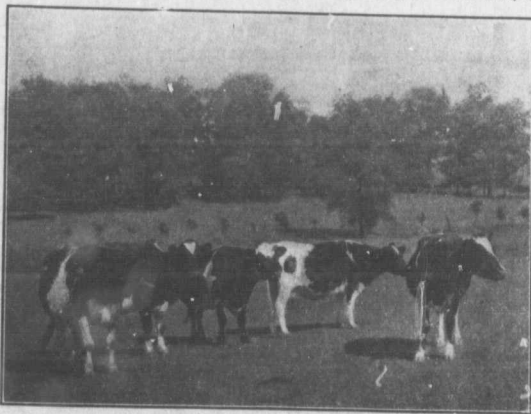
Quick lime must be slaked before it can be evenly distributed over the ground. The best plan is to distribute it over the field in small heaps, much as is done with stable manure. Forty heaps of fifty pounds each, two rods apart, is an application of approximately one ton per acre. If water amounting to one-third the weight of the lime be added and the heap covered with about an inch of soil, the lime will soon slake, when it may be spread with a shovel. This latter operation is not a pleasant one, but if the slaked lime is mixed with earth, and a damp day chosen for the work, it may be accomplished without any great inconvenience.

Hydrated lime is simply the quick lime slaked, screened and bagged. It is consequently more expensive, but its action in the soil will be the same as quick lime slaked in the field.

Air-slaked lime is quick lime that has been allowed to slake without the direct addition of water. It differs from the freshly slaked lime in that it has taken up some carbon dioxide from the air, and part of the lime has passed back into the carbonate condition. The amount that has been thus changed will depend upon the length of time the lime has been exposed to the air.

Ground limestone is simply the limestone rock, similar to that which is burned in the preparation of quick lime, finely pulverized. Naturally the more finely it is ground the quicker it will react in the soil. The coarser-ground material will remain an active agent for a longer time in the soil. Consequently it is not essential that the whole of the material be very fine. Generally speaking, if the rock is so pulverized that the larger particles are no bigger than flax seed and all the fine material that would naturally be formed in the process of grinding remain in it, it will be fine enough. The very finely pulverized material costs more to prepare and is more difficult to handle, and does not serve the purpose any better; for applications of ground limestone only need be made at intervals of four or five years. The finest materials will come into use first and the coarsest later. At the same time, it may prevent a too rapid leaching away of the material. *Mari* is

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A Part of the Herd: Bred for Business and Looking the Part.

*An address before the W.O.D.A. convention at St. Mary's, in January last.