

fertilizers cannot exert their full influence, but remain largely or wholly undissolved and inert until such time as—if not too late—favorable conditions may be restored by adequate rainfalls.

LIME AND LIME COMPOUNDS.

In view of the growth in the practice of liming, but also because of the fact that ground limestone is sometimes sold fraudulently as a fertilizer (this applies particularly to the Province of Quebec) the nature and particularly to the compounds merit brief mention here.

The purpose in applying lime or lime compounds to the soil is usually primarily to neutralize acidity, but may be to liberate plant food (potash in heavy soils), to improve the tilth of clays and clay loams, or, less frequently, to furnish lime for crop nourishment.

Prominent scientists have, within recent years, expounded new theories regarding the chemistry of what we have always termed "soil acidity," but these have not yet changed the practice of liming or annulled the benefits accruing therefrom. The fact remains that, through lack of lime in suitable form, certain soils become acid—a condition unfavorable to the growth and activities of the special bacteria which we desire to encourage—and that such acidity may be neutralized by an adequate supply of ground limestone or lime. It is significant to note, in this connection, that the crops most likely to derive benefit from liming are the legumes—clover, alfalfa, beans, peas, etc.—which carry the nitrogen-gathering bacteria in their root-nodules.

The farmer himself may test his soils for their approximate lime requirements by the simple method employing blue litmus paper. The latter may be procured, in strips, from any drug-store. Having obtained a representative sample of the soil to be tested, a strip of litmus paper should be placed in a tumbler, the paper being bent L-shaped, so that the lower end lies flat on the bottom of the glass. A few ounces of the sample may then be poured carefully into the tumbler and boiled water, sufficient to thoroughly moisten all the soil, added. If the soil is very strongly acid, the reddening of the litmus paper will commence almost immediately. If, after the lapse of fifteen minutes, no distinct signs of reddening appear, there is no acidity present and no need for liming. The rate at which the blue litmus paper turns red and the intensity of the coloring may afford a more or less reliable indication of the degree of acidity present. In performing the test great care should be taken to avoid touching the sensitive litmus paper with moist hands, which would cause the paper to redden. The placing of the litmus in the bottom of the tumbler, a method adopted by the writer, enables the operator to observe progress without withdrawing the strip from the tumbler, or laboratory beaker.

The naturally occurring limestone, a carbonate of lime (mild lime)—when ground so finely that at least 50 per cent. will pass through a screen having 100 wires to the linear inch—is the safest and generally most satisfactory form in which lime may be used agriculturally. For the correction of acidity two tons per acre is an ordinary application, but a high degree of acidity will demand more for its complete neutralization.

Marl is another source of carbonate of lime and, though less pure than the high-grade limestone, possesses the advantage of being more easily pulverized.

Ground limestone, if pure, will yield on burning—for every 100 pounds—56 pounds of lime, known also as quick lime or burned lime. The addition of water to quick lime produces slaked or hydrated lime, a fine powdery material. Air-slaking takes place when lime is left exposed to the air, as is sometimes done by putting the lime out in heaps on the field. Both quick lime and slaked lime are caustic and their use tends to promote a too rapid depletion of the humus or organic matter of soils. They should, as a rule, be employed only on "heavy" or muck soils.

The most important influence of lime on clay is in causing a coagulation or cementing together of the clay particles, resulting in a larger-grained, more friable and porous soil.

One ton of quick lime or one and a half tons of slaked lime would be approximately equal, for practical purposes, to two tons of ground limestone.

There are special ground limestone distributors, but the application of the material may be performed by an ordinary manure spreader, broadcast fertilizer sower, or from a wagon by means of shovels. Slaked lime may be applied in a similar manner, but quick lime is more difficult of application. The customary method is to put the quick lime out in small heaps on the field and allow the lime to air-slake before being spread by shovels.

Gypsum, or land plaster, unlike the other lime compounds considered, is incapable of neutralizing acids; indeed its liberal or continued use would result in the creation of soil acidity, since gypsum is a sulphate of lime, a compound of lime with sulphuric acid, the latter being one of the strongest acids known. Gypsum, both as a source of sulphur and as a liberator of soil potash, may influence favorably such crops as clover, turnips and potatoes. Superphosphate contains gypsum, a fact mentioned in article No. 2.

Small applications of gypsum, say 300 pounds per acre, may often prove profitable, but undoubtedly its use as a fixer of ammonia in stables is the more commendable. Sprinkled daily on the floors and gutters, gypsum will form a compound—sulphate of ammonia—with the ammonia of the manure, which would otherwise escape as a gas. The use of gypsum in this way will not impair its other qualities.

FERTILIZER CONTROL.

The reader who has followed this treatise through-

out will have perceived the need for a greater measure of protection being afforded the farmer's interests by stricter Governmental supervision of the fertilizer trade. Why should not the Government exercise some control over the composition and prices of fertilizer materials on the market and enforce measures to effectively restrain perpetrators of fraudulent practices, now permitted to pass unchecked?

The Highland and Agricultural Society of Scotland publishes annually, before the opening of the fertilizer season, a list of the current prices, at certain central points, of the various standard fertilizer materials, showing the cost per unit of the plant food therein. Our farmers have usually no reference on the subject, save the price list of the fertilizer manufacturer.

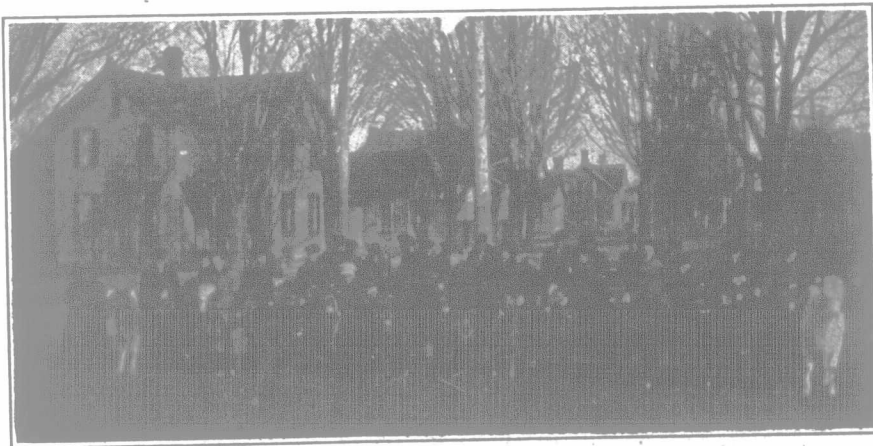
The Dominion Fertilizers Act came into effect in the year 1909 and was administered originally by the Department of Inland Revenue. On the dissolution of that department, in the year 1918, the administration of the Act was transferred, not to the Department of Agriculture where it logically belongs, but to that of Trade and Commerce and, since then, to the Department of Public Health.

The recent revision of the Act is in some respects retrogressive and certainly not in the farmer's interests.

Is it not reasonable to suppose that the Department of Agriculture, occupied as it is with the solution of the farmer's problems, among them those of soil fertility, is the one branch of the public service qualified to administer the Fertilizers Act?

In justice to the farmer and to the conscientious fertilizer manufacturer and dealer, the Federal Department of Agriculture should assume the administration of the Dominion Fertilizers Act (suitably revised), or, preferably, each individual province of the Dominion should, through its Minister of Agriculture, enact and enforce its own fertilizer laws.

(Conclusion.)



Sixteen Calves Distributed by the Bruce County Calf Club.

Odds and Ends.

As a result of the last general elections in Australia the Farmer's Party considerably strengthened its position by electing nine members as against three in the former House. Labor has twenty-eight members and the Nationalists (Premier Hughes' party) 37, omitting the Speaker, so that the Government stands in a precarious position and will need to "carry on" by the grace of the representation of Labor and Agriculture. The legislative battle is over the tariff with the prospect of the high wall enthusiasts being held in check. The Farmer's Party stands for free importation of agricultural implements, and no increases upon other items until shown to be necessary by an impartial tribunal, the Interstate Commission.

New Zealand is suffering from a great dearth of labor, skilled and unskilled, while domestic servants have become practically an extinct species. As in Canada and the United States, farm labor in the Island Dominion is especially short. The Government has resorted to the old expedient of assisting the passages of immigrants (farm laborers with wives) from Great Britain, and providing free passages with a £2 bonus to domestic servants.

A Michigan association of farmers is reported to be maturing plans for the establishment of two completely farmer-owned beet sugar factories. The object is to secure fair prices for the beet crop now said to be prevented by an alleged combination of manufacturers.

The Bolshevik Government of Russia is applying conscription in a new way—on the dictum that he who does not work shall not eat—in order to restore productive industries after 5½ years of destructive fighting. A lot of people have yet to learn that the ills of the world will not be cured by fighting and idleness.

Middlesex Co., Ont.

Alpha.

A Belated Seeding.

At time of writing, April 15, it is raining and snow is to be seen on the north side of fences and woods. It certainly does not look very spring-like, and at best seeding will be later than usual in this district. Last year seeding was under way in fairly good time, but untimely rains delayed operations and it was well nigh the first of June before some of the spring grain was put in the ground. One should be prepared to speed up the seeding once the land is in condition, but it is unwise to put the cultivating implements on clay soil, in particular, if it is at all wet. It is better to bide one's time getting the odd jobs straightened away, in readiness

for seeding. Seed time and harvest have been promised: they have never failed, and there is no use worrying about the weather. Those who are planting spring wheat should get it in as soon as they can in order to get the best results. Oats come next, while barley may be left until the last. Sod may be plowed for peas after the other grains are sown. No one can tell what kind of a season we will have, but it is a safe precaution toward the insurance of a crop to make a good seed-bed so that whether the season is wet or dry one can rest assured that he has assisted nature to the utmost of his ability. We have seen farmers get so anxious when seeding is delayed that they give very little preparation to the seed-bed. They take a big chance in doing this—sometimes they get a crop, and sometimes they do not. The cultivation helps the liberation of plant food for the benefit of the plants, and it also puts the surface soil in condition so that should the season become dry the evaporation of needed moisture will be at a minimum. The best seed available and the best seed-bed that can be made are none too good.

As soon as the spring grain is in, those who are putting in roots should get the land prepared and the mangels sown as soon as possible. Here again the quality of the seed-bed counts for a good deal. During a wet season it may not be practicable to plow the ground. If the land was plowed last fall it will not be necessary, of course, to plow this spring. Manure may be cultivated in and the soil put in fine tilth without the use of the plow. Sowing mangels on the flat is a more common practice to-day than rowing up. If it comes a dry season, it stands to reason that the plants will obtain more moisture when growing on the flat than when in drills. It does make hoeing a little harder, but what of that if a larger crop is obtained? Potatoes and turnips follow the mangel planting, but they may be delayed until early in June if necessary. In fact, turnips sown from the 10th to the 15th of June are likely to be firmer than those sown in May. The

roller may be used to advantage in the preparation of the seed-bed, especially if the soil is lumpy, but this is one implement which should be used judiciously. Leaving a field with a smooth surface increases the loss of moisture through evaporation, and also is an aid to soil drifting. The roller may advantageously be used to fine the soil and firm it around the seed, but light harrows should follow at an interval of two or three days. This will form a dust mulch which prevents the moisture from escaping. Where there is a nice, dry surface one may rest assured that there is not much evaporation, but you have possibly noticed

that while the surface is dry your footprint will be quite moist. This is due to evaporation of moisture from the smooth surface. It must be remembered that there is not enough rainfall during the growing season to supply the needs of our crops. If they are to attain the maximum growth, they must draw on moisture stored in the soil reservoir during the fall, winter and spring rains. It will be noticed that in a dry season following a comparatively dry winter and spring the crops are much lighter than during an equally dry season following a spring of copious rains. There is great need for the practice of dry farming in Ontario. By this we mean the conservation of soil moisture by proper cultivation at the proper time. The aim of every farmer should be to grow the best crops possible, even though a heavy crop is harder on the soil than a light one. There will, at least, be more fertility to return to the soil if the crops are fed on the farm. Bear in mind that the agriculturist must do his part if he would reap a bounteous harvest.

CANADA'S YOUNG FARMERS AND FUTURE LEADERS.

Bruce County Shorthorn Calf Club.

The calf-club movement is spreading rapidly throughout the Dominion, and it is one which is destined to create a greater interest in the raising and feeding of better live stock. Besides, it gives the boys and girls a little insight into business transactions. The banks are co-operating with officers of the Department of Agriculture and agricultural societies in forwarding the scheme. The Agricultural Representatives have been instrumental in creating an interest in this work in their various counties. Always apostles of good live stock they have instilled into the minds of boys and girls the desire to own and care for a pure-bred animal. Having an animal to call their own, and for which they are responsible, gives the boys and girls a little different viewpoint than when they are looking after "father's" stock. But there is also the tendency toward the creating of a liking for all classes of stock, and, with the development of the boy's animal, father's herd is likely to receive better attention. It is laying the foundation of future pure-bred herds which would otherwise be grades or cross-breeds. It is developing live-stock men who will no doubt be prominent in the show and sale-