The Fertilizer Requirements of Ontario Soils

Sidelights on the Soil Survey Now Being Conducted by Prof. Harcourt

IN the past three years, all unknown to the most of us, the soils of Western Ontario have been surveyed and classified by soil experts, working under the direction of Prof R. Harcourt of the Ontario Agricultural College, Guelph The initial survey work in the western counties has now been completed. The soils have been broadly classified as to their physical composition and the samples taken by borings on every sideroad and by-road west of Toronto are now being subjected to a chemical analysis. Similar work will be started in Eastern Ontario this summer. When this work is finally completed our knowledge of Ontario soils and their fertilizer requirements will have been increased immensely. A couple of weeks ago Prof. Harcourt gave the editors of Ontario's agricultural publications an outline of the work accomplished and a glimpse of some of the more important conclusions arrived at.

Roughly, the soils of Western Ontario may be divided into two general classes: (1) The lowland or deposit soils, once on a lake bottom; these for the most part are heavy clays (2) The upland soils on the other hand are glacial deposits and are generally gravels and loams, and it is on these soils that the problems of fertility are of most moment These requirements, Prof. Harcourt classifies under three heads—organic matter, lime and phosphorus. "Organic matter," said he, "is at the basis of all fertility problems. Organic matter or humus in the soil holds water and provides the agencies by which plant food is made available." Organic matter is generally found in sufficient quantity in the heavy clays when at all intelligently farmed, but in the upland soils the maintenance of organic matter is one of the big problems of soil management.

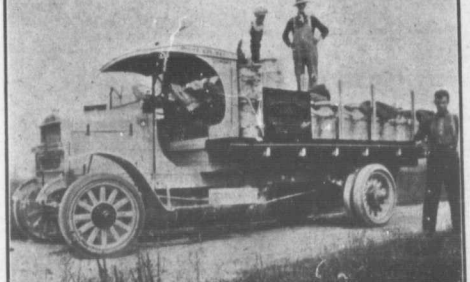
Lime Needed in Ontario.

Few realize how generally lime is required in the soils of Ontario. In the borings made by Prof. Harcourt's assistants it was found that, on the average, lime was not found in sufficient quantities until a depth of 24 to 28 inches had been reached. Even where lime was originally present in large quantities, for instance in soils of limestone formation, there may not now be sufficient lime in the surface soil to properly nurish a crop. The organic acids formed in the soil bring the lime into solution and in a soluble form it leeches down into the subsoil. This will happen in the richest soils and the better a man farms and the more organic matter he incorporates in his soil, the stronger will be the acid soil solutions and the greater the liability to lime leeching out. In the long run, therefore, the men whose farms will need lime applications most are those who farm the best. Prof. Harcourt mentioned it as a common observation over Ontario that clovers when first seeded would make an unsatisfactory growth, but once they had gotten their roots down into the subsoil would grow luxuriously. "This is because the roots have reached a supply of lime," said Prof. Harcourt. "I am convinced that in many cases the winter killing of clover in Ontario is due to nothing else than an acid soil."

"How much can one afford to pay for ground limestone?" was asked.

"Just as much as the farm would be worth without it," replied Prof. Harcourt, "and that might not be much. If a soil is allowed to become depleted of lime it is done for so far as crop production is concerned." Even in the lowland clay soils the need of lime is often great. In what Prof. Harcourt called the "Haldimand" clay there is an abundant supply of lime, while the "Milton" clay is deficient in lime. It was mentioned at this point that alfalfa thrives on the Haldimand clay, but its growth is rather doubtful on the Milton clay. The lime content of the two soils explains the difference and the survey which Prof. Harcourt is just completing will show in a general way just where in Western Ontario lime applications will be profitable and where they are not needed. One experiment in particular was mentioned where an application of limestone doubled the yield of potatoes, both plots being fertilized equally with manure.

Under average conditions an application of two tons of ground limestone to the acre will rectify any lack of lime in the soil. Where is this limestone to come from? Several companies in Ontario are now grinding limestone. A Buffalo concern has been making enquiries as to an Ontario market, and it is just possible that they will supply lime more cheaply than any of the concerns now offering their products on the market. A still more promising



A Connecting Link between Producers and Consumers.

"This shows the up-to-date way in which our milk hauler delivered our milk last summer," writes Wm. Scoble, of Wentworth Co., Ont., in sending this illustration to Farm and Dairy. The motor truck is coming into common use in collecting milk for city consumption.

source of supply is the cement companies, and just recently a representative of the Canada Cement Company called on Prof. Harcourt to discuss the feasibility of making ground limestone one of their products. These companies own limestone deposits and they have all the facilities on hand for grinding limestone on a very extensive scale.

Phosphoric Acid Needed.

There is a considerable section of Western Ontario where the soil is deficient in phosphoric acid, notably west and north from Guelph. Near Goderich, Prof. Harcourt spoke to one man who could not grow oats without applying phosphatic fertilizer. The farmers in this district, however, were buying expensive mixed fertilizers to help along their crops when all that they needed was the cheaper phosphatic fertilizers, such, for instance, as super-phosphate or ground phosphate rock.

An interesting and important result of the survey is Prof. Harcourt's announcement that Ontario soils are liberally supplied with potash which is now the most difficult to obtain of all fertilizer ingredients. In the first six inches of soil there is anywhere up to 40,000 lbs. of potash per acre in Ontario. The average grain crop will take from the soil only 100 lbs. of potash per acre, while mangels will take up to 300 lbs. per acre. It is evident therefore, that the potash supply in the first six inches of soil could not be exhausted by constant cropping in 100 years. The potash content runs from one and one-half to two per cent., but the content of phosphoric acid is as low as .2 per cent. Prof. Harcourt recommended that on these soils the nitrogen be gotten from the applications of barnyard manure and from the growing of legumes, that phosphatic fertilizers only be purchased and that the potash already in the soil be made available by thorough cultivation and by increasing the organic matter and therefore the organic acids in the soil.

A mere chemical analysis of the soils, stated Prof. Harcourt, will not determine just what that soil needs to grow crops as a chemical analysis does not indicate the availability of the plant food of the soil. In this connection it is interesting to note that the backyard gardeners of our cities have been sending numerous samples of soil to Guelph asking for directions for fertilizing. With a smile Prof. Harcourt told of a doctor who sent a soil sample about as big as a medical powder with the brief request, "Please prescribe." Prof. Harcourt's reply was, "Sample too small for diagnosis." To determine what Western Ontario soils really need and to supplement the work of the soil survey just completed, it is planned to establish demonstration plots on which some simple fertilizer experiments will be conducted. These experiments will test the general effects of organic matter, lime and phosphorous on the growth of various crops. These demonstration plots will be widely scattered over Western Ontario, special care being taken to have a plot on each different type of soil. The result of all of this work will be an ability on the part of the staff of the O. A. C. to give really intelligent directions to farmers as to the fertilizing of Ontario soils.

Making a Poor Farm Productive

"Mac" Visits an Old Friend and Learns a Few Things

HOW often we entertain misconceptions as to the operations of our own neighbors! There are men whom we have known for some time and whom we unconsciously think of as "business farmers." We know that they sell from their farms a tremendous quantity of produce. They are generally considered "big" farmers, and yet when we come to find out, all the land they work may not be more than one hundred acres or even less. We wonder what is the secret of their success, and usually find that dairy cows, covered ditches, and general careful farming have played a large part in working out the success that has been achieved.

Such a farmer as this is Wm. Campbell, who lives three miles north-west of the village of Maxville, in Glengarry County. I had lived within a couple of miles of his farm for eight years. I had driven past his gate dozens of times and had seen his team passing into town morning after morning with the wagon well loaded with milk cans, and had, without taking the trouble to enquire, gathered the idea that he was one of the more extensive farmers of the district.

It was not till recently, when in the neighborhood, and I called on Mr. Campbell, that I found out my mistake. As we walked through the big barn and looked at the rows of heavy producing grade Holsteins, 26 milkers, besides young stock, the stable full of farm horses, and the flock of sheep, I saw everything to confirm my former opinion as to the size of his farm. When I casually asked him how much land he owned and he informed me that he had, all told, 125 acres, but that quite a bit of it was occupied by bush and rough pasture, I was more than surprised. The most natural question for me then to ask was, "How much feed do you buy?" His reply was "Nothing but a few tons of concentrates."

The Secret.

Then Mr. Campbell grew reminiscent and said, "This farm wasn't always as productive as it now is. When I came here 16 years ago there were two frog ponds which drained across what is now a fine level flat, and kept the whole thing just one great bog. The drier ground had been cropped with grain for years till it simply wouldn't grow anything."

Mr. Campbell was thus up against two problems, that of draining those wet lands, and of restoring the fertility of the higher ground. He saw that to restore the latter he must have stock—preferably dairy cattle, and that to produce feed for those cattle while the poor soil was being improved, he must bring his bog land into production as well. To accomplish this, he had a large open ditch run down the centre of the flat to a satisfactory outlet. He connected the frog ponds by means of a covered ditch, which drained into the open one. He also put covered ditches in the other low spots and thus brought into satisfactory production spots which formerly were so sour that they would not grow anything but "horse tails." Regarding the change that during the intervening time had been worked on the farm through proper handling, Mr. Campbell said, "When I took my first crop off that eight-acre field, I got two loads. Last year I took eight loads off two acres of it."

Farm Equipment.

In equipping his farm Mr. Campbell has not gone to any unnecessary expense. He says that he has preferred to invest his spare cash in improving the land. However, soon after taking over the farm, he was obliged to build a barn. This still stands, a fine large structure which is both comfortable and convenient. A few years ago he built a concrete silo, a cement block milk house, and at the time of my visit had just erected a new iron frame machine shed.

The latest addition to the farm equipment is the milking machine. In speaking of it Mr. Campbell said that up to a few days before he bought the machine he had no intention whatever of doing so. He had always had sufficient help for milking and had got along alright. However, when the clocks were put ahead an hour, and he had to get his milk

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