Soils and Crops

Address communications to Agronomist, 73 Adelaide St. West, Toronto

X. Y:—Will you please explain the action of bacteria in relation to soil fertility?

Answer:—The action of bacteria in the soil is to bring about the decay of the organic matter and so reduce it to a condition that it can be used as food by plants. In the process of decay, acids are created which make plant food available. The nodules on leguminous plants are caused by bacteria, making possible the utilization of nitrogen from the air. This nitrogen, and, in fact, all soil nitrogen occurring as plant or animal remains, cannot be utilized by succeeding crops until it has gone through preparatory processes. First, it is broken down to ammonia, then built up to nitrite, and then to nitrate, the form in which crops take it from the soil. These processes depend entirely upon soil bacteria.

E. N. B.:—I understand that sweet clover sometimes introduces from 40 to 50 pounds of nitrogen per acre and also supplies humus-forming material. Would it be a good plant to grow to be turned down as a green manure?

Answer—Sweet clover would undoubtedly prove a very excellent green manure, but on account of its high value as a food for live stock it would seem unwise to turn it under in the crop stage. Dealing with this very question at an agricultural conference held at Winnipeg, Dr. Grisdale, Deputy Minister of Agriculture for Canada, pointed out that where sweet clover can be grown successfully, and the grower understands how to handle it, it would seem profitable to use it for animal food and to return the manure to the soil.

Nurse Crops for Seeding Clover.

Nurse crops are almost universally used when seeding clover. Their most important functions are: to reduce the cost of production of the clover hay (red clover being a biennial or perennial that produces little or no forage of value the first season), to shade the young seedling plants from the hot July and August sun, and to leave a sturdy stubble that will retain the snow and protect the clover from the heaving action of frost.

The cereal nurse crops, in order of their revenue-producing qualities, would usually stand: oats, barley and wheat, in Eastern Canada. In providing shade at the right time, and not tending to smother the clover seedling later in the season, the order would likely be reversed: wheat, barley and oats. In sturdiness of straw and the ability to withstand the weather and hold a blanket of snow on the field, the order would be: wheat, oats and barley.

The investigational work with nurse crops at Charlottetown over a period of six years, has been along two lines: First, to determine the best rates of seeding nurse crops, and second, a comparison of different cereals as nurse crops for clover.

The experiments on rates of seeding nurse crops were arranged in connection with a four-year rotation, hoed crop, grain, clover and timothy. Four rates of seeding were used each year with both oats and barley. The rates used were 1½, 2, 2½ and 3 bushels per acre with oats, and 1, 1½, 2 and 2½ bushels per acre with the barley. The returns, though not conclusive, re seeding for clover, were quite marked in the second year hay (timothy) in favor of the light seeding of the nurse crop. The rate of 1½ bushels per acre of either cereal, gave the best average returns for the two hay crops in the rotations. When the returns from the rotations were made up as a whole, roots, grain and hay, seeding at the rate of 1½ bushels per acre with oats and also with barley gave the highest average return per acre.

The experiment with different sorts of cereals as nurse crops was planned also with a four-year rotation of hoed crops, grain, clover and timothy. The three cereals, wheat, oats and barley were used. The rates of seeding were: wheat, 1½ bushels; oats, 2½ bushels; barley, 1½ bushels. A six-year average of the hay produced, places these in order of value as nurse crops: oats, wheat and barley. Taking into consideration the value of the hoed crops and grain in the complete rotation, then the average return per acre would place them in the following order: oats, barley and wheat.

Summing up then, the different factors to be considered in the selection of a nurse crop for clover, we are rather surprised to find that oats, sown at a rate that will give first quality seed grain, stands at the top, with barley second and wheat third. The results also indicate that these cereals are all satisfactory nurse crops when sown thick enough to produce the best quality of seed grain.

Poor Fruit and Vegetable Crops: How to Avoid Them.

The long Canadian winter gives farmers, fruit growers, market gardeners and dwellers in cities and towns abundant time to think over the work of the coming growing season, and to plan how to make use of their time in order to obtain the best possible crops; but sometimes opportunity is neglected, and sufficient thought is not given to the many problems which confront the man or woman who works on the land. If things are not clearly thought out and provision made for obtaining the seeds and other material needed to insure the greatest success, when the spring rush comes it may be too late.

There is such a difference in the quality of seeds of various kinds and varieties of vegetables that this should be considered when ordering. Take, for instance, the onion. The seed of this vegetable loses its germinating power very rapidly, and if one obtains old seed, or uses old seed that one has on hand, there may be few, if any, plants germinate. Moreover, even if some plants grow, there may not be enough to insure a good stand, particularly if the root maggots happen to be bad. Sometimes, also, the onion seed bought may be from strains which require a longer warm season for development than we have in many parts of Canada, and the result will be a large proportion of thicknecks. Seed that will germinate well, and its special strain or selection, are very important with other kinds of vegetables also, the greatest difference perhaps being in strains of cauliflower, cabbage, and tomato, but also such staple crops as beets, carrots, parsnips and turnips vary much in shape and trueness to type, and in other ways. If care is taken to order seeds from a reliable source, and to get, not the cheapest, but the best, the difference in price between the best seed and the ordinary will be repaid many times in the satisfactory crop that is obtained, provided that it is looked after and that the season is favorable.

Careful attention to the vegetable crop after the seed has germinated will do much to prevent a poor crop. There are cutworms, root maggots, flea beetles and other insects to combat and great vigilance is required in order to prevent damage from being done rather than in trying to control these insects after they are well under way. The poisoned bran mash is the best remedy for cutworms, and a supply of this should be on hand to apply just as soon as there is the first indication that cut-worms are about. For root maggots affecting cabbage and cauliflower, corrosive sublimate is the best remedy. Another treatment is necessary for the root maggots affecting onions, which often destroy almost all, or all, of the young plants. Bulletins dealing with these insects can be obtained free on application to the Publications Branch, Department of Agriculture, Ottawa.

There is often a temptation to sow seed or set out plants too early in the spring, with the result that the seed either rots in the ground, or else the young plants are killed or badly injured by frost, and when a resowing or a replanting is made, it may be too late to obtain good crops. The following hints may be of service:—

Seed to be sown early in spring, the young plants from which will stand some frost—beets, carrots, lettuce, onions, parsnips, peas, radishes, kohlrabi, garden cress, salsify, spinach, parsley and leeks.

Seed best sown in hot-beds, the young plants from which will stand some frost—cabbage, cauliflower, celery.

Seed to be sown after danger of frost is over unless it is planned to protect the plants—beans, corn, cucumbers, melons, potatoes and squash. Seed of late cabbage is not sown until May, but the plants will endure frost, and seeds of swede turnips should be sown late, although turnips will stand frost.

Seeds sown in hot-beds, the plants from which will not stand frost—melons, egg plants and peppers. These plants require a longer warm season than most plants, hence the necessity of starting them in hot-beds.

In order to prevent serious losses of the fruit crop it is important to begin early. If foliage of fruit trees is destroyed, the crop for the following year will be reduced very much, if, indeed, there is any crop at all that year, it will have a bad effect on this season's crop also. The tent caterpillars are increasing in Eastern Canada, canker worms are bad elsewhere, and other insects are destructive, hence the trees should be sprayed to kill them before they have done appreciable harm. Disease must also be controlled if loss to the crop is to be prevented. As caterpillars begin to work and diseases are active just when the leaf buds are breaking, or have broken, the spray materials should be on hand and the pump in good order to begin spraying. Spray calendars can be obtained from the Dominion and Provincial departments giving best formulas to use and times to spray, with information about the insects and diseases to be destroyed.

The conservation of moisture in the early part of the season is important if we are to prevent a loss of crop. Just at blooming time, and when the fruit is setting, it is necessary to have a good supply of moisture in the ground to insure the fruit setting should the weather be hot and dry at that season. Hence, early cultivation to conserve moisture and warm up the soil, so that growth will be active and there will be a flow of sap to the setting fruit, is very necessary.

Danger From Gasoline.

The writer happened recently upon an advertisement which began something after this fashion: "If a quart of gasoline will carry your Ford a distance of four miles how far will one gallon of it carry the roof of your house?" Certainly, here is food for reflection! Plenty of people there are who never stop to figure it out until after the explosion carries roof and walls and everything else before it. The danger of using gasoline for cleaning or other purposes, lies not so much in its being inflammable as in the fact that its vapor, when mixed with air in the proper proportions, is highly explosive. A slight draft will carry the vapor oftentimes to an open flame, and ignition, with explosive effect, will occur, regardless of the fact that one considered oneself sufficiently removed from such to be in no danger.

We recall a disastrous fire which occurred in a country town and which was due to the fact that two men sought to empty a barrel of gasoline into an underground tank. They were working in the open air unmindful of the fact that the wind was blowing directly from them toward the building where double doors stood ajar. Gasoline vapor was carried into the building and found its way to an open fire at the far end. The explosion which followed blew the whole side of the building out, let the roof fall in and more speedily than it takes to tell it the entire structure was a mass of seething flames. This is the time of year when gasoline for cleaning purposes is used oftentimes within doors because of inclement conditions outside. It should be remembered that the cooking or heating stove, the kerosene lamp or anything else of this kind offers the spark which will set off the explosion should the gasoline vapor mix with the air in just the right proportions. Be careful.

The first farmer was the first man, and all historic nobility rests on possession and use of land.—Emerson.

"Feeling" For Layers

This method is about as certain as the trap nest—Experiments with capons—Feeding costs — Excellent Flesh produced without confinement — Handling Baby Chicks.

BY L. STEVENSON, ONTARIO DEPT. OF AGRICULTURE.

The writer carried on a series of experiments with poultry when connected with The Agricultural Experiment Station for Vancouver Island, Sidney, B.C., and presents the following notes as among those worthy of consideration:

Determination of Egg-Laying.

A test was made of the feeling method, to determine its accuracy. Thirty hens that were under trapnest record were subjected to the feeling process for eight days: January 17 to 24.

The results of "feeling" were checked up and tallied perfectly with the "trapnesting," indicating that it is quite possible for any careful person to determine which hens are laying by feeling the bird for the presence of the egg in the oviduct, in the early morning before she leaves the perch. The method also has an advantage in that it eliminates the necessary confinement of the birds in a "trapnest" for a period which is frequently longer than is actually required to produce an egg

The great disadvantage of the feeling method is that it is impracticable for pedigree breeding, inasmuch that the eggs from individual birds cannot be recorded.

Experiments With Capons.

Thirty cockerels were operated on when twelve weeks old. These birds were a thrifty and well-grown lot, averaging 2¼ pounds in weight. After caponizing they were kept under the same conditions as the cockerels. The feed cost for a pound increase in weight was slightly less for the cockerels up to six months of age. At this time the cockerels and capons weighed the same. These birds were killed for Christmas trade when 264 days old, and weighed, plucked, 8 pounds 2 ounces. The percentage of offal was low, being but 18 per cent. of the total weight. The birds were not crate fed, but were finished on a liberal milk ration. The quality of the flesh was excellent, and the wholesale price received was 30 cents per pound. The advantages of caponizing are that an excellent quality of flesh can be produced without confining the birds in small feeding crates and the tender flesh can be retained to a greater age and weight. The cockerels made just as good gains, and when milk fed in crates for two weeks, produced the same high grade of flesh. Following is the feed cost of an eight-pound two ounce capon:

Feed cost to rear to end of third month	21.54
Feed cost to rear during fourth month	16.2
Feed cost to rear during fifth month	13.17
Feed cost to rear during sixth month	21.2
Feed cost to rear during seventh month	21.3
Feed cost to rear during eighth month	23.4
Feed cost to rear during December, 20 days	14.4
Total feed cost	$1.31.21

These birds were sold for $2.43 each wholesale, leaving $1.11.79 per bird. From this we can deduct 20 cents, the price paid for the bird as a day-old chick, and have 91.79 cents per bird for labor and shelter.

Handling Baby Chicks.

In another experiment a thousand one-day-old chicks were procured from two reliable local breeders. The first day they remained in the incubator, and on the second day they were transferred to the brooder, but were not fed until forty-eight hours old. The following hints on general treatment are given:

Do not chill or overheat the chickens, or disastrous results will follow. If they pant they are too hot, and if they huddle together they are not warm enough.

Do not overfeed during the first week.

Change the water daily and see that it is perfectly clean.

Give plenty of green food.

Feed sour skim milk whenever possible.

Do not forget to supply charcoal, grit, and shell.

Make all change of food and feeding gradually.

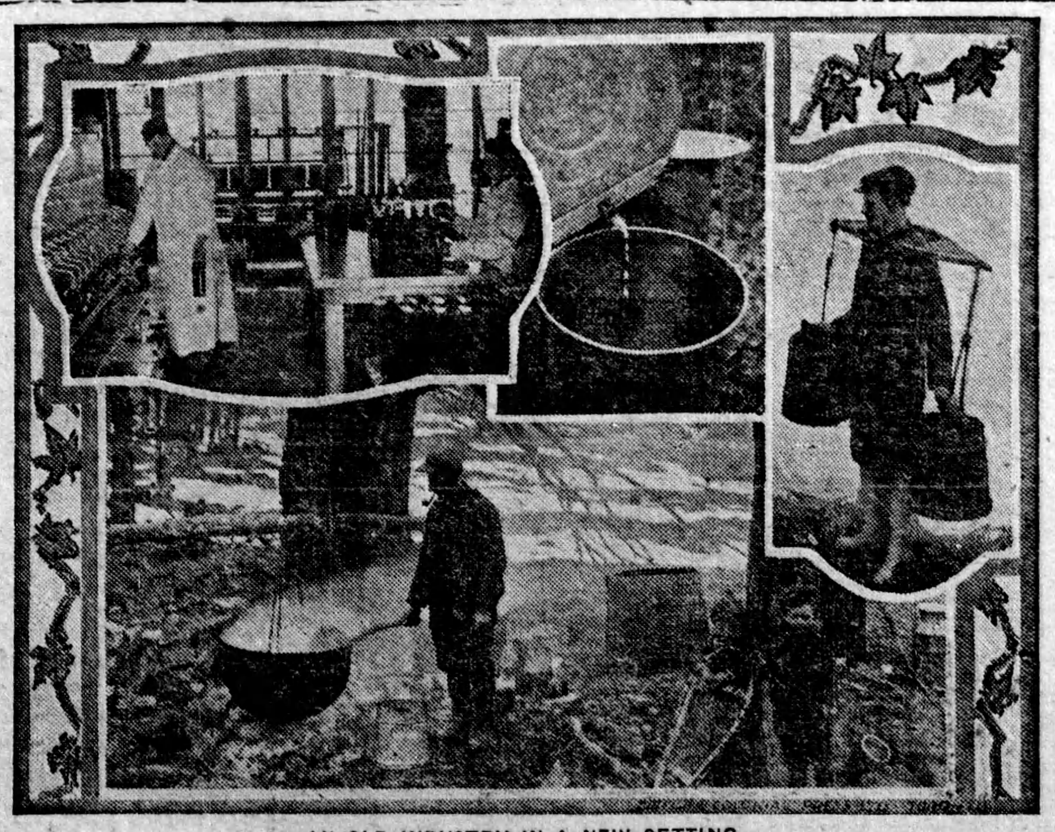
Clean and disinfect brooder often.

Do not use damp, mouldy feed or straw.

Never allow chicks to crowd in brooders or colony houses.

Place chicks on the range in colony houses, after the eighth week.

Do not let the cockerels and pullets run together on the range.



AN OLD INDUSTRY IN A NEW SETTING

Maple syrup and maple sugar, now delicacies, were originally used by settlers as a substitute for cane sugar, which was, of course, almost impossible to obtain. In some parts of Quebec and Eastern Ontario, the old methods of collecting sap and converting it into syrup are still used. The picture shows a farmer collecting syrup in wooden pails and boiling it at an outdoors fire. The upper central picture shows the modern method of tapping and collecting sap in sanitary receptacles, and the upper left-hand picture shows the scientific methods of handling syrup.

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TO BE OF SERVICE to Eastern Canadian Farmers and help to meet their needs in securing competent farm help, the Canadian Pacific Railway is prepared to utilize its widespread organization to provide such help from a number of countries.

The CANADIAN PACIFIC Railway will now receive and arrange to fill applications for male and female farm help to be supplied from Great Britain, Belgium, Holland, Denmark, Switzerland and Norway, in all of which countries the Company has representatives who have farmed in and are familiar with Eastern Canadian conditions and who are now in touch with such men and women ready and anxious to come to Canada.

THE GOVERNMENTS of the countries above mentioned have expressed their willingness to aid the immigration of this class of their peoples. In order to fill such applications satisfactorily and bring the help to the farmer at the proper time and with a clear understanding of the requirements and obligations of each, a printed "Application for Help" form has been prepared which can be obtained from any of the offices listed below.

The Company will make no charge to the farmer for this service nor will the farmer be required to make any cash advance whatsoever towards the travelling expenses of his help to the nearest railway station. The information necessarily asked for in these application forms, which will be held in strictest confidence, covers the following points:—the kind of help wanted—male or female—married or unmarried; date required and for how long; nationality desired; monthly wages offered; kind of work offered, etc.

MONTREAL, P.Q. { J. Dougall, Gen. Agricultural Agent, C.P.R. / C. La Due Norwood, Land Agent, C.P.R.

KENTVILLE, N.S.—Geo. E. Graham, Gen. Mgr., Dominion Atlantic Ry.

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J. S. DENNIS, Chief Commissioner, Montreal.