have been tried with complete success: (1) Covering with soil alone, without straw, but with ventilation; (2) covering with soil alone without ventilation, and (3) scattering absorbents amongst the potatoes while being pitted, using nothing but soil as a covering, without ventilation.

The objection to the use of straw is that it often gets so damp that it causes the potatoes to rot. Where no straw is used the soil absorbs the heat and moisture which are finally given off through the pores of soil, and, if the covering is not too thick, every pore in the soil is a good ventilator. On this basis, it is desirable to put on a thin covering of soil until frosty weather sets in; if the pit is made as steep as possible, there will be no danger of rain penetrating it. In using absorbents amongst the potatoes, dry ashes have proved beneficial; but there is no reason for raising an objection to lime, plaster, or salt, or any mixture thereof, although we have never seen experiments tried with these absorbents. If straw is used at all, it is better to put on a thin covering of dry earth first, and, as soon as cold weather sets in, put on a covering of straw and a final covering of soil.

Analyzing Soils.

We are in receipt of the following letter from a subscriber:—

SIR,—Would you be kind enough to analyze a little box of earth if I express it to you and tell me what it is deficient in, the best fertilizer you know of to use on such land, and where to get it? I have about thirty acres which are poor, and I thought if I could get a fertilizer which would bring it up so that I could get a crop of fall wheat from it and then seed it down to clover, it would be the best thing I could do with it.—G. G., Amherstburg, Ont.

We are pleased to find that farmers are beginning to take interest in such matters. We are constantly receiving inquiries of a similar nature, which we answer through our correspondence columns, but we desire to give special prominence to the above communication in the hope that a greater number of our readers will be benefited by a more comprehensive exposition of the subject.

The first question to be decided is, What have soil analyses accomplished for our farmers? Not much, if we depend upon the analysis alone; but if the analysis corroborates all the other evidence, it is all that can be expected of it at present. If it clashes with the other evidences, very little practical good can result. Some soil analyses have proved a success; others a failure. The chemist can find the percentage of the leading constituents of plant food, the extent of their solubility, and whether there are any ingredients injurious to plant growth; but there are certain constituents required by the plant, which may exist in such small quantities as to escape the analyst's notice, in which case some plants might flourish and others not.

If everything depended upon the chemical composition of the soil, analysis would be a much greater success; but we find that there are *physical* properties which cannot be overlooked. A condition may arise in which a soil which contains the greater percentage of plant food may produce worse crops than that which contains the less. For instance, a clay soil has great retentive power and can easily retain much more plant food than the crop requires, but it may be so stiff and so wet or dry as to be almost barren. Again, if the season is unfavorable, no amount of fertility can satisfy the demands of the crop. Another serious hindrance to the analyst's occupation is the difficulty in finding a proper solvent to test the solubility of the plant food. He can tell what percentage is soluble in water and in the various acids, but he does not yet know what degree of solubility the plant demands. It is well known that the roots attack insoluble matter and make its food available, the roots of some plants being greater assailants than those of others, so that the analyst is still at a loss to know just how soluble the plant food should be in every instance. However, it is believed that the plant food which is soluble in hydrochloric acid can easily be made available by the roots, but this standard is, at least, only approximate. The soil and subsoil vary so much in the same field that it is difficult to get a handful for analysis which may be taken as the average.

Those who read the experiments in potatoes recently published in the ADVOCATE will have a comprehensive judgment as to how soils should be analyzed, and each farmer must make the analysis for himself. We shall now proceed to show him how.

First get your soil into the proper mechanical condition; that is, see that it is neither too stiff nor too loose. This condition is attained by tillage, drainage, and applications of various sorts. If the land does not now produce a good crop in a favorable season, make a note of it; note also the nature of the crop, and whether or not insects or fungoid growths have been the cause of the failure. If not, the soil must be deficient in one or more constituents of plant food. If you now try another crop of a different chemical composition, you will be confirmed in the belief that the soil is lacking in something, and your duty is to find out what that something is.

We have often pointed out that the prominent deficiencies in mostly all soils are one or more of the following, viz.: nitrogen, phosphoric acid and potash, the other constituents of plant food being usually in sufficient abundance for the small requirements of all crops. Some soils, however, are deficient in lime. Let us first take up the question of potash. Here a knowledge of geology is required. If the stones found in your neighborhood consist largely of granite, they will have entered largely into the composition of your soil, and you will have an abundant supply of potash. The potash comes from the felspar in the granite, and the soil will consist largely of clay. Another evidence of potash is an abundant growth of potash eating trees or plants, such as maple, oak, beech, walnut or elm amongst the trees, and purslane and tansy amongst the weeds. Now, if the ashes of these trees were spread on the ground while clearing the forest, the land will be specially rich in potash, and you need no chemist to tell you the fact. If, however, your barn-yard manure has been badly leached from year to year, much potash will have been wasted, it being very soluble, and it is quite possible that a potash fertilizer will have a good effect. In other soils it is quite likely that potash is deficient, but it is cheaper to find out by applying a potash fertilizer than by employing a chemist.

Let us now consider nitrogen. Its source is in vegetable matter, rendered available for the plant by decomposition through various stages into ammonia and finally into nitric acid, the latter being the form in which it is taken up by the plant. Soils rich in vegetable matter are easily recognized by their dark color, but a soil may be somewhat light in color and still contain sufficient nitrogen for the crop. By thoroughly drying the soil in the sun, then weighing it, afterwards heating it, then weighing it again, the difference in the weights will approximate the quantity of organic matter in the soil, the organic matter being lost in the process of heating. Where large quantities of barn-yard manure are applied, or large quantities of stubble, weeds, clover, etc., plowed under, there will be a good supply of organic matter in the soil, but it may not be in a good condition for plant food. There are two main sources of loss of nitrogen: (1) Over-fermenting the manure heap, by which the nitrogen escapes in the form of carbonate of ammonia; and (2) summer-fallowing, by which nitrogen is lost by drainage in the form of nitric acid, the lime in the soil escaping at the same time. This loss is immense in a wet season.

We have now seen that every farmer has the means of testing his own soil for potash and nitrogen. With regard to phosphoric acid, however, there is no simple test. This valuable constituent is not governed by geological formations, and in organic matter it is found only in small quantities. The farmer who is sure of having plenty of the other constituents in his soil can, as a rule, greatly economise his manure by the addition of bone dust or superphosphate to supply the lacking phosphoric acid. If he cannot reach the conclusions above mentioned, his only remedy is to make several small plots in the field, where he can test all three constituents in different proportions. For nitrogen, nitrate of soda or sulphate of ammonia is used; for potash, muriate of potash or sulphate of potash, and for phosphoric acid, bone dust or superphosphate.

We may inform our correspondent that we have not yet appliances for the chemical analysis of soils; but in a future issue we shall describe how to analyze them mechanically and how to name them correctly, which will also be of service in making tests. The fertilizers named can be procured from dealers who advertise in the ADVOCATE. Every intelligent farmer can be his own chemist.

If farming is a business, look out for crashes.

Prof. Cook, in his paper on Economic Entomology, read before the American Pomological Society, says the reason why imported insect pests are for a time more destructive than native species is the fact that they have fewer parasites or predaceous enemies to contend with. In the course of a few years these enemies increase in such numbers as to hold them in check. He said that new insect pests are learning to feed on plants heretofore not disturbed by them, so the entomologist has constant work before him. Another thought was that as insects increase in variety and number insecticides are multiplied in equal if not greater proportions.