of crop, and different manures are suitable at different stages of the growth of the same plant. Phosphoric acid, potash and ammonia are largely demanded by all crops, and soils are most rapidly exhausted of these constituents.

Farmyard manure is the most universally applicable, but its supply is very limited in proportion to its demand. It can be aided or even supplemented by the judicious use of substances containing nitrogen, such as guano, sulphate of amnonia, nitrate of soda, rape cake, &c., and those containing phosphoric acid, such as apatite, coprolites, bones or animal matter, superphosphate of lime, mixed phosphates containing lime, magnesia, potash and ammonia, as in "artificial" manures, guano, and those containing potash, as the ashes of plants.

Wheat and cereals demand a very large proportionate amount of ammonia and next of phosphoric acid—silica, lime, etc., being generally present in sufficient quantity Potash is also largely supplied by most soils.

Turnips and root crops, though having as large a percentage of nitrogen as cereals, liave also the marked property of absorbing ammonia from the atmosphere, and thus getting a quantum of nitrogen do not require it so much as manure. It is very serviceable after the plants have attained a vigorous growth, and should be combined with carbonaceous manures and placed not too near the seed as their presence is prejudicial at an early stage though most necessary when approaching maturity for the development of the weight of the bulb. The soluble phosphates are the most demanded by turnips and root crops at an early stage of growth to promote active development, but are not needed as they approach maturity for they do not increase the weight of the bulb.

Phosphates alone used as manure are not successful. The amount of phosphoric acid in the turnip crop is not larger than it is in the wheat crop, yet experience teaches that a direct supply of soluble phosphates is more influential in promoting the growth of the turnip than wheat, and herce they must exercise some important function in its development.

To give an idea of the amount of material obtained by crops from the soil as minerals, and the amount of soluble mineral or ash constituent present, from the air and soil as gaseous ar aerial, or as often termed organic constituents, I present a table which I have compiled from those given by Magnus and Lawes and Gilbert,—and as well an analysis of the soil. The quantity of each constituent is given in pounds weight, and they exist of course in combination though spoken

of as in the free state. Straw and grain are included in the analysis.

Per acre of soil one foct deep, soluble in acid—lbs	
7581 3-73 223 26 26 28	Phosphoric Acid
12-00 12-73 13-73	Potash
35794 4-73 9 112 123 323 660 121	Lime.
10180 1-89 6 7 8 11 4 32	Magnesia.
17920 61-3 102 88 90 6 11	Silica.
80468 94 182 171 184 102 289 373	Totals.
10 55 56 56 113 124	Nitrogen.
4080 3891 3513 3777 2957 4150	Dry Crop.

In no part of the Dominion are correct ideas of the chemistry of agriculture more needed than in Nova Scotia, where many farms are quite run out. I have seen thousands of acres lying waste in different parts of the province, and on enquiring the cause from those in the vicinity they said the land was spent and not worth the trouble of tillage, though it had at one time been good.

The rotation of crops and manures which obtain in England are not on that account necessary for Nova Scotia, but the principles which dictate and the occasions which demand rotation are precisely the same. The composition of our soils may vary from those of Great Britain, but good tillage and judgment in the selection of appropriate manures for plant food are as necessary for the one as the other.

To assert that Nova Scotian farms want the same manures and crop rotation as Rothamstead would be haphazard, but to say that our farms want as good tillage and as careful experimenting is simply a statement of fact.

The soils of Nova Scotia are extremely varied, and their chemical analyses are not alone sufficient upon which to build a perfect system of agriculture. Because though chemistry may give all the constituents in their natural state of aggregation, it cannot positively state the in-

fluence on each of tillage and exposure to the air with the acquired solubility of its minerals. However it can suggest the most likely experiments to be tried in the way of manures and crops.

A rotation of crops applicable to most soils is the alternating of cereals with roots, vetches and clover, as these possess marked superiority in absorbing ammonia from the atmosphere and as well of assimilating the nitrogen and thus enrich the soil for a grain crop by the products of their decay, while their accompanying tillage has increased the soluble minerals from the vast insoluble reserve that makes up the mass of clay and sand and loam to which we give the general name of soil. Careful and intelligent agricultural experiments by the agricultural societies on the granitic, plaster, and alluvial soils of our province, would before many years bring unwonted fertility to our farms, and the demand for manures, whether phosphatic or ammoniacal could be freely supplied by the resources of our own province.

There is an old and very erroneous saying that "any kind of a man is good enough to make a farmer of," but even limited experience will convince that there is no human calling that can give as good and continuous return for the capital and intelligence invested as the farm. I could not say to Nova Scotian farmers buy a book and immediately set to work on what is wrongly styled scientific farming, for failure would be the probability. But rather study up the hest authorities on agriculture and set apart five or even one or two acres upon which to experiment with all varieties of crop and manure that would hold out prospects of succes. Thus there would be no fear of incurring any serious loss or disappointment. It takes energy and patience with study both of chemistry and agriculture to make a good experimenter on a plot of one acre, and this method alone when thoroughly and repeatedly worked out can give success. on the more extended area of the farm.

Young men designing to enter on an agricultural career would need to devote as much time to education if success is to be assured, as would be needed if they intended adopting the professions so called. For it is an extensive and complicated subject and can give scope to the most accomplished intellect in studying its mysteries.

Chemistry does and will do much for agriculture; it explains the changes taking place in and products resulting from vegetation; it gives, in competent hands, the composition of the active constituents of the soil and suggests the most appropriate additions thereto, or in other words directs EXPERIMENT, the crucial and TRUSTWORTHY TEST.