THE CANADA FARMER

VOL. III. No. 10. | TORONTO, UPPER CANADA, MAY 15, 1866. | POSTAGE FREE.

The Field.

Familiar Talks on Agricultural Principles.

EXAMPLES OF FERTILE AND EXHAUSTED SOILS.

The chemist is able to make use of the soil as a witness in its own behalf, and to obtain from it inconvertible evidence respecting its condition and the usage to which it has been subjected. It is a rather reluctant witness however, and requires a very scientific process and most careful examination, to make it disclose the secrets it can tell. The soils of Canada have not been very extensively analyzed, still some examples are within reach by the help of which the general statements made in the course of these "Talks" may be illustrated. Some analyses of Canadian soils were made by Dr. Hunt of the geological survey of Canada and published in the report of the survey for the year 1849 and 1850, and also in the general report in 1863. A few of these analyses are quoted in Dawson's First Lessons in Scientific Agriculture, whence we transfer them to our columns, together with most of the accompanying comments upon them. They are pregnant with instruction, and will richly reward patient study.

One of the soils analysed was a vegetable mould from the alluvial Flats of the Thames in Western Canada, and it is said to have yielded 40 or even 42 bushels of wheat to the acre, and in some instances to have been successfully cropped for thirty or forty years without manuring. Of the soil treated in this rascally manner, Dr. Hunt says:

"Such is the fertility of the soil in this region, that little need has hitherto been felt of a system of rotation in crops; but some however have begun to adopt it, and have commenced the cultivation of clover, which grows finely, especially with a dressing of plaster, which is used to some extent.

"The natural growth of these lands is oak, and elm, with black walnut and whitewood trees of enormous size; the black walnut timber is already becoming a considerable article of export. Fine groves of sugar maple are also met with, from which large quantities of sugar are annually made.

"I give here an analysis of a specimen of the black mould from the seventh lot of the first range of Raleigh. The mould here is eight or ten inches in thickness, and has been cleared of its wood, and used six or eight years for pasture; the specimen from a depth of six inches contained but a trace of white silicious sand.

"No. 1 consisted of—

Clay	83.4
Vegetable matter	12.0
Water	4.6
	100.0

100 parts of it gave to heated Hydrochloric Acid—

Alumina	2.620
Oxyd of iron and a Little Oxyd of Manganese	5.660
Lime	1.500
Magnesia	1.050
Potash and Soda	.825
Phosphoric Acid	.400
Sulphuric Acid	.108
Soluble Silica	.290

"

This, it will be observed, is a soil rich in alkalies, phosphoric acid, and soluble silica; and on these accounts, eminently adapted for the growth of wheat as well as of nearly all other ordinary crops.

With this may be compared a soil from Chambly, in Lower Canada, respecting which the following remarks are made:

"The soils of this seigniory are principally of a reddish clay, which, when exposed to the air, readily falls down into a mellow granular soil. In the places where I had an opportunity of observing, it is underlaid at the depth of three or four feet by an exceedingly tenacious blue clay, which breaks into angular fragments, and resists the action of the weather. The upper clays constitute the wheat bearing soils, and were originally covered with maple, elm, and birch; distinguished from them by its covering of soft woods, principally pine and tamarack, is a gravelly ridge, which near the church is met with about fourteen acres from the river; it is thickly strewn with gneiss and syenite boulders much worn and rounded. The soil is very light and stony, but yields good crops of maize and potatoes, by manuring."

"The extraordinary fertility of the clay is indicated by the fact that there are fields which have, as I was assured by the proprietors, yielded successive crops of wheat for thirty and forty years, without manure and almost without any alternation. They are now considered as exhausted, and incapable of yielding a return, unless carefully manured; and such, for the last fifteen or twenty yeas, have been the ravages of the Hessian fly upon the wheat, which is the staple crop, that the inducements to the improvement of their lands have been very small; so that the Richelieu valley, once the granary of the Lower Province, has for many years scarcely furnished any wheat for exportation. But the insect, which for the last three or four years has been gradually disappearing, was last season almost unknown, and the crops of wheat surpassed any for the last ten or twelve years."

"Of a number of soils collected at Chambly, only 3 have been submitted to analysis; they are—one of the reddish clay taken from a depth of sixteen inches, from a field in condition, and considered as identical with the surface soil before tillage, No. 2; and one at a depth of six inches, from a field closely adjoining, but exhausted by having yielded crops of wheat for many successive years without receiving any manure, No. 3; the latter supported a scanty growth of a short thin wiry grass, which is regarded as indicative of an impoverished soil, and known as herbe à cheval; both were from the farm of Mr. Bunker; the third, No. 4, is a specimen of the gravelly loam above mentioned, from an untilled field upon the farm of Mr. Yule."

No. 2 contained a small amount of silicious sand and traces of organic matter, and gave 5.5 per cent of water.

100 parts of it yielded to heated Hydrochloric Acid—

Alumina	3.300
Oxyd of Iron	8.680
Manganese	.160
Lime	.711
Magnesia	2.310
Potash	.536
Soda	.340
Phosphoric Acid	.418
Sulphuric Acid	.020
Soluble Silica	.180

No. 3 consisted of—

Silicious sand with a little feldspar	9.0
Clay	79.2
Vegetable matter	6.8
Water	5.0
	100.0

100 parts of it gave—

Alumina	not determined
Oxyd of Iron	4.560
Lime	.347
Magnesia	.888
Potash } Soda }	.380
Phosphoric Acid	.126
Sulphuric Acid	.031
Soluble Silica	.080

By the action of water, a solution containing minute traces of chloride and sulphates of lime, magnesia, and alkalies is obtained. 100 parts of the soil give in this way, of chlorine, .0013; sulphuric acid, .0005.

No. 4. This soil contained about 20 per cent. of pebbles, and 12 of coarse gravel; that portion which passed through the sieve consisted of—

Gravel	75.0
Clay	13.7
Vegetable matter	6.1
Water	5.2
	100.0

The soil was very red, and the sand silicious and quite ferruginous, consisting of the disintegrated syenitic rocks which make up the coarser portions.

100 parts gave—

Alumina	2.935
Oxyd of Iron	5.505
Lime	.156
Magnesia	.409
Potash	.109
Soda	.144
Phosphoric Acid	.220
Sulphuric Acid	.018
Soluble Silica	.080

The first of these soils, [No. 2] that which had not been exhausted, closely resembles in its proportions of inorganic plant-food, that first noticed. It is further to be observed, that while one of these soils, that from Raleigh, is very rich in vegetable matter, and the other, that from Chambly, contains very little, both are equally fertile as wheat soils. This is a striking evidence of the great importance of the mineral riches of the soil.

If now, we compare the fertile soil, No. 2, with the exhausted soil, No. 3, we see at once that the latter has parted with the greater part of its alkalies and