

I fancy I recognise the same teaching in a lecture given by a certain professor of agriculture at the meeting of the Dairymen's Association, held at Saint-Hyacinthe on the 16th January last. My readers may judge of this from the following extracts taken from the fourth report of the Association in question :

" A *rotation* is the succession of plants which follow one another on the land during a period of years at the end of which the course of cropping is resumed in a constant order which enables the land to produce the greatest possible amount without its fertility being impaired, and even sometimes enables it to regain that which it has lost by a too extended production of exhausting plants " (Page 79.)

" Other plants have the property of resting the soil, and of helping to economise its resources : they are those which extract from the land but little nourishment." (Page 81.)

The author makes special mention of *red-clover*, which, says he, " extracts the greater part of its nourishment from the air, and restores (*remburse*) by its roots to the land more than it has drawn from it." (Page 82.)

" The remains of red-clover constitute in the soil a manure which *maintains* its fertility, to the profit of the succeeding crops." (Page 82.)

" An instance of a rotation with successive crops .

- 1st year, cattle-roots manured ;
- 2nd year, barley or wheat, or both ;
- 3rd and 4th year, red clover, or a mixture of clovers and American tares :

5th year, wheat, or oats, or maslin (oats and pease), according to the quality of the soil."

This rotation is a *meliorating* one, since it comprises three *meliorating* crops against two *exhausting* crops."

The author, though he does not expressly say so, evidently classes *red-clover* among the meliorating crops.

I beg to state, with all humility, to the learned professor and to all of his way of thinking, that the doctrine is an erroneous one. Were this theory true, the plants, which borrow nothing from the soil, would grow as well on a bad soil as on a good one, on a suitable soil as well as on a soil not adapted to their wants, the preparation of the land would be only a work of extra refinement, even were it not entirely useless. Now what does experience teach us ? If the land is rich and well prepared, the clover crop yields well. In the opposite case, the yield is insignificant. If the upper layer of the land only is rich, the clover starts well, but fails when the roots reach the inferior subsoil. Nevertheless, the ambient air is the same every where. Then, the clover must find its food both in the soil and in the air, like all other plants, it yields more or less abundant crops, as the soil is more or less suitable to its growth. All the world knows that ! " But," say they,

the food matters furnished by the soil to the pod-bearers, are much less in quantity than those it furnishes to the cereals and the root-crop." Unfortunately, it is not so at all. Burn any plant you please, and you find that ashes remain, these ashes represent the mineral matters furnished by the soil. The heavier the crop, the more abundant are the ashes, and the proportion between the combustible and the incombustible parts of which the different species are composed, will show us if the loans levied from the soil are much greater as to one plant than as to another.

The subjoined figures show that red-clover demands for its development large amounts of mineral matters. The proportion of mineral matters of certain plants to their general composition is as follows :

	p ct.
Hard wheat	2.22
Soft wheat.....	2.12
Barley	3.10

Oats	3.25
Rye.....	2.60
Pease	2.10
Vetches, tares, lentils	2.30
Red-clover hay.....	7.76

As to Alsike and white-clover, the proportion is about the same. (v. p. 178.) (1)

These figures may vary a little according to different authors, but nothing can show more clearly the falseness of the theory, that so called meliorating plants derive their nourishment from the atmospheric air alone.

Here, I cannot refrain from a remark which must have already struck the readers : A plant which receives all its nourishment from the air cannot leave any ashes when burnt. (2)

Another remark I have to make is this :

" Among the meliorating forage plants," said the learned professor, " there are some which rapidly cloy or wear out the land, and cease to grow, leaving the soil in a state of exhaustion : such as red-clover and pease, which should never be sown again on the same land before the expiration of four or five years." (Page 82.) (3)

How can a plant which does not impoverish the land, but enriches it, cause such an exhaustion ? And why must we wait four or five years before sowing it again on the same land ? Besides, this statement is not in accordance with facts.

Here, on the contrary, is what is the real state of the case :

In a poor soil, red-clover will not take. If the subsoil is bad, the clover will not last. If the subsoil is rich, the clover will last a long time. The first season may cause it to disappear for a time, but in succeeding ones it seems to return to life of its own accord. Still, the time of its duration is limited. As age approaches, the roots of the clover prolong themselves, stretch out into the subsoil, and then obtain their food from the inferior layers. These lower beds must by degrees become exhausted, after an interval of some time, more or less extended, the clover, which no longer finds there sufficient nutriment, begins to suffer, and finishes by disappearing altogether for want of support. All plants whose roots penetrate deeply into the subsoil are in the same predicament.

The so-called meliorating plants feed just as do the so-called exhausting plants, and the former no more spare the plant-food in the land than do the latter.

Meliorating plants are a pure fiction of the imagination, they have no real existence.

The pod bearing plants grown for fodder dive into the subsoil for the chief part of their food, after harvest, they leave at the surface a quantity of refuse matter with which the upper soil enriches itself. These plants act as miners in the vegetable kingdom, they search out the riches of the subsoil, and the upper soil benefits by what is thus brought within its

(1) Wolff gives hay of red-clover = from 5.30 to 7.00.

A. R. J. F.

(2) Whence comes then the carbonic acid found as the carbonate of potash, of soda, &c., in the ashes ? These salts do not exist in the growing plants, but are formed during their combustion. When plants are burned, all the organic acids are burned, and consequently, although in living plants the potash is combined with organic acids to form neutral or even acid salts, yet, as these acids are destroyed when plants are burned, caustic potash, soda &c., are left, which of course combine with carbonic acid to form carbonates of potash, soda, &c. The carbonic acid, I need hardly say, is formed by the burning of the carbon contained in the plant. A. R. J. F.

(3) Can the word *rassasier*, to cloy, have anything to do with De Candolle's long exploded theory that plants leave behind them certain excrements that render the soil wherein they have grown unpropitious to plants of the same species ? A. R. J. F.