

round with a thong made of the leaf itself. The bunches should be slung in pairs across poles and put in the drying house. Great care should be taken of the fires, as too much heat and hurry will spoil the whole crop; if the houses get too hot the finest qualities of the leaf are destroyed, as the real substance is burned out, and only the coarse vegetable matter left.—More depends upon proper drying than any other part to determine its market value.

The culture of tobacco is said to be exhausting to even new land. In Virginia the land will sustain only two, or at most, three crops.

Tobacco of fine quality has been raised on the farm of C. K. Carpenter, in Orion, Oakland county, which has been manufactured into cigars, and is considered equal to Havana by those who are good judges. We have not the least doubt that enough can be cultivated in Michigan to supply the home demand, and that farmers can realise large profits at the present high prices. Let them try a small patch this year, just by the way of experiment.—*W. S. B., Michigan Farmer.*

THE LAWS OF CULTURE OF THE LAND, ACCORDING TO LIEBIG.

[TRANSLATED FROM THE FRENCH OF THE "JOURNAL D'AGRICULTURE PRATIQUE," EXPRESSLY FOR THE "MARK LANE EXPRESS."]

To enable the farmer to cultivate in the most profitable manner, he should know what are the constituent parts of plants, and also by what means these plants obtain nourishment.

The growth of plants, the manner in which they appropriate to themselves the elements which contribute to their nourishment, and the nature of those elements themselves—all this was formerly enveloped in mysterious obscurity. In these modern times the natural sciences have sufficiently progressed to teach us what it is necessary to know to guide us in the culture of plants which the care of man assuredly should develop.

The constituent parts of plants are of two kinds, *gaseous* and *solid*; they are also called *organic* and *inorganic*; the latter are parts that resist the action of fire—the ashes, or mineral parts. If we proceed to consume a plant by fire, the gaseous part will fly into the air, while the other will remain in the form of ashes. The proportion of gases in a plant is found to be much larger than the solids. 100 kilogrammes of fir-wood burnt only leaves $\frac{1}{2}$ kilo. of ashes, wheat-straw nearly 5, pea-straw 9, clover 11.

The volatile or combustible parts are oxygen, azote, hydrogen, and carbon. The solid parts—those that after combustion are found in the form of ashes—are phosphoric acid, potash, silica, sulphuric acid, lime, magnesia, iron, and salt.

Of these elements, *four* volatile and *eight* solid, are formed the bodies of plants; conse-

quently they are the food of plants. The gaseous elements, or otherwise organic principles, are absorbed by the leaves and branches; the roots also take in gaseous aliments when they are in the earth.

In order that the leaves and branches may be able to absorb the gaseous principles, the surface of them is provided with very minute parts. The roots absorb these ailments by their very fine extremities.

To enable the plants to assimilate the nutritive principles, it is necessary that the latter be placed at their disposal in a suitable condition. The volatile principles are, for the most part, absorbed under the form of water, ammonia and carbonic acid; it is only as bodies in solution that the solid parts can pass into the organism of plants.

The various productions from prevailing vegetables are the results of diversified combinations of the four volatile and eight solid principles. Thus, tartaric acid is composed of one-fourth carbonic acid, one fourth hydrogen, and one-fifth oxygen; essence of turpentine is composed of 10 parts carbon and 10 parts hydrogen; 2 parts azote, 22 of carbon, 30 of hydrogen, and 3 of oxygen form the elements of *atropia*, that violent poison which belladonna contains.

The fibres of wood (cellulose) and fecula contain precisely the same elements—6 parts carbon, 5 parts hydrogen, and 5 parts oxygen—nevertheless cellulose and fecula are two very different substances.

The gaseous, or organic, elements, in accordance with their nature, are found everywhere all over the world. The solid, or inorganic, are fixed to a point from whence they can only be removed by extraneous force. The result is, that the gaseous elements are inexhaustible. The motion of the air, and its tendency to preserve its equilibrium, carries them wherever they are needed, or wherever they seem likely to fail.

With the inorganic elements it is quite the reverse; they are not all found in every country, nor in large quantities. The faculty which plants possess of assimilating the organic principles contained in the air and earth, has some limits, partly imposed upon them by their nature, and partly by the appropriation of inorganic and solid substances. *A certain analogy must exist between the two kinds of elementary substances in plants.*

In order that plants may be able to absorb and assimilate a certain quantity of gaseous elements, there must exist a proportionate quantity of solid elements. The plant can only take in and retain as much of the gaseous elements as it can digest with the help of the solid elements. The composition of plants is the same in all places; the relation between the gaseous and solid elements is always alike in the same plant.

When a plant does not find in the earth the