

**Agriculture.**

From *Plant Nutrition in Scientific Agriculture*, by J. W. Dawson, L. D., F. R. S., Principal of McGill University, John Lovell, Montreal.

**CHAPTER VI.**  
The substances thus excreted by plants are either organic or inorganic. With respect to the former, many of them are taken from the soil and placed in water, and from substances having the properties of gums, gummy matters, oils and other organic compounds, which, when excreted, have shown that at least a part of these substances is due to the escape of the juices from wounded parts of the plant. A better instance of the excretion of organic matter is furnished by the fact that when grain is made to sprout in powdered chalk, after germination has taken place, a part of the chalk (carbonate of lime) is found to be converted into calcium chloride; acetic acid (vinegar) having been produced in the young plants, and this is due to their excretion with the water.

**THE WATER HAS NOT YET MOISTENED.**  
The quantity of moisture which is taken up by plants is well shown by some experiments of De Saussure. First, he found that after vegetables have attained their full growth, they will continue to grow in proportion to their own weight, that is, after the seed is ripened; that is, a plant of wheat, when ripe, contained less than one-half the proportion of water of ashes contained in a plant before ripening. Secondly, this was verified by an actual measurement of the water taken up by the plant, and it was found that while the whole quantity of the diminished, some of the ingredients greatly increased in quantity. Thus, when a quantity of wheat was sown in a pot, it was found that in the grain it contained four to one, so that the other ingredients must have been lost to a much greater extent than the proportion before stated. Thirdly, the quantity of silica contained in the stems or wheat stalks in another way a proof of the excretion of this substance. Silica does not combine with water, but when it combines with potash, soda, or other alkaline substances, in certain proportions, it becomes soluble in that state; it takes into the vessels of plants. Silica, however, requires nearly half its weight of potash or soda to be soluble, and on examining the silica of ripe wheat, it was found that the quantity of silica which it contained was four times that of their alkaline matters; on this there is present in the ripe plant only half the quantity of silica required for the solution of the silica which it contains. It is evident, therefore, that a portion of potash or soda has been separated from the stems with which it was combined, and has been excreted, and this process may take place repeatedly, so that a small quantity of alkali, and the silica which it carries, may be introduced into the stems of wheat. Plants have, therefore, the power of sending back to the soil the silica of soluble substances, whether obtained from the ground or formed in their own system; and it is even possible that some of the matters thus excreted, as in the case of the alkali just noticed, combined with substances in the soil, and thus become fitted to be again absorbed with beneficial results.

The well-known benefits of a rotation of crops, have been attempted to be explained by supposing that the excrement discharged from the roots of a plant, must be harmful to others of the same kind if planted in the same soil, while, on the other hand, they might be nutritious to plants of other kinds. Thus, if the roots of a pea be placed in water, they communicate to it in time a brown color, in consequence of gummy secretions being thrown off from the plant; but if after the water has thus been filled with excrement, another plant of the same kind be placed in it, it will not flourish; but if, in stead of a second pea, be placed in a plant of wheat, the new crop will grow, and take from the water a part of the matter previously deposited in it. In the same manner, the soil in which any species of vegetable has been cultivated, may become enervated by the excrement, and the substitution of some other crop upon it will have the effect of restoring it. It is evident that this cannot have much influence in this only, since those previously existed in the soil, and are still abundant, and that the quantity of these mineral matters taken from the ground and not returned to it, is only very powerfully, and of the rapid deterioration of plants when long cultivated on the same soil. The organic excrement derived from food which is obtained from the elements afforded by air and water, are also capable of rendering the soil barren to the plants from which they proceeded. We must not, however, forget that these excrement may, like other organic matter, be decomposed, so that after a sufficient interval, this decomposed matter gives rise to a soil in which the following, which gives rise to the excrement in the soil to decompose, may be substituted for the excrement of the plant.

The latest experiments and observations on this subject have shown that the organic excretions of plants do not so readily fill the soil, and that the extent to which they remove mineral matter from the soil is very small. The principal cause which renders the soil unproductive to them. This we will consider under another division of our subject.

**The Ascending Sap.**—The stems of plants are composed of a central part, which is curved upward into the stem, becoming in its progress more or less united with the wood, and in this manner, in consequence of this interlacement, and probably also of changes effected by the action of the sun's heat, which is not without effect, the sap of trees, even in the lower part of the trunk, differs much from the water which the roots are sucking from the soil. Thus, in spring, the sap of the maple is thick in sugar, a substance which is not only not obtain from the water in the ground. The presence of this sugar is due to several causes—1st, the water and carbonic acid drawn up from the soil contain the elements of sugar, and may possibly be converted into it by the action of the wood, or of the young buds; to what extent such transformations can be effected by the wood, is not however very certain. 2nd, many trees store up in autumn a quantity of starch, and possibly other substances, in the cells of their stems and roots; and that the starch thus prepared may be rendered soluble in extracting the growth of their young leaves, the first process necessary in its conversion into sugar, a change as will afterwards be seen, very easily effected. 3rd, in spring, before the leaves are developed, growth is going on very slowly, and the sap not being used in the formation of wood and leaves, is allowed to accumulate in the wood, and when the tree is stimulated by the light and heat of the sun, may be obtained by tapping

it. But as soon as the leaves are formed, the sap is rapidly withdrawn to furnish materials for their growth and for the formation of wood; and for this reason it cannot then be obtained in the same quantity or of the same quality as in early spring.

The national debt incurred by the Federal States up to the present time is calculated to amount to about \$600,000,000. Almost all that money has been spent in making widows and orphans. How many wives and children would half of it have made happy?

A man was recently tried in New Fairfield, Ct., for attempting to "kiss, hug and tickle" so the indictment reads—a certain woman.

A Madrid journal the *Higante*, states that a project for securing the immigration of a million of the Irish people into Spain has been set on foot, and is daily assuming proportions which seem to speak favorably of its ultimate success. The negotiations of the subject are at present progressing favorably.

The Richmond *Sentinel* regards the result of the Presidential election as a declaration by the North of four years more of such war as Lincoln wages, though it has doubts of his ability to maintain it for so long a period.

Therefore, the Southern people are urged to think of war only for an indefinite period. The desire to have no talk or trouble about questions of peace and invite such men as Vice President Stephens, Gov. Brown and Mr. Boyce to resign.

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