VEGETABLE NUTRITION

AND

INSECTIVOROUS PLANTS.

Abstract of a lecture delivered at Huddersfield, on March 9th, by Professor Williamson, President of the Yorkshire Naturalists' Union, being the fifth of a course of Gilchrist Science Lectures.

Plants are composed chiefly of carbon, and this is proved by a very simple experiment, if we take a piece of wood and burn it, without letting the air get to it, it will be converted into pure carbon—charcoal; but if we burn it in the open air a very different result follows, all that remains after the burning is a few ashes, all the rest has passed away in invisible gases—carbonic acid, oxygen, hydrogen, and nitrogen. In the ashes which remain we find in very small quantities—lime, potash, soda, a very small proportion of iron, and in such plants as grasses and canes—silica or flint. By what manner, and by what machinery do these plants get at these materials? If you take any plant, and cut a thin slice from the stem, and place it under a microscope, you will find that it is made up of a number of little bags or cells filled with a jelly substance. No matter how small or how large the plant may be it will still be made up of these minute cells. Then among these cells we have long tubes or vessels, through which the circulation of the plant passes. If we make a thin slice of some green leaf we shall find that it too is made up of little cells, but inside these cells will be little green specks, called chlorophyl grains, which gives the color to the leaf, Wherever a plant is green these grains are there. Leibeg, the German chemist, thought that plants derived all these substances which we find in their tissues through their roots, but this has been found

out to be a mistake, it was known even then that plants could not take up any kind of solid matter, but he thought that decayed vegetation produced carbonic acid, which when dissolved in water might be taken up by the roots of the plant. But recent investigations have brought out different theories, and even our present ideas cannot be looked upon as absolutely perfect, as fresh discoveries are made, and new facts found out they will have to give way and others take their place. All the carbon of which the plant is composed is taken in through the pores of the leaves in the shape of carbonic acid gas, and these chlorophyl grains have a remarkable affinity for this gas. See how beautifully the order of nature is balanced. Every time we breathe we inhale oxygen and nitrogen, but when we exhale we give off carbonic acid gas, a poisonous gas, known to miners as "choke damp." This is not only done by ourselves but by lower animals as well, and what man and animals are doing now, man and animals have been doing ever since they existed, and millions of years before man made his appearance, animals carried on the same work, and if no antagonism to this poisoning had existed the atmosphere would soon have become so much corrupted that it would have been impossible for an animal to have lived in it for five minutes. But all this has been rectified, for that which the animals give off the plants want, and so the true balance is kept up, and the atmosphere is to-day probably just the same as it was when plants and animals first began to live. The plants take in carbonic acid gas and liberate oxygen; animals take in oxygen and liberate carbonic acid gas. But it is only during the sunlight that plants are active, during the night they are dormant, except that they liberate a very small quantity of carbonic acid gas, and from this fact some people have imagined that it is hurtful to keep plants in sleeping rooms, but the quantity of gas evolved during the night is so small that no bad results need be feared on this account. Plants generally feed upon inorganic substances, and we want a scientific system of farming. Now the farmer goes by the rule of thumb, but we want to instruct him so that he might know when certain soils are adapted to the growth of certain plants, and so on. But there are certain plants which feed upon organic substances, we know some plants, especially the Sundew and Venus' fly-trap, which catch flies. If you will examine a leaf of Sundew you will find that it is studded with little bristles, each one of which has a knob at the end, and these knobs have the power of secreting a sticky substance. These bristles are longest round the edges of the leaf, while in the centre there is only the knobs. Insects are attracted by the gay color of the leaf, and as soon as they settle upon it they find themselves entangled by this sticky bird-lime, and the long bristles at the edges then begin to bend over until the fly is completely enclosed in their folds, where it is held until it is digested, and appropriated to the use of the plant. The process of digestion is exactly the same as that which takes place in our own stomachs. Another plant of this kind is Venus' fly-trap, it grows in Carolina. The leaf of this plant consists of two lobes with bristles along the edges, and when a fly settles upon it the lobes close instantly and the fly is imprisoned between them, where it is held until it is digested. It may be asked, Are the plants any better for catching these flies? and Mr. Darwin has answered this question in a most satisfactory manner: he has shown that those plants fed upon flies produce more flowers, more seed, weigh heavier, and are altogether stronger plants than those which had no flies. There are many other plants which catch insects by various means, some of them have vessels containing water, and when an insect goes to peep into the pitcher, if it makes the slightest slip it topples over into the water, and when it is once there it finds it very difficult indeed to get out again. It is a very interesting subject, and one that is well worth the careful study of any intelligent young man or woman.