

gas, which, by again dissolving into the air, begins its work anew. By this important process the equilibrium of the constituents of the air will be restored and preserved for ever!

The facts stated in the foregoing demonstration will clearly show that, and for what reason, the atmospheric air in the country and in the woods must be purer and more wholesome than that of densely populated cities; and that the trees are very instrumental in this action. Furthermore, they prove that the shade trees in our cities should not only be regarded as sheltering ornaments, but also as benefactors to our sanitary welfare. The consequences will, therefore, be entirely different, when we keep our shade-trees sound and enable them thereby to perform their duty as air-purifiers—or allow rotten trees, or even stumps, in our streets, which, besides their disgusting appearance, consume oxygen gas, and will produce dangerous miasmas in return. And these are the reasons why I have tried so frequently in the last five years to lead the attention of the public to the poor condition and the constantly increasing mortality of our shade-trees, and why I have been in a state of war against the destructive measure-worm!

Another very interesting phenomenon in connection with vegetable life is that which we term growth. This is certainly one of the greatest wonders in creation; and if this fact does not more seriously attract our attention, the reason is to be found in its familiarity. Let us suppose, however, that a certain person had never seen a tree, and some one should step forward with an acorn in his hand and endeavour to make him believe that this small, lifeless object, when planted in the ground would become alive and commence to grow. After a while it would send out a root that grows into the ground, and a stem that grows into the air. The latter would gradually extend in size until it reached 100 feet or more. It would also bring forth branches, twigs, leaves, flowers and fruits, exactly of the same shape as that in his hand; and from the latter another would spring up, and it would go on in such succession for all time to come! Would such a person believe the assertions, although all that was said about this acorn was the truth—nothing more than the very truth!

You are all sufficiently acquainted with the phenomenon which is called growth; the explanation of this process, however, is somewhat difficult to comprehend. I will, therefore, confine myself to the description of the practical effects connected with the growth, and will commence with the very seed-grain.

The seed in general is composed of the germ, the cotyledons, and an external coat. The germ is the embryo of the future plant; the cotyledons serve as protection and as a supporter, and the coat as a covering to keep the cotyledons together. In the embryo the disposition of the future root and stem is already existing, and the cotyledons contain some albumen or amylum. The seed-grain, after having remained some time in close contact with the damp soil, absorbs so much moisture therefrom that the albumen or amylum becomes liquid, and in this state they serve as the nourishment for the embryo. Starting into life, the em-

bryo gradually gains in size, presses on the cotyledons, and these again on the coat, until they burst, even if they were the hardest nut-shells!

The embryo begins thereafter to extend downward, forming the roots, and as soon as this penetrates the ground and is able to absorb nourishment from them, it supports the germ, which grows now upward, forming, in true time, the stem, leaves, branches, twigs, flowers and fruits.

What next will take us with surprise is the extraordinary diversity in the vegetable world. This is not less remarkable between the different kinds of plants, than between their parts.

Although the number of native plants, Cryptogams and Algæ included, may be estimated at 200,000 species; nevertheless it is a rare case, to find two species, whose leaves are entirely of the same form.

The correct knowledge and description of all these forms can only be regarded as one of the most difficult tasks in the study of botany. It is called the terminology of plants; and fills many immense volumes, with expressions, mostly derived from foreign languages.

For its monotony the terminology of plants may be regarded as the very touchstone for the earnestness and perseverance of young botanists and, in most instances, it becomes the rock where both may be wrecked!

Another very interesting quality of plants is the great diversity in their colours. The most prevailing is green, which colour is most pleasing and beneficial to the eye. Then follow white, yellow, red, and blue, with all the imaginable mixed colours, shades and nuances. The brilliancy of flower colours excels all that is found elsewhere.

It happens, not unfrequently, that the most brilliant colours in the most striking contrasts and in the most regular design are found in the small space of a petal of a more regular construction than the best artist would be able to produce.

Next to colours, the fragrance of many vegetables must be regarded as of great interest and value. In their delicate organism they frequently prepare fluids and gases which transpire through the leaves, flowers, and fruits, and produce that kind of sensation to the olfactory nerve which we call the smell. This odour is very agreeable in many cases, but often, however, it is the direct opposite and even dangerous.

The aromatic plants, or their parts, are frequently used for different purposes, as for perfumery, spices, medicines, &c.; in many cases, however, the essential constituents are extracted from them in the shape of extracts, tinctures, ethereal oil, &c.

Nearly all that has been said about odour, is also, in most cases applicable to the taste.

It has often been stated that it is the destination of the vegetable kingdom to spread over the surface of the earth. As, however, our globe is of very different construction, and particularly in the different zones, the plants, as a matter of course, must be organized in such a manner; as to answer all requirements in this respect.

In hot climates we find, therefore, most of the plants covered with very large leaves, as, for instance, the palm trees, bananas, caladium, and