

explain) ; and to effect his object, the operator took the pollen from the only variety which had reflexed sepals, but which bore flowers so small as to be insignificant, and placed it upon a large incurved variety, then he raised a number of seedlings thus hybridized and selected those which showed the most tendency to be reflexed, these he crossed with each other for several years until at last his object was gained. He took great pleasure out of the operation and sold the stock of his best seedling which he named " Duke of Wellington " for thirty pounds sterling. This was the first large flowered Fuchsia with reflexed sepals.

Another gentleman turned his attention to the *Calceolaria* (1) with a similar result. *Calceolaria* as a rule are either self-coloured or spotted, and he conceived the idea of obtaining some striped flowers ; this he did by noticing, that in some kinds, the spots ran together and showed a tendency to form lines. He took two of these and crossed them with each other and found by this means the tendency to become striped had increased. Thus, by a series of years of hybridization and selection he had a race of *Calceolarias* striped like a carnation, but the in-breeding had rendered them so weak that the plants died after once or twice blooming. These instances are given to show what may be done in this direction, and how new and improved varieties can be obtained, but the cases might be multiplied indefinitely. To those who have time and take a sufficient interest I would recommend to try the process ; they will find nothing in horticultural practice so exciting. To look for the seedlings as they flower and be continually expecting something new, is a most agreeable occupation, and so great is the rage for novelties at the present time that something entirely new will fetch a good price and will repay the trouble and time expended.

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### CAMBIUM.

Not a few, even of those who know considerable about arboriculture, are well acquainted with the meaning of the term " cambium. " We are apt to speak and think of the vital juice of a tree as " sap, " but we must bear in mind that, while the term is correct, when the liquid called sap

(1) *Calceus*—a shoe. Ed.

has undergone a process of elaboration in the leaf, it is no longer sap but cambium.

Receiving in its progress upward such soluble ingredients as it finds in its passage, it is still sap, but when these are acted upon by contact with the atmosphere, through the leaves, and are changed by evaporation of the superfluous hydrogen and oxygen, and the fixation of a certain amount of carbon and, sometimes ammonia, it is converted into such a form as to become the aliment of the tree.

It now commences its descent towards the roots, that is to say, in the opposite direction to that by which the sap had ascended ; but it never reaches the roots, because it is equally distributed over every portion of the tree and expends itself in making deposits of new tissue wherever required.

In other words the sap and cambium may be compared to the chyle and blood in animals.

In all exogenous plants—those whose growth is formed outside of the central cylinder : the principal deposit and assimilation of cambium forms a new concentric layer of woody matter, outside of the preceding year's alburnum or sapwood, and a new layer of cortical or bark-matter inside the preceding years formation of liber or inner-bark. Hence during the season of growth, after the ascent of the sap, the cambium is found descending between the wood and the bark.

In animals, the circulation is continuous at all times and seasons and the supply of vital principle is always proceeding. In the vegetable kingdom it is not so, but growth takes place at one season of the year, namely in the spring and summer when the soil and atmosphere are ready to supply the necessary elements to accomplish the end. And then just as the blood in animals performs its various functions of making bone, muscle, cartilage, horn, hair, etc., so the same stream of cambium supplies material for wood, bark, buds, leaves, flowers, and fruit.

Some may be inclined to say all this is mere speculation and theory, but the fact of the ascent of the sap and descent of the cambium is easily proved. Thus, if we tap a maple or other exogenous tree while the sap is ascending copiously, it will run out, and in case of the grape vine, so freely as to cause death. And if we wait until the tree is in full development of its leaves and then tie a ligature tightly round one of its branches so as to prevent the free downward flow of the