

of the bark, which had been first formed, and which yield to this pressure to a certain extent; but, becoming themselves consolidated by the effects of the same pressure, they acquire increasing rigidity; and, the same cause continuing to operate, they at length give way, in various places, forming those deep cracks, which are observable in the bark of old trees, and which give so rugged an appearance to their surface. The cuticle has, long before this, peeled off, and has been succeeded by the consolidated layers of cortical envelope which form the *epidermis*. But the epidermis, which is continually splitting by the expansion of the parts it encloses, itself soon decays, and is constantly succeeded by fresh layers, produced by the same process of consolidation in the subjacent cortical substance.

During the third and each succeeding year, the same process is repeated; new layers of cellular texture and of woody fibres are deposited around those of the preceding year's growth, and a new internal coating is given to the liber of the bark. The compressing power continues to be exerted on the internal layers of wood, directing their growth vertically, while they are capable of elongation, and can be supplied with nourishment. In time, however, by continued pressure, and accumulating depositions of solid matter, the vessels and the cells become less and less pervious to fluids; till at length all farther dilatation is prevented. But the tree still continues to enlarge its trunk by the annual accessions of vigorous and expansible alburnum, and to take its station among its kindred inhabitants of the forest; till, arriving at maturity, its majestic form towers above all the junior or less vigorous trees.\*

The development of each branch takes place in the same manner, and by the same kind of process as that of the trunk. The buds from which they originate, spring from the angle

\* It is contended by Dr. Darwin and other writers on vegetable physiology that each annual shoot should be regarded as a collection of individual buds, each bud being a distinct individual plant, and the whole tree an aggregation of such individuals. I shall have occasion to revert to this question when I come to consider the subject of vegetable nutrition.