

more slowly, as the wound underneath, from exposure to the air, has become dead, and frequently rotten, proving an incumbrance, which, though the living principle cannot in this instance free itself, it has no power of turning to any good account. If, however, this dead wood, be carefully removed, and the wound protected from the injuries of the atmosphere, the new bark is found to spread much more rapidly; and as every new layer of bark forms a new layer of wood, the whole cavity, whatever it may be, is in process of time filled up.

This operation of nature was turned to great advantage by the late Mr. Forsyth of Kensington Gardens; under his management, many timber trees, became entirely hollow, were filled up with new wood, and made to produce fresh and vigorous branches; and Pear-trees, planted in the time of King William, became so decayed and knotty as to bear no fruit worth gathering, were, by gradual paring away of the old wood and bark, and the application of a composition judiciously contrived to stick close and keep out air and wet, restored to such health and strength as to cover the garden walls with new branches bearing a profusion of fruit.

*The Wood.*—When the bark is removed, we come to the wood, which makes the principal bulk of the trunk or branch of a tree or shrub. When cut across we observe a number of concentric layers distinct in the fir and many other trees, each of these layers externally is hard and solid; they differ however among themselves in hardness and breadth; it often happens that all the layers are broadest towards one side of the tree, so that the centre of the layers is not in the actual centre of the trunk; the wood owes its strength and tenacity to innumerable woody fibres, and consists of various vessels running for the most part longitudinally, some having a special coat and

others not; some of these vessels when young convey the sap from the root to the branches and leaves: others contain the various peculiar or secreted juices; others perhaps common air; and the whole are joined together by the cellular substance already described. Linnæus and other botanists believe that one of the circular layers is formed annually, and that the hardness of the external part of it is caused by the coldness of winter, and therefore that we may tell the age of a sound tree, when cut down, by the number of layers, and some are of opinion that the dates of very severe winters may be ascertained by the increased hardness of the rings formed during such seasons, and moreover that the north side of a tree may be known by the narrowness and density of the rings. Mirbel and Du Hamel contradict this theory, but their objections are not satisfactory. There may be occasional interruptions in the formation of the wood from cold or fickle seasons, and in some trees the thin intermediate layers, hardly discernible in general, that unite to form the principal or annual ones, may from such fluctuation of seasons become more distinct than is natural to them. Such intermediate layers are even found more numerous in some trees of the same species and age than in others. But Smith is of opinion that those trees which show the annual rings, will always show the peculiar influence of summer and winter in them. Trees in hot countries, as the Mahogany and Evergreen, have them but indistinctly marked, yet in these they are visible. With regard to the greater compactness on the north side of the tree, Smith agrees with Du Hamel in his objection to it.—The truth is, most wood is formed in that part most favourable to vegetation, where there is consequently most branches and leaves. This, in a solitary tree is generally towards the south; but the occasional variations, dependent upon local exposure,