a tτee, but that the branches on any one side of the trunk of the tree are dependent for their support on the roots which protrude from the trunk on that same side. Both Buffon and Du Hamel found experimentally, that when the limbs and branches of any part of a tree showed symptoms of decay, the corresponding roots were invariably in a dis­eased state. They also found that on that side of a tree from which the roots had pushed most vigorously, the annual concentric layers of wood were thicker, and that consequent­ly the form of a section of the tree would be eccentric to­wards that side.

The facility with which the roots of plants seek out for themselves the best localities, is surprising. If two trees of different species be growing on the edge of a marshy space, that tree which requires most moisture will push its roots towards the marsh, while that which requires a dry soil will push its roots into the dry firm ground. Du Hamel relates an instance in which he dug two trenches crossing each other at right angles ; he then returned the soil into these trenches, and planted a tree at the point of their intersec­tion. Some years after, upon examining the roots, it was found that they had invariably pushed into the four lines of trenches, leaving the intermediate undisturbed earth wholly untouched by them.

An equally important consideration with the quality of the soil, is its quantity, that is, its depth from the surface. In fact, in speaking of soils in connexion with the growth of timber trees, it must of course be understood that it is not merely the surface-soil which is meant, but that soil in which the roots of the trees would push and spread,—the soil for several feet in depth. It often happens that the surface-soil may be well adapted for tillage and for vegeta­tion, and yet the sub-soil, that which is essential to the growth of timber trees, may be totally incapable of supply­ing them with nourishment. Trees which grow singly, as in hedge-rows or in parks, do not require equal depth of soil with those which grow in forests, because they have the power of spreading their roots in search of food. But for forest trees, either oak, chestnut, or beech, a depth of at least four feet of appropriate soil is absolutely necessary to pro­duce fine timber trees. Elm and ash do not require so great a depth.

Buffon has given a scale for the ages at which it is desir­able to fell timber. It is dependent upon the depth of soil in which it grows. He says that a depth of from two to three feet will not support a tree in a thriving condition for a longer period than fifty years. From three to four feet of soil will enable the tree to continue improving until about seventy years old ; and in a soil from four to five feet deep it will flourish for a century. These periods are for strong and favourable soils. In lighter soils at least ten years must be taken from each period, and the timber will then also be inferior in quality. As a general rule, the more generous and favourable to the growth of the timber the soil may be, the longer it is advantageous to wait before felling it. Trees should never be allowed to become stag-headed, that is, to have their upper branches bare of leaves. It is in the top branches that the first symptoms of the decline of the tree are to be perceived. The leaves have a faded, weakly ap­pearance, gradually diminish in number, and finally the branches become barren of foliage, and decay. The least appearance of want of vigour in the vegetation of the top of a tree should be the signal for its being felled ; and even then it is also a sure token that the timber is past its prime.

The nature of the soil in a tract of country may be ob­served, either by opening it, or by examining the products. Thus, at all times of the year, if plants which grow only on marshy land are found on any tract, we may evidently as­sume that tract to be marshy land, whatever its temporary appearance may be. The nature of the sub-soils may often

be ascertained by the ditches. The goodness of earth is easily tested by making an excavation in it. If the whole of the excavated earth can be returned into the cavity, the soil is poor, but if, on the contrary, there is an excess, its quantity is a sure criterion by which to judge of the rich­ness.

In the preceding observations as to soil, moisture has been decried as unfavourable to the growth of good timber ; but it must be observed, that a deficiency of moisture has also its evils, although they are not of the same kind as those which arise from a superabundance of it. Water is absolutely ne­cessary to the growth of timber ; for even if the soil be rich, and light, and well adapted for the reception of the roots, and for affording them nourishment, there must be suffici­ent moisture in it to form a vehicle for a supply of that nourishment, otherwise the trees will be of very slow growth, not from the lack of proper nourishment, but from the want of a sufficient supply. The timber does not appear to suffer from this in its quality, but in its size. On the contrary, indeed, wood of such growth is extremely heavy, hard, and dense, as, for instance, the Scotish mountain oak. Where there is a greater supply of moisture, the growth of the timber will be more rapid ; and, in consequence, although its fibre will be tough, its grain even, and its colour the same as the other, the concentric layers will be thicker, and therefore there will be fewer of them in the same space ; but, to compensate for this, we have in a less number of years an equal sized tree, which has the advantage when felled of being in its prime, while the tree of slower growth may have already, from great age, the defects attendant on what is called overgrown timber. There is also another point to be considered ; the quicker the growth of the tree, the more it will shrink when converted as timber. Trees of rapid growth, therefore, are not fitted for any thing but large conversions. Timber of slow growth, and of con­siderable age, is by far the best adapted for panelling and for furniture.

These remarks afford an idea of the difference in the appearance of timber grown on good soil from that produ­ced on bad soil. As to this difference, it may however be desirable to enter more into detail. An oak tree, grown on the soil adapted to the development of its best properties, not only has its concentric layers thin and close together, but they are also of very uniform thickness, and the texture of the grain is fine. When the wood is split it has a glossy varnished appearance, and is of a very pale yel­low or straw colour. There is sometimes as much as one fourth difference in weight between samples of oak timber ; and the heaviest loses a much less proportion of its weight in drying, and will also, if immersed in water, absorb Jess, than the lightest. The alburnum of the best timber is small in quantity, and the bark thin and of an even smooth texture. In breaking such wood, it produces a sharp de­cided noise. Having comparatively little moisture in its composition, and being less hygrometric in its nature than wood of more open texture, it is little subject to decay; and its grain being hard, it is not easily pierced by insects.

The great size to which oak trees will attain when fa­vourably situated as to soil and locality, is truly astonishing. We will mention two instances as examples of this fact. One is the celebrated chapel-oak of Allonville in the Pays de Caux in France, which is still standing. The other is that of an oak which was felled in Monmouthshire in 1791. The oak of Allonville measures at its base thirty-five feet in circumference, and at six feet above the level of the ground it is twenty-six feet in girth. It is hollow, and the interior is fitted up as a chapel. This transformation was effected in 1696. The computed age of the tree is between eight and nine centuries. The other instance, the Mon­mouthshire oak, produced, when it was converted, the fol­lowing enormous quantity of materials:—