

## THE NATURALIST.

BOTANY.—III.

**Wood.**—Having finished, in our last, the consideration of bark, we now come to that of wood. It consists of what are called *ligneous layers*, of which those in the centre are the hardest; and are called *duramen*, or *heart-wood*; while the outer ones are called *alburnum*, or *sap-wood*. The latter, on account of its soft, moist nature, is not good for building; and foresters sometimes cut away twenty or thirty layers, before they arrive at the durable heart-wood. It is in the latter that decay, when it attacks a tree begins; and old trees, much decayed within, will sometimes be seen blooming with vigour; but in such a case the alburnum will be found entire. Sap does not ascend through the bark or through the pith; for either of them may be removed without injuring the flower or fruit; but it ascends through the sap-wood. In order to harden the latter, it has been recommended to strip the tree of bark before felling it. It varies in thickness in different trees; and also in different parts of the same tree. Thus, if the trunk of a tree be sawn across, the circles of which it is composed will be found to be thicker at some parts than at others. This has been ascribed to the aspect, but it really depends on the soil; for the circles are thickest in those directions in which the roots obtain most nourishment. In general, one of these circles, or zones, is formed every year; but there may be two zones in one year, if the weather should change from warm to cold, and from cold to warm again; and if the winter should be very mild, so as not to put a stop to the growth of the tree, only one layer (though more than double the usual thickness) may be formed in two years. In general, however, the age of the tree may be known by the number of circles. If the summer be cold, of course the zone formed that year will not be so thick as the rest; and from this circumstance Linnæus, from examining old oaks, told what years had been remarkable for great cold. If the cold be so great as to freeze the sap in the alburnum, the outside of the latter is destroyed; but in the following year a new layer is deposited round it; and when the tree is cut down, you may tell the date of the hard winter by the number of circles which surround the decayed part. This was done in France, after a period of ninety-one years. On the same principle inscriptions have been found in the middle of a tree. Thus, in some trees in the East Indies, inscriptions were found which had been made by the Portuguese, two or three hundred years before; and which had been gradually closed in by fresh layers. The mark of the injury always remains; for wood is not deposited over it for some time. A stone may become enclosed in the same way, after a series of years. If the leaves of a tree be destroyed by caterpillars, but little wood is formed that year; because the sap is not elaborated. Knots are the bases of abortive branches, having become encased in the ligneous layers. External to the alburnum, is the *liber*, or innermost layer of the bark. It was much used for writing upon, before the invention of paper; inasmuch, that it has given its name to the Latin word for book. Trees which grow very quickly are light and spongy. The American alce grows nearly a foot a day.

In the section of the trunk of a tree, the circles are seen to be crossed by lines, radiating from the centre to the circumference. These are called *medullary rings*; and consist of laminae, and not of mere threads. They are composed of cellular tissue; are thickest in the middle; and separate the fibres from the concentric layers. Some of them are complete, reaching from the centre to the circumference; but many of them are not so. They are most numerous at the circumference.

**The Pith.**—Within the innermost circle of wood (like the marrow within a bone) is the pith, or medulla. It is surrounded by spiral vessels, which constitute what is called the medullary sheath. The form of the pith is various—being circular, or oval, or angular. Some have thought that the pith entirely disappears during the growth of the tree; but it is now said that it does not. Its uses have been variously stated. Some have said that it was like the brain and spinal marrow in animals—giving sensibility to the plant; but some plants have no pith. Some say that its office is to elaborate the sap; others that it is a reservoir of nutriment for the young shoots; for by means of the medullary rings, the buds are said to be brought into connection with the centre of the tree.

**The Root.**—Plants are composed of five parts:—1. root; 2. stem; 3. leaves; 4. flowers; 5. appendages. We begin with the root, which is the part first developed. Some parasitic plants appear to consist only of flowers; having neither root, stem, nor leaves. They are called parasitic, because they grow upon others, (like the mistletoe upon the oak,) instead of by an independent root of their own. Plants are divided into *cellular* and *vascular*; the former consisting of cellular tissue, which we examined in our last paper; and the latter containing vessels, which we also took a view of on the same occasion. Vascular plants are divided into *monocotyledonous* and *dicotyledonous*, according as the seed consists of one, or of two lobes; a lobe being called a cotyledon. This is well shown by a common bean; which, if the outer skin be removed, will be found to consist of two portions, which are called *lobes* or *cotyledons*. These cotyledons, when a seed germinates, usually rise above the ground, and become leaves.

The root is the descending part of the plant. Its most simple form is that of a fibre, of uniform thickness. If the light have free access, it remains white, as is seen in the roots of hyacinths placed in glasses. The fibre is terminated by a little body, called a *spongiole*, through which water is received for the nourishment of the plant; and if it be cut off, new fibres are sent off above the section, each terminated by a spongiole. Duck-weed has a solitary fibre for a root; but most plants have many fibres, descending from what is called a *radical plate*. Fibrous roots belong to the most simple plants. The next gradation is the *divided fibrous root*; each fibre being furnished with a spongiole. This kind of root is well seen in the grasses. Altogether, eleven kinds of roots are enumerated, as follows:—1. simple; 2. fibrous; 3. ramose; 4. bulbous; 5. tuberous; 6. articulated; 7. fusiform; 8. globose; 9. creeping; 10. præmorse; 11. palmate; 12. bidorted; 13. beaded; 14. granulated. Fibrous roots are generally found in sandy soils. The ultimate divisions of the fibres are called *fibrille*. When a root has no subdivisions, (like the radish,) it is called *simple*; while those roots which are divided into lateral branches are called *ramose*. A tulip is a good example of the *bulbous* root. They are of various kinds:—1. solid, as the meadow-saffron; 2. laminated, as the onion; 3. scaly, as the squills, or sea-onion. The potato is the best example of a *tuberous* root, as it is called, although no proper root springs from the tuber; but the root (which is really a *fibrous one*) has tubers connected with it. Roots divided into joints (like the wood-sorrel) are called *articulated*; the different parts being, as it were, articulated to each other. Every joint may be separated, and will become a new plant. An articulated root is sometimes called horizontal, but it is very seldom that it grows in that direction. What appears to be a horizontal root, is very often an underground stem. A *fusiform*, or tap-root is oblong and tapering. The carrot and parsnips are good examples; the turnip is a variety of it, and in the radish we have two varieties of it. It belongs to *biennial* plants; those which take two years to come to perfection. The stock, or body of the root, is called a *candax*, which, like the tubers of the potato, forms a reservoir of nutriment, which is gradually carried up to the leaves, and there prepared for the nourishment of the seeds. As this absorption takes place, the root becomes sticky; owing to the vessels deprived of their moisture, becoming dry. Some divide this kind of root into three varieties:—1. proper fusiform, as the beet-root; 2. conical, as the carrot; 3. tapiform, as the turnip-radish. To the tap-roots belong the mandrake; so called, because it divides into two, like the lower extremities of a man. It was formerly directed to be pulled up by a dog, which was to have its tail fastened to the plant. A *Globose* root resembles a bulb, but has radicles springing out from all parts of it, as in the earth-nut, and some species of ranunculus. A *creeping*, or *repent* root, passes along horizontally, and sends up fibres to the surface. It is very difficult to extirpate it. We have an example in common mint. It is found to be very useful in the dykes of Holland, and in Fifeshire; for the roots bind the soil, and keep it together. A curious kind of root is that which is truncated, or ends abruptly. It is called *præmorse* because it appears as if part had been bitten off. Mervil says, that this abrupt appearance is caused by the separation of the old root from the new. The plant called the "devil's bit scabious," has this kind of root; for a reason which is quaintly told by Gerard, (an old botanist,) in his "Herbal." "The great part of the root seemeth to be bitten away. Old fantastick charmers report, that the devil did bite it for envie, because it is an herbe that hath so many good vertues, and is so beneficial to mankind." The part which is left has no "vertues" at all. A *palmate* root is a kind of tap-root, divided into several conical portions like the fingers of a hand. It is seen in some species of orchis. Some roots are called *bidorted*, because much twisted, or deformed, or bent back on themselves; others *beaded*, because they resemble a string of beads; and others, again, *granulated*, from consisting of a number of small round bodies, clustered together.

Let us now take a look at the relation which exists between roots and the soil in which they grow. Some kinds of plants do not grow well on the same ground, for many repeated crops. On this account, it has been thought that each plant requires a peculiar kind of nourishment, which, in time, becomes exhausted, and then that other plants should be put into that ground in their stead. This is not true in its full extent; for plants of the same kind may be made to grow in soils of very different kinds. Some have assigned the different shape of the roots as the reason why some plants succeed well after others. If a pear-tree be planted after a plum-tree, it does well; because (it is said) it strikes its roots more deeply. For similar reasons, it is said that plants with *creeping* roots, succeed well after others with *tap-roots*.

Earths are fitted for the roots of plants in several respects.—1. They are moist, and therefore do not injure the tender spongioles and fibrils. 2. They are but little soluble in water, and are not changed by the air; so that their permanency is secured. 3. They are not transparent, or they would admit too much of the sun's heat; and light (which would injure germination) is excluded. The advantage of this is seen in the hyacinth, which, after having flowered in water, with its roots exposed to the light, must be put into the ground, to recover its exhausted energies. 4.

They are of a dark colour, so as to absorb the heat of the sun, instead of reflecting it. In this way a proper degree of warmth is secured; and the attainment of this object is much facilitated by the addition of a little soot. N. R.

## THE PEARL.

HALIFAX, FRIDAY EVENING, NOVEMBER 23, 1838.

**CANADA NEWS.**—To any person of common sensibility and possessed of the principles of common humanity, it is deeply painful to hear of scenes of bloodshed and of death: with the views of peace and love which we entertain, to ourselves it is doubly so. With us, life is infinitely precious, whether it be the life of a rebel or a loyalist. Life—we can never forget—is the gift of a benignant Creator, a merciful boon granted for the high purposes of immortality. When loss of life is connected with sickness and other providential dispensations, we bow to the gracious decree, inasmuch as we see the all-wise author of life resuming his own gift. Not so, however, with most foul, most hideous war. Here we behold mortals usurping the place of their God, and hurrying their fellow-creatures to the bar of infinite justice. Man is sent to his final destiny by the reeking hands of his fellow man. With hate and desperation in his quivering heart—with blood on his soul, and with the instruments of death clutched in his dying grasp, he is swept away to give his account to the Judge of quick and dead. Not to mention the irreparable loss of the dead to their families, not to dwell on the case of broken hearted widows and their wretched offspring, we look now solely at the spectacle of the dead. They have gone—their hearts will no more feel the kind susceptibilities of our nature; this beautiful earth with its multiplied scenes of attraction they will never again behold; the endearing names of father, husband, brother, friend, will no more sound in their ears; their opportunities for mental, moral, and religious improvement are cut off; in a word, their day of probation is ended. Is all this nothing? Or is this a *light thing*? But the news come that 50 or 100 of the rebels of Canada are killed—a thrill goes through the multitude with its first announcement. But who weeps in secret at the thought of such an immolation? who mourns at such a sacrifice of human life? whose heart is filled with grief at the consideration that so many fellow-creatures have passed away from earth and its probation? "Oh! but they were rebels!" Aye, and were they not men, were they not immortals, were they not possessed of souls as precious in the sight of heaven as yours? But the fact that they were rebels, should add intensity to our grief at their dissolution. It is not long since that we read an official document by Sir Geo. Arthur, in which he states that he became reconciled to the thought of the execution of LOUNT and MATTHEWS, from a firm belief that they had found mercy with God! Here let us stop, and in this connexion, record that beautiful passage of Holy writ—

"Let the wicked man forsake his way, and the unrighteous man his thoughts:  
And let him return unto the Lord, for HE will have mercy upon him;  
And to our God for he will abundantly pardon,  
For my thoughts are not your thoughts,  
Neither are your ways my ways, saith the Lord,  
For as the heavens are higher than the earth,  
So are my ways higher than your ways, and my thoughts than your thoughts."

To return to our subject, Sir George was willing to permit the law to have its due course, because its victims were prepared to die, but can we find any mitigation of our grief in such a hope in the case of rebels? Is it not the universal belief of christians that the aggressors in warfare are murderers, "and we know that no murderer hath eternal life abiding in him." Shall we hear of the death of 50 or 100 more murderers, without a shudder, without tears of deepest sorrow? Our own peculiar views with respect to warfare, render rebellion in our estimation a thousandfold more wicked, than can possibly be held by those who cling to the common opinion that war, in some cases, is lawful and christian. We have been led to offer these few remarks, having just risen up from a perusal of an excellent article in FRASER'S MAGAZINE for SEPTEMBER last. The two or three extracts below, we wish we could imprint on the hearts of all our readers. Are they not worthy of a second and third perusal?

"If it were possible, after perusal of the most heroic exploits of warriors, the most glowing narratives of successful stratagem, to look on the actual field of contest, the bleeding limbs, the mangled frames, the distorted faces, and the writhing features of the dying and the dead, we should shrink from war as the game of demons. Could we also retire to the homes from which these warriors, full of generous enthusiasm and patriotic sympathies, marched forth to the high places of the tented field, and listen to the cry of widows severed from husbands they loved, and the wail of orphans deprived of fathers they longed and looked for in vain, we should curse the passions that provoked the conflict, and feel justly that in war there is more of the ferocity of fiends than the magnanimous virtues of the patriot, or the sensibilities of uncorrupted man. War is an epitome of the darker elements of human nature. It may have bursts of glory; but these compensate not for its more dreadful agencies. There is a brilliancy