

soon as it becomes visible, and its structure can be distinguished, it is found to contain within itself many of the parts which are to arise from it, in miniature, and folded up in the smallest possible compass. The portion destined to form the stem is gradually expanded both in breadth and height, but principally the latter; so that it rises as it grows, during a certain period, until the fibres acquire the solidity and strength necessary not only for their own support, but also for sustaining the parts which are to be farther added. In trees this process generally occupies one whole season; during which the growth of the first layer of wood, with its central pith, and its covering of a layer of bark, is free and unrestrained. On the second year, a fresh impulse being given to vegetation, a new growth commences from the upper end of the original stem, as if it were the development of a new bud: and at the same time a layer of cellular tissue is formed by the deposition of new materials on the outside of the former wood, and between it and the bark. This is followed by a second layer of wood, enveloping the new layer of cellular tissue.

The effect of this new growth is to compress the layer of wood which had been formed during the first year, and to impede its farther extension in breadth. But as its fibres, consisting of vessels and cells, are not yet consolidated, and admit of still greater expansion as long as they are supplied with nourishment, their growth, which is restrained laterally, is now directed upwards, and there is no farther enlargement of their diameter. From the same cause the pith cannot increase in size; and is even found to diminish by the pressure of the surrounding wood. Thus, the vertical elongation of the entire stem continues during the whole of the second year, and the trunk becomes sufficiently strengthened by the addition of the second layer on its outside to bear this increase of its height.

While this process is going on in the wood, corresponding changes take place in the bark, and a new layer is added on its inner surface, or that which is contiguous to the wood. This layer constitutes the *liber*. All these new depositions must of course tend to stretch the outer portions