

general use is considered as the most valuable of all the timber trees of our Union, that it attains its largest size and greatest perfection in the cold and comparatively barren soil of those swampy plains, many of which extend in considerable tracts along the borders of the Chesapeake, and on the right and left shores of the lower Potomac; while on the otherwise fertile soils, west of the mountains, it is by no means so remarkable for its size. Whence it may be strongly inferred, that a tree, the texture and density of wood of all the species being known to be alike, may in one situation attain a much larger size, and in a transverse section of its trunk exhibit a greater number of concentric circles than another of the same age the growth of a different situation.

If it be true that trees are enlarged chiefly or only by the formation of successive concentric layers, then it necessarily follows, that those layers, as the tree enlarges, must become wider as well as longer each year, so as to embrace the whole of its increased dimensions; and consequently the quantity of wood formed each year, supposing the several concentric layers to be of the same thickness, must increase annually in a compound ratio. But although such a rate of increase may well be supposed to be carried on during the early years of its growth, there is every reason to believe, as was observed of the diminished thickness of the last fifty outside rings of the before mentioned English oak, in the two hundred of them which were counted from its centre to its surface, that the concentric layers become thinner and less distinguishable as the tree grows older; and in proportion as its roots find it difficult to draw an increased supply from the soil in which it stands. These concentric layers, as they are successively laid on not only prevent the previous ones from thickening, or enlarging in any way, except by rising upward, which it is said they do not do; but as it is thought the continually increasing pressure, produced by the laying on of new layers, becomes so great as in many instances to occasion decay and a hollowness of the tree. *Roget Anim. and Veget. Physi. pt. 1, c. 1, s. 3.(c)*

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(c) "That the upward growth of the stem takes place altogether in the green shoot of each year, whilst the older portions of the stem undergo no change in dimensions, is proved by the following fact, known, I presume to all. When a name is cut upon the bark of the beech tree, (*fagus sylvatica*,) the tree may continue to grow until it has doubled its original height, but the name will never be raised further from the ground than the point at which it was originally cut. This process is the same, both in exogens and endogens."

"Concerning the growth of the fibro-vascular system, *i. e.* the vascular tissue and woody fibre, there has been a great diversity of opinion among botanists. By far the greater part of the observations which have been made for the purpose of examining into this matter, have been made on exogenous plants; to these, therefore, our attention must be principally directed. But yet it should be remarked, we can admit no explanation which does not