

leptome. The cambium commences then to develop new groups of leptome outwards and new groups of hadrome inwardly. By continued growth the cambial arches extend towards the pericycle and meet outside the rays of the hadrome, thus a completely closed ring of cambium becomes formed, and this is able to develop leptome and hadrome throughout its entire width. The original structure of the root has, thus, become very considerably changed, since the secondary groups of leptome are located in the same radius as the secondary hadrome, while the primary were arranged in alternation with each other. At this stage the structure is very much like that of a stem (Dicotyledones and Gymnosperms) except that the primordial hadromatic rays are yet to be observed. But besides resulting in the formation of secondary leptome and hadrome due to the cell-division of the cambial ring, the pericycle possesses, also, the power of developing secondary tissues by similar cell-divisions. This new tissue is, on the other hand, parenchymatic, and is called the secondary cortex, since it agrees in all respects with this particular tissue. It is easy to understand that the primary cortex with epidermis and endodermis are not able to follow the continued growth of the elements in the central cylinder, but become split, die off and are finally thrown off altogether, thus the secondary cortex formed by the pericycle takes the place of the primary.

We may pass now to the structure of the beet. In a fully developed root of this plant we notice in a cross-section a number of concentric rings, resembling the annual rings of a perennial, woody stem. However, these rings are all made in one summer, and by following their structure gradually from month to month, the structure is shown to have originated in a very different way from that of a stem. The fact is that the secondary cortex is here able to develop continuously new strata of leptome and hadrome separated by medullary rays in concentric rings and in centrifugal direction. As soon as one stratum of leptome and hadrome has performed its function for some time, it ceases to grow any further, and a renewed formation of another ring outside the first one takes place and so on, so that a number of rings are formed during the season; the most conspicuous portion of each of these