

XVII. LATERAL BUD PRIMORDIA IN THE EMBRYO OF GYMNOCLADUS DIOICA

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The plants on which these observations were made were grown from seeds that were collected near Ames, Iowa, in the fall of 1924. On January, 14, 1925, the seeds were planted in the Iowa State College green-house for the purpose of making studies of the germination and seedling stages of the plant. Before planting, half of the seeds were scarified by rubbing them on sand-paper until the light line showed; the other half were planted without being scarified. By February 7, 90% of the scarified seeds had germinated, while up to June 9, 1925, at which time I left Ames, none of the unscarified seeds had germinated, and they showed no signs of having absorbed moisture. Seeds



Fig. 1. Showing lateral buds on the epicotyl.

gathered from trees and planted immediately behaved the same as those mentioned above.

The germination of the *Gymnocladus* is hypogaeous, the epicotyl elongates and leaves the cotyledons below the surface. The upper end of the epicotyl is reflexed until after it reaches the surface, hence the plumule is pulled through the soil instead of being pushed through.

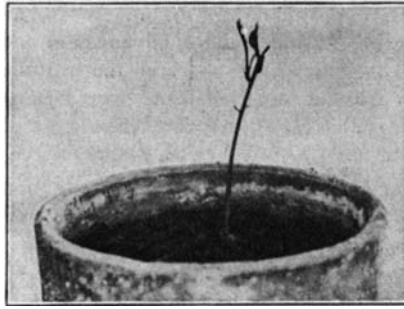


Fig. 2. Showing branches from lateral buds of the epicotyl.

In describing the young seedling, it was found that the epicotyl had a groove on either side extending from the cotyledon to the plumule, so that in cross section, the epicotyl resembled more or less the outline of the figure 8 with the constriction in the figure representing the grooves in the epicotyl. At intervals in these grooves there were short protuberances, the number of

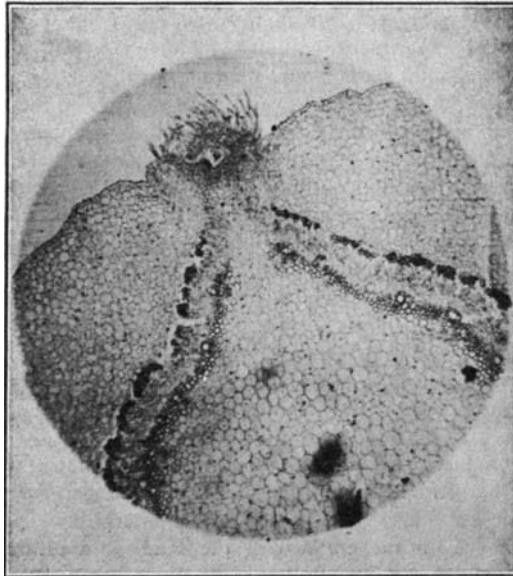


Fig. 3. A cross section of the epicotyl through a lateral bud primordium.

which varies from five to eight on each side. There is a tendency for them to be opposite or approximately so, altho they are frequently alternate. As the seedling advances in age, the epicotyl rounds out and the thick bark obscures the protuberances which are apparently without function. One would naturally surmise that they were either lateral dormant buds or the vestige of some former organ.

A microscopic examination of a cross-section of the epicotyl taken through one of the protuberances reveals a peculiar structure. The stele is elliptical in cross section with the ends of the ellipse pointed toward the grooves in the epicotyl. In the stele opposite the protuberance there is a gap through which the parenchyma cells extend from the pith to the cortex. This would lead one to suspect that they are possibly bud primordia.

In tracing these structures back to find how early they appear on the epicotyl, it was found that they are in evidence on the embryo of the seed, and may be seen with the unaided eye. Their genesis up to the present time has not been traced farther than the mature embryo.

This condition was very peculiar and since we know of no other plant in which it is duplicated and since we have been unable up to the present time to find mention of it in literature, we decided to experiment with it.

Last fall some seeds were planted in flower pots in the Botany Office of Oklahoma A. and M. College for the purpose of trying to prove or disprove whether the protuberances are bud primordia or not. A vigorous seedling about three inches high and whose epicotyl showed a great amount of chlorophyll was selected and the plumule cut off. The next day the upper two protuberances began to swell, and a day or two later the second pair from the top began to enlarge, but they never equaled the upper pair. The three lower pairs remained unchanged.

In about a week later cutting out the plumule, the upper pair of protuberances began to take the form of a bud and later developed into branches. With the appearance of the branches, the second pair of buds ceased developing.

The conclusion of the experiment is: (1) that the protuberances are the primordia of lateral buds which under normal conditions will not develop; (2) that these lateral bud primordia are in evidence on the embryo of the seed—a condition which as far as we know is not duplicated in any other plant; (3) it is not known why these bud primordia should be in two rows on the epicotyl while they appear promiscuously upon the stems.