

THE JACKET LAYER IN SASSAFRAS.

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In the ovules of some angiosperms a definite nutritive tissue invests the embryo-sac, while in others no such layer exists. This nutritive jacket appears in all cases to be simply a modification of one or more layers of cells on the inner wall of the ovule. It is purely a physiological tissue and is usually described as consisting of cells with deeply-staining contents. It is much less definite in structure than the tapetum in the microsporangia of the stamen, but reminds one of the so-called spongy tissue in the ovule of the pines and related plants. Although usually described as a dark staining tissue, there are examples where just the opposite is the case. Cook (1) describes the tissue in the wall of the ovule of *Agrostemma githago* as consisting of two zones, the inner zone consisting of thin-walled cells which degenerate while the embryo-sac is enlarging. Although the cell walls of the zone were very delicate, the entire layer was sharply separated from the outer tissue by a very thick limiting wall.

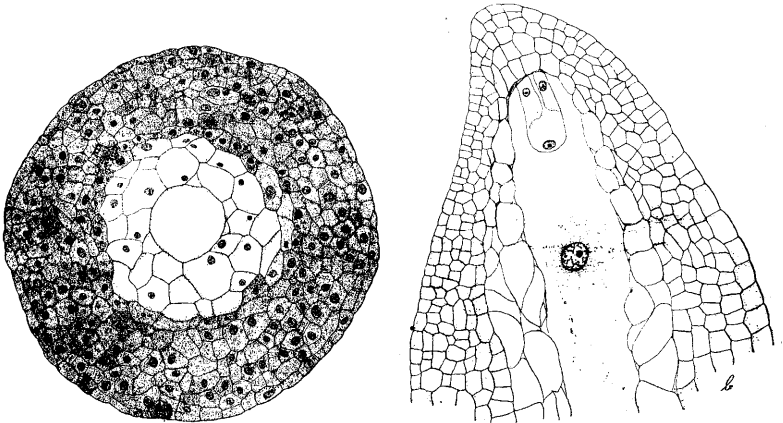


Fig. 1. Ovule of *Sassafras*, showing jacket layer. a, cross section; b, longitudinal section.

While studying some preparations of *Sassafras sassafras*, the writer observed a jacket of cells surrounding the mature embryo-sac. This layer shows some resemblance to the delicate zone in *Agrostemma*, but there is no distinct limiting wall on the outside. It is from one to several layers of cells in thickness and the cells are light-colored with Delafield's haematoxylin and Heidenhain's haematoxylin, while the cells of the outer zone stain very dark (Fig. 1, a, b). The cells have large vacuoles and comparatively little

protoplasm and begin to degenerate when the embryo-sac is fully formed. This jacket layer thus performs an important function. First its cells nourish the developing female gametophyte, and later, by their disintegration a further food supply is furnished to the developing endosperm and embryo. By their rapid disintegration there is also a decided increase of room in the ovule. These processes correspond to the functions of the tapetum in the microsporangium.

As stated before, this jacket layer in the ovule must be regarded as purely a physiological tissue, being developed in various ways in different angiosperms. It may be entirely absent as in *Sagittaria* and *Lilium*; it may be represented simply by disintegrating cells in contact with the embryo-sac as in many monocotyls and dicotyls; it may have a development as in the examples just discussed; or it may be a highly specialized layer of dark-staining cells. To the last type belongs *Aster novae-angliae*, where the layer is described by Chamberlain (2) as consisting of cells with dense protoplasm remarkably free from vacuoles. *Stylidium* (3) and *Lobelia* (4), as well as many other genera of *Sympetalae*, have highly developed jacket layers.

1. COOK, M. T. The Development of the Embryo-sac and Embryo of *Agrostemma githago*. *Ohio Nat.* **3**: 365-369. 1903.
 2. CHAMBERLAIN, C. J. The Embryo-sac of *Aster Novae-Angliae*. *Bot. Gaz.* **20**: 205-212. 1895.
 3. BURNS, G. P. Beiträge zur Kenntniss der Stylidiaceen. *Flora* **87**: 313-354. 1900.
 4. BILLINGS, F. H. Beiträge zur Kenntniss der Samenentwicklung. *Flora* **88**: 253-318. 1901.
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