

become spherical and thus reducing their contact surfaces to nearly nil (Loewi, Fitting, Hannig). Or it may be a result of chemical alteration (a) of a part or (b) of the whole of the cell wall. The middle lamella may be dissolved, in this way loosening the secondary walls from each other; or the whole or part of the secondary membrane may be altered (Tison). Such chemical alteration may or may not be preceded by cell-division in the cells directly involved. Even in species in which this usually takes place, it may be omitted (Tison, Loewi) either entirely or in a part of the separation layer, as I have myself observed. When cell-division does occur, it is an expression of a resumption of growth (secondary meristem of previous authors), but as cell growth obviously does not necessarily lead to cell-division, this may be absent. The amount of growth may vary with external conditions, and it is usually much more marked under water or when high relative humidity prevails, and may lead to callus hypertrophy (Kuster, 40, p. 289). And in species where growth is usually omitted (e.g., *Ampelopsis*, *Impatiens*) cell-division accompanying separation is still occasionally observable.

Rhexolysis, while frequent in the mosses, is, so far as I know, generally quite rare, and its precise nature and the causes leading up to it need investigation. Tison believes it to occur in *Aristolochia Siphon* (leaf), but Loewi questions the accuracy of Tison's observations, basing his criticism on the similarity of Tison's description and drawings to appearances seen by him (*Laurus*, etc.), and leading to separation by the joint action of chemical alteration in the cell-wall and turgor. In view of my own work, Loewi's criticism is justified.

An apparently true case of rhexolysis, however, occurs in the style of *Gossypium*. Several minute transverse fissures appear at different levels somewhat above the apex of the ovary. These deepen and gape. Microscopically, they are seen to pass transversely through the tissues without relation to the position of the cell-walls, and without any evidence of separation of entire cells. The protoplasts, with their inclusions, are found *in situ* and the protoplasm torn through. Experiments indicate that external mechanical relations (pull or pressure of the staminal tube) are not factors. The fissures are not to be discovered before the latter half of the second day of anthesis.

Schizolysis is, on the other hand, general, but presents widely divergent appearances. The simplest cases (primary meristem) are those in which, by the solution of the primary membrane (middle lamella), the involved cells—usually occupying an ill-defined and irregular zone—can fall apart. Loewi, assigning to alteration of the membranes a very minor rôle, believes that separation, as exemplified in *Ampelopsis*, is accom-