Abscission.—HODGSON[20] and KENDALL[21] have recently contributed to the literature on the abscission problem, the former having investigated foliar abscission in *Citrus* and the latter the abscission of flowers and fruits in 10 genera of the Solanaceae, and particularly in *Nicotiana*. The investigation of an abscission problem may be expected to resolve itself into an effort to determine the following points: (1) the histology of the tissue in which the abscission takes place, and the position of the abscission zone therein; (2) the extent of the abscission zone, its histological differentiation, if any, and its development, that is, whether performed or not; (3) the position of the separation layer within the abscission zone, and the nature of the actual abscission process, that is, the method of cell separation; (4) the time of abscission, involving both reaction time and abscission time; and (5) the possibility of inducing abscission experimentally (by poisonous gases, mechanical injury, etc.). The most vital as well as, often, the most obscure of these matters which should receive consideration is the one involving the determination of the method of cell separation. In this connection both HODGSON and KENDALL found, in the species investigated, that the abscission process conforms to the usual type which involves the separation of cells along the plane of the middle lamella. No cell divisions or elongations were observed to precede or accompany abscission. HODGSON notes a remarkable swelling and gelatinization of the cell walls of the separation layer, which is followed by a dissolution of the gelatinized walls. In this case such cells, after functioning in abscission, resume growth and divide rapidly for a time. The abscission problem in *Citrus* is of peculiar interest because of the well known shedding of immature oranges of the Washington navel variety which annually results in considerable financial loss to orange growers.[22]

KENDALL'S article contains a more or less satisfactory consideration of all these points noted as of interest, but, as is perhaps inevitable in an attempt to cover so wide a field, no more than a beginning is made in working out some of the more fundamental problems. Thus, he shows that from water extracts of separation zones in which abscission has commenced a decidedly heavier precipitate comes down in 95 per cent alcohol than from those in which abscission has not started. This difference is tentatively ascribed to the presence of pectin in the first case, it being derived from the hydrolysis of pectose during the dissolution of the primary cell membranes in the activated separation cells. This conclusion may or may not be justified, but such experiments indicate

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[20] HODGSON, R. W., An account of the mode of foliar abscission in *Citrus*. Univ. Calif. Publ. Bot. 6:417–428. 1918.

[21] KENDALL, J. N., Abscission of flowers and fruits in the Solanaceae with special reference to *Nicotiana*. *Ibid.* 5:347–428. 1918.

[22] HODGSON, R. W., Some abnormal water relations in citrus trees of the arid Southwest and their possible significance. Univ. Calif. Publ. Agr. Sci. 3:37–54.

lines along which future investigation should lie, especially in view of the fact that KENDALL succeeded with lower percentages of alcohol in bringing down a different type of precipitate. This latter precipitate might be expected to yield cytolytic enzymes. He also finds a reduction in the sugar content of abscission zones following cell separation, and that the normal acidity on *Nicotiana* pedicels is low and is only slightly reduced during abscission. This latter fact is taken to indicate that the activity of enzymes alone is responsible for the dissolution of the middle lamellae during cell separation.

KENDALL reports that illuminating gas and laboratory air will cause abscission in the majority of the species investigated, but that resistance to abscission stimulated in this manner appears suddenly in some species. Tests were also made as to the effect of a variety of mutilations of the flower and pedicel in inducing abscission. Relatively slight injuries to the ovary were effective, whereas considerable amounts of tissue had to be removed in the case of other flower parts before abscission was induced. It is interesting to note that mechanical injury was not found to be particularly effective in the tomato, and that the following species rarely or never exhibit floral abscission: *Nicotiana Bigelovii* (3 varieties), *N. quadrivalvis* (2 varieties), *N. multivalvis*, *Petunia hybrida*, *Salpiglossis sinuata*, *Salpichora rhomboidea*, and *Lycium australis*. A detailed summary of the pertinent literature is included in KENDALL'S paper. —T. H. GOODSPEED.

Nitrates in forest soils and forest regeneration.—In an important contribution HESSELMAN[23] has reviewed the present state of our knowledge of the composition of forest soils and finds, among other things, that while from earth containing relatively little humus it has been possible to isolate organic compounds of known composition the humus of many soils is composed largely of chemical compounds of undetermined character, but that on the whole the constituents are colloidal in nature and are largely influenced by the amount of mineral salts in the soil and ground water. He distinguishes two types of forest humus soils, the "mild humus" characteristic of deciduous forests, well aerated and containing nitrate-forming as well as denitrifying bacteria, and "raw humus" found in coniferous forests as a series of layers of leaves and litter in various stages of decomposition from which nitrate-forming and denitrifying bacteria are usually absent.

Recognizing decomposing litter as one of the principal sources of nitrogen in forest soils, he has investigated the "decay capacity" of various forest types, using several different methods. He has determined the relative abundance of various bacteria, the nitrogen content of trees and plants, and has shown that nitrate supply and nitrate formation is at its maximum in beech forests and at its minimum in mossy coniferous stands. Lime in the soil and in solution

[23] HESSELMAN, HENRIK, Studier över saltpeterbildningen i naturliga jordmåner och dess betydelse i växteekologiskt avseende (with abstract in German). Meddel. från Statens Skogsförsöksanst. Haft. 13–14. 297–527. *pls.* 7. *figs.* 30. 1917.