are employed which are alkaline in nature and have the objection of staining the background.—ERNEST F. ARTSCHWAGER.

Size variation in secondary xylem.—BAILEY and TUPPER[8] have applied the comparative method in thoroughgoing fashion to an attack on the problem of cell size. Confining themselves to a study of the length of the tracheary elements in the secondary xylem of trees and shrubs among vascular cryptogams, gymnosperms, and angiosperms, they present data derived from thousands of measurements on some 440 species belonging to 124 families. The most conspicuous fact brought out by this reconnaissance survey is that the length of these elements is roughly correlated with phylogenetic position, being greatest in vascular cryptogams, somewhat less in gymnosperms, and least in angiosperms. This progressive reduction in the length of the wood cells has been associated with the reduction in amount of the primary xylem in the passage from lower to higher forms, but is probably due in greatest measure to the evolution and differentiation of vessels. These elements have become progressively shorter and broader, thus losing their resemblance to the primitive tracheid; and the fibers and tracheids associated with them have also grown shorter, although naturally to a less extent. Notable exceptions to the general rule are the vessel-less Magnoliaceae and Trochodendraceae, represented by *Drimys* and *Trochodendron*, which possess tracheary elements far longer than other angiosperms, and thus resemble the gymnosperms. Evidence from this source obviously supports the view that these genera are primitive rather than reduced types.

The authors have also made a preliminary study of the relations between the length of the tracheary elements and the age of the plant, its growth habit, and the environment under which it lives. So far as the cells studied are concerned, there is no definite correlation between body size and cell size. The tracheary elements may increase in length for a few years as the plant grows larger, but they soon reach a constant size. Dwarfed and depauperate plants tend to have somewhat smaller elements than normal individuals.

The authors point to the need of more intensive investigations in this hitherto almost unexplored field; and in particular call for a careful study of the activities of the cambium and the factors which direct these activities. Indeed the growing point of plants, once so enthusiastically studied as the key to histology and then for so long neglected, bids fair to be once more a center of interest as one of the keys to a knowledge of morphogenesis.—E. W. SINNOTT.

Sap concentration in epiphytes.—Continuing the studies already noted[9] upon the concentration of tissue fluids, HARRIS[10] has found in several species of

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[8] BAILEY, I. W., and TUPPER, W. W., Size variation in tracheary cells. I. A comparison between the secondary xylems of vascular cryptogams, gymnosperms, and angiosperms. Proc. Amer. Acad. **54**:149–204. *figs. 6*. 1918.

[9] BOT. GAZ. **65**:285–286. 1918.

[10] HARRIS, J. ARTHUR, On the osmotic concentration of the tissue fluids of desert Loranthaceae. Mem. Torr. Bot. Club **17**:307–315. 1918.