by shorter periods of darkness and light. Humidity of the air was figured to a standard.

Potometer determination of stomatal aperture involves mass movement of air through the stomates under differential pressure, while transpiration involves static diffusion of water vapor through the stomates. To clear up the physics of the problem, DARWIN gives two quotations from Sir J. LARMOR: "The speed of diffusion through a narrow aperture between two open spaces is proportional to its diameter. The speed of a stream of air through such an aperture, between open spaces having different pressures on them, is proportional to its area if the effect of viscosity can be neglected, but proportional to the $\frac{3}{2}$ power of its area if viscosity is preponderant. Which of these conditions prevails, or whether the circumstances are intermediate, in a given case, depends upon the diameter of the aperture." "Diffusion through a long pipe or channel varies as the area, and flow through it depends upon a reduced area owing to the flowing air adhering to the walls of the tube; in fact it varies as the square of the area if viscosity is predominant. Thus if this be the case, provided the channels are of fairly uniform width, transpiration would be proportional to the square root of flow, the same law as that obtained for the case of holes in a thin plate." DARWIN believes the second assumption most nearly represents the situation, for the first applies only to tubes whose lengths are less than one-fifth of their diameter. As might be deduced from either of the physical laws just stated, the author has made one curve by plotting the square root of the rate of potometer flow, and another by plotting the rate of transpiration for various stomatal apertures, and for 18 separate experiments finds general agreement between the curves, although there are many minor discrepancies.

One regrets that the experiments were not carried out in closely controlled temperature and humidity conditions, which might go far to eliminate minor discrepancies. Evaporimeter records and measured light intensities might also aid in explaining these discrepancies. Much has been done since 1900 to put the material and energy exchanges between the leaf and the air upon a sound physical basis, and this is a noteworthy step in that direction. One is impressed by the excellent scientific spirit of the writer, and by the considerate way in which he deals with those who differ from him.—WM. CROCKER.

Sweet potatoes during storage.—HASSELBRING and HAWKINS[10] made a study of the course of the carbohydrate transformations in sweet potatoes (*Ipomoea Batatas*) during storage. The data indicated that a more rapid transformation of starch into sugar took place immediately after the roots were dug than at subsequent periods. This suggested intensive investigation relative to the effect of cessation of leaf activity and the effect of different temperatures on the progress of carbohydrate transformations. The study was

[10] HASSELBRING, H., and HAWKINS, L. A., Carbohydrate transformations in sweet potatoes. Jour. Agric. Research 5:543–560. 1915.

planned so as to include 3 series of experiments. In the first series samples of freshly dug potatoes were collected and cut lengthwise into two equal parts. One set of the samples was used immediately for the determinations of moisture, sugar, and starch. The corresponding halves were divided into 3 sets and each set stored at a different temperature for 12 days before similar determinations were made. The samples were stored at 30, 15.5, and 5° C. For a check a number of whole potatoes were subjected to the same conditions. The second series was a duplicate of the first, except that the potatoes were dug about 2 weeks later. This series would show any change occurring in the growing potatoes after the first series was harvested. The third series of experiments was modified so as to determine the effect of removal of the vines on the carbohydrate transformations. The roots were not harvested until 10 days after a killing frost.

HASSELBRING and HAWKINS pointed out that to the rate of carbohydrate transformations in stored sweet potatoes the Van't Hoff temperature law was applicable. In general, at 30° C. starch hydrolysis was rapid at first and soon reached an end point. At 15.5 C. a more normal rate of transformation took place, tending toward a state of completion. The hydrolysis at 5° C. was markedly retarded. In spite of the utilization of reducing sugar in respiration, HASSELBRING and HAWKINS were able to show a marked accumulation at first and very little subsequent accumulation. The concentration of the reducing sugar was found to be comparatively low during the period of storage. There was a lag in accumulation of cane sugar, associated with the increase of reducing sugar. The data suggested that the mode of carbohydrate transformation in stored sweet potatoes was from starch to reducing sugar, which resulted in the formation of cane sugar as the end product. On studying the effect of the vines on transformations, it was found that during their activity the sugar content remained low. As soon as the flow of materials was checked by removal of the vines, the usual transformations as found in storage of sweet potatoes manifested themselves.

HASSELBRING and HAWKINS[11] have pointed out that the internal changes during storage must play an important rôle in susceptibility to decay. Aside from the theoretical significance, it seems that this mode of attack on storage problems of this nature will be of economic value.—FRED W. GEISE.

Taxonomic notes.—BRITTON,[12] in continuation of his studies of West Indian plants, has described new species in *Cleome*, *Chamaecrista* (3), *Leucocroton* (3), *Passiflora* (3), *Rondeletia* (10), *Eriocaulon* (3), *Dupatya*, *Pilea*, *Ichthyomethia*, *Castelaria*, and *Stenostomum* (2).

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[11] HASSELBRING, H., AND HAWKINS, L. A., Physiological changes in sweet potatoes during storage. Jour. Agric. Research 3:331–342. 1915.

[12] BRITTON, N. L., Studies of West Indian plants. IX. Bull. Torr. Bot. Club 44:1–37. 1917.