from 3–6 times in Jena glass or in platinum dishes; the water was redistilled and kept in Jena or in Thüringen glass. The most important of BENECKE's results, and those in which he is at variance with the investigators mentioned above, are as follows: (1) Dextrose or ammonium salts cannot be substituted for asparagin in the simple solution, asparagin 0.25 per cent., magnesium sulfate 0.05 per cent., potassium phosphate 0.02 per cent. (2) Potassium is necessary for development, although a very small amount of K-ions suffices for growth and pigment production. (3) Potassium cannot be replaced by lithium, sodium, or ammonium. It can be replaced by rubidium and caesium, though not to the same degree, the presence of 0.0000015 per cent. of KCl being sufficient for development, while RbCl must be 10 times, and CsCl 100 times, as strong. The latter are also more toxic than KCl in concentrated solutions. (4) The presence of magnesium in the solution is necessary for development. Growth occurred in Mg-free solutions in Jena glass, which has 5 per cent. Mg in it, while no growth was obtained in Vienna glass. This Mg relation has been a stumbling-block for many investigators. On the other hand, the conclusion of most of the other authors that phosphate is essential in the solution is confirmed by BENECKE, as is also the observation of JORDAN and of NOESSKE that the acid group SO_4 is necessary for pigment development in *B. fluorescens* and *B. pyocyaneus*. BENECKE, however, does not distinguish between the two pigments produced by the latter organism, which may not be alike dependent upon sulfate.—MARY HEFFERAN.

Infectious chlorosis.— Further studies of BAUR[6] on the infectious chlorosis of the Malvaceae have shown that green shoots which occasionally appear on variegated plants of *Abutilon Thompsoni*, Hort., are entirely immune to the disease and remain so. If a scion from one of these immune shoots is grafted upon a variegated plant, the scion produces only green leaves. If another scion of a green susceptible variety is grafted upon the first, the second scion will become variegated, showing that the virus is conducted unchanged through the immune piece. If, however, the experiment is conducted by using the immune species *Lavatera arborea* L. as the intermediate piece, no infection occurs in the second scion. In the first instance the intermediate plant is immune but does not affect the virus; in the second instance the virus is evidently destroyed. In his former paper BAUER showed that the virus causing chlorosis was developed only in the light. In the present paper the light relation is more fully investigated. It is found that somewhat shaded individuals, as when growing under shrubbery, lose their variegation, although growth is not greatly influenced. The optimum for virus formation, therefore, lies much above that for growth. Although shading the plants resulted in a diminution of the white areas, it was not possible by increased illumination to increase the areas above a certain maximum which

[6] BAUR, ERWIN, Weitere Mitteilungen über die infectiöse Chlorose der Malvaceen und über einige analoge Erscheinungen bei Ligustrum und Laburnum. Ber. Deutsch. Bot. Gesells. **24**:416–428.

seems to be attained at ordinary illumination. This seems to indicate that even the green areas of infected leaves are permanently immune to the variegation. Both in blue and in red light plants retained their variegation.

BAUR has extended his investigations to other variegated plants and finds that infectious chlorosis is of widespread occurrence. Both true variegation and the infectious form may occur in varieties of the same species. Among the forms investigated, a variety of *Ligustrum vulgare L.* and one of *Laburnum vulgare* (Griseb.) owed their variegation to infectious chlorosis similar to that of *Abutilon Thompsoni*, Hort.—H. HASSELBRING.

Hydrocyanic acid in plants.—GUIGNARD has been giving special attention to plants which contain glucosides that produce this acid, and the conditions under which they may become poisonous. He relates in one paper[7] the cases of poisoning from the use of beans derived from wild or subspontaneous forms of *Phaseolus lunatus* L., a species having many forms, of which our Lima bean is one. In cultivation these are generally quite innocuous, but all contain phaseolunatin in greater or less quantity, which is split by emulsin into glucose, acetone, and hydrocyanic acid. The beans from Java have proved most virulent. A botanical and chemical history of the species is given, with illustrations of the seeds of many varieties. A new, convenient, and certain mode of detecting the acid is proposed. Filter paper is moistened with 1 per cent. picric acid and dried, then moistened with 10 per cent. sodium carbonate and dried, in which state it keeps its sensitiveness several months. A strip suspended in a test tube containing 0.02–0.05^{mg} HCN becomes red-orange in 12–24 hours.

In other papers[8] Guignard notes the presence of a cyanogenetic compound in *Sambucus nigra* L., *Ribes rubrum* L., *R. aureum* Pursh., where it is found in the fresh leaves from vigorous shoots, green fruits, and young bark of the stem, while traces appear elsewhere. The compound is probably a glucoside that is split by emulsin, which accompanies it and does not seem to be a reserve food.[9]

Emulsin he reports in the aerial roots of a considerable number of exotic and indigenous orchids,[10] and also in certain yeasts[11] (resembling *Sac. Pastorianus* Hansen). This has also been announced by HENRY and AULD.[12]

---

[7] GUIGNARD, L., Le haricot à acide cyanhydrique (*Phaseolus lunatus* L.). Revue de Viticulture **1906**. *col. pl. 1. figs. 9.*

[8] ———, Sur l'existence, dans le sureau noir d'un composé fournissant de l'acide cyan-hydrique. Bull. Sci. Pharmacol. **12** and **13**. 1905–6.

[9] ———, Nouvelles observations sur le formation et les variations quantitatives du principe cyanhydrique de sureau noir. *Idem.* See also announcements in Compt. Rend. Acad. Sci. Paris June 3, July 24, Sept. 4, Dec. 26, 1905.

[10] ———, Quelques faits relatifs à l'histoire de l'émulsine; existence générale de ce ferment chez l'Orchidées. *L. c.* footnote 8.

[11] ———, Secretion d'émulsine par les levures. *L. c.*

[12] Proc. Roy. Soc. B. **76**:568. 1905.