

SECTION ON BOTANY

Chairman: FLOYD E. BEGHTEL, Evansville College

The papers published below, in full or in abstract form, were presented in the sectional program. Dr. Winona H. Welch, of DePauw University, was elected chairman of the section for 1939.

ABSTRACTS

A comparison of market milk from ten Indianapolis companies by use of the direct microscopic method of analysis. INA STANLEY, Butler University.—One quart bottle of milk, delivered by each of ten companies to homes, was used for this analysis. This was done in July, 1937, and repeated in September, 1937. Both plate and direct microscopic methods were used. Plate counts for July ranged from 4,000 to 120,000; for September from 1,000 to 198,000. Six companies showed increase in September over July and four showed decrease. Direct counts for July ranged from 8,100,000 to 31,910,000 and in September 2,840,000 to 20,930,000. From the direct counts all companies showed decrease in September as compared with July. Staphylococci were the most abundant form of organism in three companies for both July and September and in two additional companies for September. In all other cases diplococci were the most abundant type. Tables are presented showing number of staphylococci, diplococci, long streptococci, short streptococci, body cells, and fungi for each sample of milk studied. Significance of large numbers of each type of organism in terms of milk production and handling is discussed. The general conclusion is reached that in all cases quicker and better cooling methods are desirable and higher standards of cleanliness are necessary in the case of apparatus, especially in that used before the milk reaches the dairy.

A fossil pollen study of Kokomo Bog, Howard County, Indiana. JOHN W. HOWELL and RAY C. FRIESNER, Butler University.—The lower eleven feet of deposits show that a typical Canadian type of coniferous forest, dominated by *Abies* and *Picea*, was the pioneer after the soil was left by the glaciers. *Pinus* is the only other genus represented in the lower seven feet of deposits, but *Larix* is present in the deposits eight feet from the bottom. Twelve feet from the bottom, *Abies* and *Picea* lose dominance in favor of *Quercus* and *Betula*. Fifteen feet from the bottom, *Betula* begins to lose out, and *Quercus* retains undisputed dominance to the surface, never being approached by any other species. *Abies* and *Picea* drop out entirely a few feet after their dominance is lost, but *Pinus* remains in low frequencies to the first foot below the surface. *Larix* continues until within 12 feet of the surface and then disappears entirely. Broad-leaved trees in addition to those above mentioned were *Acer*, with a maximum of 10% in 10-foot level; *Carya*, 25% maximum at the 8-foot

level; *Fagus*, 5% maximum in the 2-, 4-, and 11-foot levels; *Juglans*, 12% maximum at the 1-foot level; *Populus*, 13% maximum in the 2-foot level; *Salix*, 9% maximum in the 19-foot level; *Tilia*, 5% maximum in the 10-foot level; and *Ulmus*, 16% maximum in the 16-foot level. The following forest succession is shown: *Abies-Picea*, *Abies-Picea-Larix*, *Quercus-Betula*, *Quercus-Carya*, *Quercus-Betula*, *Quercus-Juglans-Carya*. (Butler Univ. Bot. Stud. 4:117-127. 1938.)

Prominent European botanists and herbaria. WINONA H. WELCH, DePauw University.—A brief story of a study of some European herbaria, with slides showing well-known botanists and herbaria.

Forest succession in the southern limits of early Wisconsin glaciation as indicated by a pollen spectrum from Bacon's Swamp. JAMES H. OTTO, Butler University.—Forest succession in the Bacon's Swamp region since Pleistocene times was determined by analysis of fossil pollen preserved in peat and marl deposits in the bog. Bacon's Swamp is a significant station because of its location near the southern limits of early Wisconsin glaciation. Samples from two borings, one 32, the other 22 feet in depth, were examined. Forest succession was from *Abies-Picea* while early deposition was in progress, to mesophytic *Acer-Fagus-Quercus* forest of the present day. Climatic periods indicated are cool moist, moderately dry, warm with increased dryness, and warm moist. Results from the two borings correlated well. Results were similar to those from other bogs of early Wisconsin depositions. (Butler Univ. Bot. Stud. 4:93-115. 1938.)

Additional records for some of the less common algae. C. MERVIN PALMER, Butler University.—New localities are here reported for several American algae. Included are several forms not frequently encountered, such as *Desmonema* and *Hydrurus* from California, and *Nostochopsis*, *Nodularia*, *Colacium*, *Stichococcus*, *Chlorotylum*, *Compsopogon*, *Mischococcus*, and *Mesotaenium* from Indiana.

Notes on an early and little known Indiana botanical journal. LAWRENCE J. KING, Earlham College.—A search into the literature of Wayne County botany has revealed an almost unknown publication containing a number of papers on the flora of Indiana. This journal, the *L. B. Case Botanical Index*, was first published in Richmond, Indiana, in April, 1877, shortly after the establishment of the *Botanical Gazette* by John M. Coulter at Hanover in November, 1875. It was published quarterly for about four years. The early issues were scarcely more than trade catalogs, but, with the withdrawal of Mr. Case from business in 1880, the journal became more truly scientific. It was illustrated profusely with woodcuts. The circulation reached 5,000. The publication was suspended with the March, 1881, number (Vol. 4, No. 2). Lucien B. Case, the editor and publisher, was a prominent florist at that time and was active in scientific circles in his own community and the state as well. He was the corresponding secretary of the Richmond Scientific Association for several years, and he also served as the first secretary of the Indiana Archaeological Association. While the journal was largely horticultural in nature in the early issues, many items of a more

strictly botanical character were included in the later numbers. Of the articles published, two by W. C. Steele are of particular importance: "The Orchidaceae of Northern Indiana," and "A Brief Note on the Ferns of the Vicinity of La Porte, Indiana." Mrs. M. P. Haines' list of "Musci, Hepaticae, and Filices in the Vicinity of Richmond, Indiana," republished later in a modified form in the Indiana Geological Report in 1879, was also included here. Two articles on the "Big Trees of Indiana," one by B. W. Smith and the other by an anonymous writer, conclude the list of the more important contributions published in the *Index*.

Microclimate, evaporation, and epiphytic mosses. J. E. POTZGER, Butler University.—A comparison is made of trees on the Butler University campus and a typical beech-maple woods on the Fort Harrison reservation. Atmometers were placed at the bases and at a height of six feet on the north and south sides of trunks of trees in upland environment and in shallow ravines. For a period of 16 weeks the south sides had greater evaporation than the north, and higher parts of the trunks greater than the bases. Trees growing on ridges on the Butler campus showed greater evaporation than those similarly located at Fort Harrison. Local environmental influences frequently obliterated the effects of exposure and topography. (Bryologist, 1939.)

A quantitative study of the phytoplankton of Lake Michigan collected in the vicinity of Evanston, Illinois. WILLIAM ALLEN DAILY, Butler University.—A weekly quantitative study of the phytoplankton of Lake Michigan at Evanston, Illinois, was made over a period of one year, May, 1937, to May, 1938. Several ecological factors were studied in conjunction with the seasonal periodicity of the phytoplankton, e. g., temperature, turbidity, hydrogen-ion concentration, bacteria, and sunlight. The Sedgwick-Rafter method was used in the study. Forty-three genera representing five classes were recorded. In order of numerical abundance, the classes were Bacillariophyceae, Chrysophyceae, Myxophyceae, Chlorophyceae, and Dinophyceae. There was a considerable weekly variation and a marked seasonal periodicity in the total phytoplankton and in its variety. Strong maxima were noted in June and October. The diatoms dominated the phytoplankton at all times, both in total number and in number of species. (Butler Univ. Bot. Stud. 4:65-83. 1938.)

A test-tube spiral absorption vessel. RAYMOND E. GIRTON, Purdue University.—An efficient and compact carbon-dioxide absorption vessel has been designed for experiments in plant respiration. A test tube and a two-holed rubber stopper enclose the system. A vertical inlet tube carries the air stream to the bottom of the test tube where it is released in the form of small bubbles. These are caught and travel upward through the absorbent solution, in a submerged spiral glass tube. A short outlet tube carries the air stream out of the vessel after the spiral has been traversed.

A pollen profile of Otterbein Bog, Warren County, Indiana. RUTH R. RICHARDS, Butler University.—The bog was filled in forty-four feet,

of which twelve feet were marl. Pollen in the lower nine feet indicates an *Abies-Picea-Pinus* dominance. *Picea* and *Pinus* persisted in small percentages to the surface, while *Abies* disappeared at the 15-foot level. *Salix* had a higher percentage of pollen at the 34-foot level than any other genus, while the three conifers here showed a sharp decline. *Quercus* was the most important genus from the 32-foot level to the surface. *Acer* was most prominent at the 13- and 18-foot levels. The top levels indicate a *Quercus-Carya* climax with an *Ulmus* subclimax.

Notes on Indiana grasses. J. E. POTZGER, Butler University, and CHARLES M. EK, Kokomo.—A list of grasses from counties from which they have not previously been reported.

A modification of the Osterhout apparatus for the measurement of plant respiration. CLINTON H. HOBBS, Purdue University.—The Osterhout apparatus, as originally designed, did not give results within a range of 5% when used in measuring plant respiration. A modification of the apparatus involves a colorimetric determination of the production of carbon dioxide by a photoelectrical method. Data are presented which show the greater accuracy of the modified apparatus.

The malachite-green differential culture-test as applied to sex-reaction strains of *Nectria coccinea*. M. L. LOHMAN and WILMA E. BURMAN, Indiana University.—Sexual reaction strains of a fungus diagnosed as *Nectria coccinea* (Pers.) Fr. (in the sense of Wollenweber) were grown on a special nutrient agar medium containing malachite green in concentrations ranging from 0.125 to 1.0 p.p.m., to determine the relationship of physiological culture types to known dye-toxicity values for the fungus. Colony diameters of plate cultures, with and without the dye, were recorded on the 10th and 15th days. Nearly identical toxicity values were found for all cultures of both strains when growth was inhibited by moderately to strongly toxic concentrations of the dye. The calculations indicate that, for the culture conditions maintained, a concentration of 0.00022% dye would be required to reduce growth to 25% of that on the control medium. However, inhibition values for the weaker concentrations studied showed a wide range since the cultures were either stimulated or inhibited in growth in varying degrees. With these concentrations some tendency to a differential response by strains was evident.

The anatomy of the leaf of *Streptochaeta spicata*, a tropical grass. PAUL WEATHERWAX, Indiana University.—The mature leaf of *Streptochaeta spicata* has in the mesophyll a series of air spaces apparently unlike any which have thus far been reported. These are formed from a special layer of parenchyma cells which thicken their walls and collapse as they die, forming a number of structures similar to steel I-beams.