

BOTANY

Chairman: H. J. BRODIE, Indiana University

R. A. Laubengoyer, Wabash College, was elected chairman for 1949.

ABSTRACTS

Variation in the bird's nest fungus, *Cyathus Stercoreus*, in culture and in nature. HAROLD J. BRODIE, Indiana University.—A long series of haploid mycelia, all derived from spores of a single peridiole of one wild type specimen of the coprophilous fungus *Cyathus stercoreus*, when paired in certain combinations yielded diploid strains that differed from one another in color, texture and growth rate. A number of the diploid mycelia were induced to fruit in culture, and these produced fruit bodies of several different types, some so unlike the parental wild type as to bear little superficial resemblance to *C. stercoreus*. Ten of the culture types were planted outdoors in garden soil enriched with manure. Two such cultures fruited after six months, and in each instance produced fruit bodies essentially identical with those obtained in the laboratory. The extreme variability of this fungus noted in collections from nature probably has a genetic basis.

Growth patterns of carrot and sunflower roots cultivated in vitro. C. W. HAGEN, JR., Indiana University.—Excised carrot (Red-cored Chantenay) and sunflower (Mammoth Russian) roots may be cultured indefinitely in White's solution containing thiamine, pyridoxine, and nicotinic acid. Both species exhibit two growth patterns, a "normal" and a "hyperhydric" type. The normal differs from the hyperhydric in its higher growth rate, more regular contour, greater opacity, higher content of intercellular gas, and its tendency to float near the surface of the culture fluid. Parallel clones of the two types may be maintained provided the normal clone is repeatedly subcultured by excision of tips of lateral roots. Apical meristems of the normal type invariably transform to the hyperhydric type within ten weekly transfers. The reverse transition has never been observed. Some evidence bearing on the nature of the transition has been accumulated.

Right-handed and left-handed corn embryos. PAUL WEATHERWAX, Indiana University.—A seedling grass plant may be designated as right-handed or left-handed according to the direction in which the edges of the lowest leaf sheath overlap. An old publication on the structure of the ear of corn states that, in the normally paired rows of grains, the embryos in one row are right-handed and those in the other are left-handed. The problem has been reinvestigated and the statement found to be erroneous. Whether a corn plant is to be right-handed or left-handed is determined wholly by chance and is in no way

correlated with the position of the embryo in the characteristic pair of grains.

The Devonian-Mississippian Transition Flora of Indiana and Kentucky. Part I: Geological Aspects. J. H. HOSKINS AND A. T. CROSS.—The flora of the black shales of southern Indiana and correlative beds in Kentucky, Tennessee, and Ohio is represented by abundant petrified fragments of wood preserved in phosphatic nodules or as isolated, phosphatized specimens embedded in the matrix which contains the nodules. These fossils are fairly numerous in certain areas of the outcrop of the black shales but they are known only from the upper few feet of this series, i.e., in that portion which is considered to be Mississippian in age.

The upper part of the Devonian portion of the black shale series contains the better known silicified trunks of *Callixylon Newberryi*, and the lower part contains a zone of abundant, carbonized compressions of *Foerstia*. These two plants are found in beds of equivalent and slightly earlier age in the Ohio Black shale and the Chattanooga shale. Other species of *Callixylon* are found in near-equivalent and somewhat older beds in New York and in the upper part (Mississippian) of the New Albany shale.

A few species of plants found in the phosphate nodule zone (L. Miss.) of this region are possibly similar to some species less well known from beds considered to be Upper Devonian, in age, from New York. In general, this flora corresponds to that recorded from similar black shale deposits of Europe, and is not easily identified as being typically Mississippian or Devonian. The flora represented here by the petrified wood may be the equivalent of one of the fairly well known Middle or Upper Devonian impression floras of eastern North America or/and Europe.

The Devonian-Mississippian Transition Flora of Indiana and Kentucky. Part II: Paleobotanical Aspects. J. H. HOSKINS AND A. T. CROSS.—The flora of the New Albany shale based on the structure of petrified plant fragments is comprised of about 35 genera and 50 species. This assemblage represents a Devonian-Mississippian transition flora, for it reflects to a certain extent the vegetation considered typical of Middle and Upper Devonian and it also includes a number of genera better known from the Mississippian and even later geologic periods. But by far the majority of species and even genera are known only from the New Albany shale or from rocks of comparable age and character.

The Pteropsida and Cycadofilicales are the most varied groups present and also the most abundant. The genera *Kalymma*, with a number of species, and *Calamopitys* are most commonly found. The morphology and range of 24 of the most common genera are reviewed and illustrated.

Increased Survival Value Resulting from Apparently Deleterious Mutations in *Oenothera*. RALPH E. CLELAND, Indiana University.—

Oenothera has suffered a number of kinds of alteration in its hereditary mechanism which would seem to militate against its success in the struggle for existence. Reciprocal translocations tend to result in non-disjunction and consequent reduction in fertility. Lethals reduce fertility drastically. Self-pollination tends to reduce heterozygosity and the beneficial effects of hybrid vigor. It would seem that plants possessing all three of these would be handicapped indeed. Instead, the groups of Oenothera which are characterized by all three are the most vigorous, the most fertile and the most widely distributed groups in the genus. Oenothera illustrates how it is possible for seemingly deleterious mutations to combine in such a way as to bring increased rather than decreased survival value. Thus, in Oenothera, translocations occur in such a way that they do not bring about significant reduction in fertility, and hence translocated chromosomes do not tend to become eliminated through selection. This brings about increased heterogeneity in segmental arrangement resulting in large circles. When circles are present, lethals become advantageous since a single pair of balanced lethals can preserve the heterozygosity of all of the chromosomes with minimal reduction in fertility, thus insuring the maximum of hybrid vigor. Self-pollination, by insuring heavy pollination, overcomes the sterilizing effect of the lethals, and in turn the lethals prevent self-pollination from reducing heterozygosity and hybrid vigor. Thus it is seen that mutations which by themselves are capable of producing harmful effects may, when properly combined, add up to increased survival value in the struggle for existence.

Forest Type Control in the Versailles Park Area Ripley County, Indiana. J. E. POTZGER, Butler University.—The Versailles Park area (Ripley County) differs somewhat from most locations in Indiana in that the microclimatic control of forest types is more complex because of the compact, leached flats habitat. North-facing slopes and gentle south-facing slopes have mixed mesophytic forest (with beech-maple tendencies), south-facing slopes are primarily oak-hickory, flood-plains have the usual sycamore-elm-hackberry association, and the compact, poorly drained flats are invaded primarily by the beech-sweet gum-red maple association. This latter type forest yields to the climax mixed mesophytic forest readily when stream cutting of a few feet in depth introduces better drainage, and no doubt better aeration of the soil. Significant features are that in this change beech and sour gum persists in the new association, sweet gum drops out completely, red maple, tulip poplar and white oak are reduced to scattered representation. The chief invader of the modified habitat is sugar maple, while red oak, black walnut, and linden become minor representatives in the new association complex. Physical characteristics of the soil and lack of adequate aeration appear to be the most vital edaphic factors in determining the establishment of the sweet gum-beech-red maple Illinoian tillplain forest type.

Forests Past and Present on Isle Royale (A preliminary report). J. E. POTZGER, Butler University.—Isle Royale in Lake Superior has

at present a striking boreal type of forest in which black spruce and white spruce are perhaps the most important species. Associated with these conifers is white birch. The forest as a whole is marked by small stem-size of trees except for some arbor vitae in swampy locations. The present forest cover may very likely be a post-fire forest. This conclusion is also supported by pollen studies from bogs on the island. The initial forest was composed chiefly of black spruce and Jack pine, with very small representation of paper birch.

The Laboulbeniales: An Interesting but Rare Group of Fungi.
HAROLD J. BRODIE, Indiana University.—Despite the extensive monographical work by Thaxter, few mycologists appear to have attempted to find or study the Laboulbeniales. These fungi may have considerable phylogenetic significance because of their supposed relationship to the Red Algae. Too little is known of the life cycle and cytology of the group and it is suggested that they should be sought and studied. The writer has found specimens of the Laboulbeniales twice in Central Canada and once near Ann Arbor, Michigan, on the wing covers of water beetles and caribid beetles. The fungi most commonly found were *Laboulbenia Gyridarum*, Thaxter, and *L. flagellata*, Peyritsch.