# BOTANY

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## ABSTRACTS

**Field Efficiencies of Sampling Methods in Forest Survey.** ALTON A. LINDSEY and S. R. MILES, Purdue University.—A statistical comparison of field efficiency for the new Bitterlich method, compared with square and circular quadrats of different sizes, was made. Intensive sampling in the laboratory was done from a 1:36 scale map of 20 acres of practically undisturbed Donaldson's Woods, Spring Mill State Park, Lawrence County, Indiana. The resulting data were used to determine for each method the number of trees required for sampling for density and basal area with 15 per cent standard error. The time for each sampling method, in seconds per tree, was determined in the actual woods. The product of these factors, expressed in hours, is field efficiency. The most efficient method tested is a proposed combination method fully operable from the point where the observer stands. It combines the basal area part of the Bitterlich method with the density part of the circular tenth-acre plot made by six-inch-base rangefinder from the central point. The operator turns through 360° once with an angle-gage and again with the rangefinder. No measurement or estimate of tree diameter is required, and no plot boundaries are laid out. By the new combination method, 1.7 hours are required to obtain an adequacy level of 15 per cent standard error for sugar maple, the species ranking third in density and fourth in basal area in this stand. The complete Bitterlich method, as used for both density and basal area, required 3 hours. Circular plots by rangefinder, and measuring trunks by diameter tape, were more efficient than square plots surveyed by diagonals N-S and E-W from the central point, and marked by flags at the corners. Tenth-acre circle plots required 2.5 hours; one-fortieth-acre plots took 5.9 hours. Fifth-acre squares required 4.8 hours, tenth-acre squares 5.4 hours, and fortieth-acre squares 8.9 hours.

**Some Ecological Correlations in Indiana.** THOMAS G. OVERMIRE, Shortridge High School, Indianapolis.—An attempt has been made to account for the distribution of certain trees, ferns, mammals, birds, etc., by the correlation of such factors as: elevation, types of soil, soil acidity, land forms, glaciation, and seasonal climatic variations.

**Mechanisms of Pollination and Seed Dispersal in *Lithops*.** J. A. JUMP, University of Notre Dame.—The species of the South African endemic, *Lithops*, are reported to be self sterile. The numerous stamens form a central free-standing androecium with a convex upper surface, resulting from the anthers being held closely together. Experiments

with artificial and natural rain show that a drop of water falling upon the center of the open, upright flower will scatter the pollen in the spattering droplets and effect pollination of nearby plants. This does not preclude the possibility of insects as the major agents of pollination under natural conditions.

Seed dispersal can apparently take place readily only by means of raindrops. The seed are contained in deep loculi of the capsules which are held stiffly upright between the single pair of leaves. Several drops of water are required to open the hygroscopic capsule initially, and subsequent drops falling upon the open loculi effectively scatter the seed to a maximum distance of at least 1.3 meters. Imbibition pressures in the neighborhood of 1000 atmospheres may be developed by the cells responsible for the opening of the capsular valves. The valves close upon drying and the process may be repeated.

**Conjugation in *Netrium*.** PAUL BIEBEL, Indiana University.—Recent studies have shown that the sexual cycles of desmids can be obtained in culture and that desmids can yield fruitful results in the study of genetics and morphogenesis. Research has for the most part been confined to the placoderm desmids (Desmidiaceae) while the closely related family of saccoderm desmids (Mesotaeniaceae) has been neglected. Successful isolation of several saccoderm desmids has made a study of their life cycles possible.

A strain of *Netrium digitus* (Ehr.) Itz. and Rothe was isolated from a pond in Brown County, Indiana. Conjugation was obtained in pure culture on chemically defined media. The strain proved to be homothallic. Conjugation was obtained when cells were plated on Bristol's agar or on agar containing no nutrients. Conjugating cells were always darker green than cells from a vigorously growing vegetative culture and had such an abundance of reserve food material that the chloroplasts were obscured. The cells produced lateral processes which fused to form a broad conjugation tube. A spheroid zygospore having four chloroplasts oriented in quadrants was formed within the tube. During ripening the zygospore secreted three walls, the outermost of which was smooth and hyaline, and the chloroplasts became yellowish-brown. Germination of zygospores has not been obtained.

**A Tripsacum-Corn Hybrid.** L. I. FARQUHARSON, Franklin College.—A mature plant has been obtained from the crossing of *Tripsacum dactyloides* with *Zea mays*. The maternal parent is a tripsacum plant from southern Indiana and possesses a somatic chromosome number of 54. The corn used as the pollen parent came from Puno, Peru. Since 64 chromosomes exist in the somatic cells of the hybrid, it is assumed that the egg cell carried the unreduced number of chromosomes. The hybrid plant resembles the maternal parent very closely. The increased length of style, width of leaf and the meiotic configurations, however, clearly indicate that this plant is not an apomict. It is suggested that this cross may occur occasionally in nature and may have been responsible for some transfer of genetic material between the two genera in comparatively recent times.

**Buried Forests of Indiana.** H. O. BEALS, Purdue University.—During the Pleistocene (Ice Age), parts of Indiana were covered by glacial ice at least three times. Forests and trees growing in the path of the advancing glaciers were buried by glacial debris. In recent years, a number of these forest beds have been exposed through erosion, road cuts, and other means and have been described by glacial geologists. Identification by wood anatomy indicates that these ancient forests were mostly conifers of a Spruce-Larch type.