

## The History of Plant Taxonomy and Ecology in Indiana

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Someone has said that when a scientist wants to recount the development of any phase of his subject, he goes back to Aristotle to get a running start. In tracing the development of plant taxonomy and ecology in Indiana, one cannot go back quite so far, but he can at least begin with the scientists who were a part of the "boat-load of knowledge," which came via the Ohio River to the intellectual settlement at New Harmony on the Wabash River in January 1826—one hundred and forty years ago. New Harmony became a rendezvous for scientists who were attracted by the free-thinking, intellectual atmosphere. Among them were William McClure, Thomas Say, Charles Alexander Lesueur, Prince Maximilian of Neuwied, André Michaux, Thomas Nuttall and Constantine Rafinesque. Of these, Rafinesque was the most picturesque. He associated himself as closely with the New Harmony experiment as his nomadic nature would permit. He was born in Constantinople in 1784 to parents of mixed ancestry—French, Turkish, German and Grecian. He had a perpetually itching foot, which led him to explore eastern America from the coast to the Wabash. Dressed in a flowing, dirty, yellow Nankeen jacket with capacious pockets, filled with zoological and botanical specimens, he roamed the forest primeval. "He became a monomaniac on the subject of new species," says Dr. David Starr Jordan (3), but he did little comparison of his collections, resulting in many duplications, so that his reputation suffered greatly and he died in poverty and low repute as a scientist. He died in Philadelphia in 1840, alone and unloved. His landlord wanted to sell his body to a medical school to pay his debts; but he was buried by stealth in a graveyard lost in the development of Philadelphia. More recently his value as a pioneer taxonomist has come to be recognized.

One can imagine the excitement of a botanist with a wide experience in Europe, free to roam the primeval forests of America. In Europe, with its mountains—the Pyrennes, Alps and Caucasus—extending east and west, when the Ice Age came, the plants were blocked in their southern retreat; hence many species were lost. In America plants were able to retreat southward before the slowly-advancing ice and to return northward when the ice receded, which is one reason for the much richer American flora. Here a single woodland area may contain more species of woody plants than exist in all of Europe.

Even in 1816, when Indiana became a state, the primitive wilderness had begun to disappear, because forests were regarded as the principal barrier to the establishment of a stable civilization. The land was of greater value than the trees which grew upon it. My father, who was born in 1845, recalled his experience as a young man, when large oak, walnut, tulip-tree and maple logs were rolled into great piles and burned, with the assistance of beverages of local origin. Now, even though land-values have greatly increased, such fine trees would have greater value than the land, unless it was land desirable for a housing-development.

By the time plant ecologists tried to map the distribution in the state of oak-hickory and beech-maple forests, prairie, etc., the original boundaries were almost completely obliterated. It is interesting that one source of information is the records of early land-surveys. When Indiana was first surveyed, the counties were divided into townships each divided into mile-square areas. The corners were indicated by blazed tree-trunks. The blazed trees have long since disappeared, but their names were recorded. The location, name and diameter of 214,000 "witness trees," belonging to eighty species and generic groups, were recorded in surveyors' journals (7).

In many ways Indiana was a favorable area for study. It was a meeting-place of various floras. Southern Indiana had many plants from the south, such as the bald cypresses of Hovey Lake; western Indiana was an outlier of the western prairies; fine, unspoiled dunes on Lake Michigan were some of the best lakeside dunes to be found anywhere; central Indiana included fine representatives of oak-hickory and beech-maple forest.

Working northward from the Ohio River and eastward from the Wabash, outward from Lakes Michigan and Erie, with work in the central part of the state facilitated by the National Road, settlements became stable and schools were established, including a number of colleges which became centers of scientific activity, nourishing many who later contributed significantly to plant taxonomy and ecology in Indiana. Among the early workers were the Coulter brothers, John M., associated with Hanover College, where he graduated in 1870 and later with Wabash College, Indiana University and the University of Chicago, and Stanley, also associated with Hanover College, where he graduated in 1877 and then spent most of his life at Purdue University. While he was a teacher at Hanover College, John M. Coulter established the *Botanical Bulletin*, which, beginning with the second volume, became the *Botanical Gazette*, which followed him finally to the new University of Chicago, where it was taken over by the University of Chicago Press and has been through the years a much-respected journal. He was the first head of the Department of Botany in the new university and attracted as his associate Dr. Charles R. Barnes, also a Hanover alumnus, and Henry C. Cowles, a graduate of Oberlin, founder of plant ecology in America. Coulter, Barnes and Cowles were the authors of the so-called Chicago *Textbook of Botany*.

Dr. Coulter recalled the work of early scientists at New Harmony (1). Then, and for a long time afterward, men were not interested in one field of science alone; their active, exploring minds and the ready availability of new material enabled one person to become an authority on almost all the sciences. For example, Dr. David Dennis of Earlham College, who died in 1916, taught successively or simultaneously botany, zoology, chemistry, bacteriology, physics and geology. He jocularly remarked that he occupied not a chair, but a settee. Gradually, however, scientists were able to devote themselves primarily to one field. The new and revolutionary principle of evolution greatly stimulated taxonomy. Instead of its being merely a cataloguing of species in very artificial groups, the task became the discovery of relationships and the arrangement of species on the basis of descent. The colleges became

centers of botanical investigation, though there have always been some workers who were not associated with any institution.

Dr. Coulter retained throughout his life a deep interest in the Indiana Academy and its affairs. He was one of the founding fathers of the Academy, and on three different occasions was invited to return to the Academy to recount the early development of botany, in which he had so large a part. These occasions were: the observance in 1909 of the twenty-fifth anniversary of the founding of the Academy; the celebration of the centennial of Indiana's statehood in 1916; and again in 1924 for the observance of the fortieth anniversary of the Academy. He spoke of the difficulty of selecting individual botanists for special mention and suggested that if his address were published, there should be appended a full biography of Indiana botanists. This was done and the list consists of 300 titles by 125 authors (1). Dr. Coulter himself contributed 30 papers, almost exclusively on plant taxonomy.

Although in the earliest years of botany in Indiana, taxonomy occupied the center of the stage, the early botanists began to record the conditions under which plants grew and the occurrence of plants in communities with reference to environment, but there was often little meaning to their observations. As Dr. John M. Coulter remarked, "ecology was without form and void" (1).

When the University of Chicago was established, Dr. Coulter was asked to assemble a staff for the Department of Botany. Among those whom he brought in was Dr. Henry C. Cowles, who had begun his graduate study at Chicago in geography. He was not an Indiana man, but the researches which led him to the publication of *The Ecological Relations of the Vegetation of the Sand Dunes of Lake Michigan* in 1899 and *The Plant Societies of Chicago and Vicinity* in 1901 were done largely in Indiana. At that time the Indiana dunes were largely unspoiled. The South Shore Electric Line had stations every few miles, which could be used to get quick access to the dunes and to the lakes, swamps and bogs which occurred among them. One area which was particularly useful was at Miller, which is now a part of the City of Gary. Such areas, including both moving and stabilized dunes, provided the material upon which the science of plant ecology was founded. Here succession was rapid and all stages could be observed in a small area. Cowles acknowledged the influence of Warming, of Copenhagen, for his work on ecology and on the sand dunes of Denmark; but so far as American botany was concerned, there had been no organized presentation of the subject of plant ecology until that of Cowles. He was the first to express adequately the concepts of succession and climax. The principles were so vital and so fundamentally important that they formed the basis of a new science and stimulated research on the part of many botanists, not only at Chicago, but elsewhere. For an excellent discussion of the contributions of Cowles, see the article on Plant Communities in *Natural Features of Indiana*, by Petty and Jackson, two present-day ecologists in Indiana (5).

I suppose all of us think that the period when we did our graduate work was at the flowering-time in the lives of our professors. The writer was at the University of Chicago from 1910 to 1915, when

Cowles was at the height of his powers. No teacher brought his students more directly to nature. He was a master in the field and led his students on trips lasting from one day to weeks. He was at his genial best around campfires in the evening. It is given to few men to found a new science and to live to see it well established.

In a paper of this sort it is difficult to know how to present the story of the history of plant taxonomy and ecology beyond the early years, particularly in view of much of the material already having been presented in the book, *Natural Features of Indiana*, and in view of material which is being presented by others in this volume. I have chosen to do it by institutions and the men in those institutions, rather than chronologically in the state as a whole, and to discuss in some detail those bontanists who have made substantial contributions in the past and leave for some future historian the evaluation of most present day workers in both taxonomy and ecology.

At DePauw University from 1891 to 1895, before going to Columbia University, was the early taxonomist, Dr. Lucien M. Underwood. As a part of his report (8) as chairman of the botanical division of the Indiana State Biological Survey, he wrote: "There has been a seeming fear on the part of some that work in systematic botany would prove an injury if attempted with a course in botanical study, and that anything short of work in cytology was undignified in a botanical laboratory." To bring this statement up to date, one might substitute "molecular biology" for "cytology."

In recent years there have been two particularly active workers in plant taxonomy at DePauw, Dr. Truman G. Yuncker and Dr. Winona H. Welch. Dr. Yuncker was there from 1919 until his death in 1964. He is well known for his long-continued research on *Cuscuta*, which was the subject of his dissertation for the Ph.D. under Trelease at the University of Illinois. He was also interested in the *Piperaceae*, on which he published numerous papers. Both these interests led him to travel widely, especially in the tropics, and resulted in the addition of numerous specimens to the herbarium. A list of his titles reaches 130 (9), not including a number of papers published posthumously. He was much interested in building up the departmental herbarium and was its curator from 1919 to 1964. It now contains approximately 125,000 sheets and has been named the Truman G. Yuncker Herbarium. He was much interested in the Academy and was its president in 1939.

Dr. Winona H. Welch, an alumna of DePauw, returned to the University as a teacher in 1930. She and Dr. Yuncker made a fine team, both working in taxonomy, but in different fields. She has become a world-authority on the Bryophytes, particularly the mosses, a field in which she continues to work. In 1957, under the auspices of the Indiana Department of Conservation, she published *Mosses of Indiana*, an illustrated manual, with 478 pages and 254 figures. She has long been active in the Academy and was its very efficient secretary for a number of years and president in 1948.

At Butler University there has been a strong Department of Botany, particularly with the coming of Dr. Ray C. Friesner in 1929. Until his untimely death in 1952, he published paper after paper, often using the



Butler University Botanical Series, which he founded, as well as the Proceedings of the Academy. He vigorously pushed the work of adding to the University herbarium, of which he was curator, and which is now named in his honor. He was much devoted to the interests of the Academy and was its Secretary from 1926 to 1935 and its President in 1936. In his presidential address (2) he discussed the effect of the Ice Age on Indiana plants. He was a man of great energy and executive ability and attractive personality.



RAY C. FRIESNER, left, and CHARLES C. DEAM in 1941.

During the period when Dr. Friesner was at Butler University, two other men were actively at work there on plant ecology. Trained at Butler and a teacher there from 1925 to 1931 was Dr. Stanley A. Cain, who went on to Indiana University, thence to Cranbrook Institute. He has become well known as an ecologist and conservationist and is now Assistant Secretary of the Interior.

Dr. John E. Potzger came late in life to the study of botany. In 1925, at the age of 39, he took Dr. Friesner's course in general botany, to satisfy the requirements for graduation from Butler University. The effect was electric, and changed his whole career. His attainment of the Ph.D. in botany at Indiana University was still seven years away, but he pursued his work with the enthusiasm of youth—an enthusiasm that was to characterize his whole scientific life. After the completion of his work at Indiana, he returned to Butler where, after the death of Dr. Friesner, he became head of the department. He became interested in the then new phase of botany, the science of pollen analysis, which threw much light on post-glacial plant succession. He was most interested in the Ecological Society of America and was its president in 1953. He worked in Canada at the Mount Tremblant Field Station of

the University of Montreal. He discovered the Cabin Creek raised bog near Farmland, Indiana, which he and his students studied intensively. He died in 1955, at the height of his powers. The December, 1956, issue of the Butler University Botanical Studies, which is dedicated to him, lists ninety-six titles of his scientific papers (6).

At Butler now is Mrs. Fay Kenoyer Daily, who is active in the study of algae, particularly the Charophytes. Also interested in the taxonomy of the algae, particularly the blue-greens, is Mr. William A. Daily, who is with the Eli Lilly Company and has been active on the committee which administers the John S. Wright Fund. He was secretary of the Academy for several years and president of the Academy in 1958. From 1925 to 1950 Dr. Mervin Palmer was at Butler. His work is on the freshwater algae, particularly those associated with public water supplies. Dr. John E. Pelton joined the Butler staff in 1950 and contributes to the Plant Taxonomy section.

At Indiana University Dr. Paul Weatherwax, who has been a member of the Botany staff there since 1915, has become an authority on corn, having studied it from the standpoint of taxonomy and morphology, its relation to man in its origin and domestication, as well as its kinship with the closely-related genera, *Tripsacum* and *Euchlaena*. For many years he was closely associated with Dr. Charles C. Deam in the preparation of publications on the trees, shrubs, and grasses of the state and the comprehensive state flora. He illustrated the book on grasses.

Also at Indiana, the work of Dr. Charles Heiser was early centered around the taxonomy of *Helianthus* and related genera. Using modern techniques of biometrics, cytology and genetics, he and his students have worked on the origin, history and taxonomic status of cultivated plants, especially the *Solanaceae*.

At Purdue University from 1887 to 1926, botany was dominated by Dr. Stanley Coulter, who was Dean of the School of Science from 1905 to 1926 and was affectionately known to thousands of students as "Dean Coulter." His was a long, active and useful life and he did much for botany in Indiana. He was a charter member of the Academy, in which he was active for 55 years. He was president in 1896 and for many years the necrologist. He published in 1899 a *Catalog of the Plants of Indiana* and was the author of numerous pamphlets and articles. He was much interested in trees and was on the State Board of Foresters from 1902 to 1916, on the state conservation commission for four years, president of the Indiana Audubon Society for four years and active in many other capacities.

Dr. Ralph M. Kriebel joined the Academy in 1933 and was for several years active in the plant taxonomy group, serving as its chairman in 1938 and the chairman of the botany section in 1940. He early attracted the attention of Charles C. Deam and they became fast friends. He built up one of the largest private collections of herbarium specimens in Indiana. It is now a part of the herbarium of Purdue University, which is known as the Ralph M. Kriebel Memorial Herbarium. He was on the Purdue University Extension Service from 1943 until his untimely death in 1946. His infectious enthusiasm for teaching and preaching all forms of conservation arose from a genuine love of nature.

Dr. Alton A. Lindsey has been at Purdue University since 1947. Previously he was a member of the Byrd Antarctic Expedition as a biologist. He has become well known as a teacher, research worker and editor, with primary interest in ecology. He is a member of the scientific advisory boards of several conservation organizations. He deserves much credit for his editing of the 1966 Sesquicentennial Volume of the Academy, *Natural Features of Indiana* and for the writing of the excellent introduction to that volume. He is the incoming president of the Academy.

Dr. J. A. Nieuwland worked at Notre Dame University from 1904 until his death in 1936. He was primarily a chemist and is best known for his pioneer work on synthetic rubber, but he was also interested in plant taxonomy. He founded the *American Midland Naturalist* and was president of the Academy in 1934. The herbarium at the University of Notre Dame bears his name.

Also at Notre Dame was Dr. Theodor K. Just, from 1929-1946, when he left to go to the Chicago Museum of Natural History where he became chief curator of botany. At Notre Dame he became editor of the *American Midland Naturalist* after the death of Father Nieuwland. He was president of the Academy in 1943 and died in 1960.

At Earlham College all the science was taught at first by David W. Dennis and Joseph Moore. Gradually through the years Dr. Dennis was able to relinquish other duties and confine his attention to biology. He was a charter member of the Academy and its president in 1899-1900. Around the turn of the century he ranged the state, preaching to county teacher's associations the gospel of field work, in a day when such activity was almost totally neglected. The author heard him on one of these occasions, came to Earlham and later became the inheritor of this tradition for field work, both from Dr. Dennis and from Dr. Cowles under whom he worked at Chicago. He was president of the Academy in 1945. His research has largely been on the ecology of peat bogs, but he considers his main contribution to plant taxonomy and ecology to have been work with students, particularly field trips to the Smoky Mountains, Florida and the Rockies over a period of 30 years or more. Upon his retirement in 1954 this tradition was passed on to Carrolle A. Markle, who with her students continues to work on the flora of Indiana, particularly Wayne County.

There have been many botanists at other colleges and universities, and persons not directly connected with any of the colleges or universities of the state who have made important contributions to plant taxonomy and ecology. An early scientist was Dr. John T. Plummer of Richmond. He was born in 1807 and was a graduate of Yale University and a practicing physician. He was a keen observer of nature and wrote catalogues of the fossils, the mammals and the plants of Wayne County. The oldest specimen known from the county is that of the Seneca snakeroot, *Polygala Senega*, now in the Purdue herbarium. A full account of his life and work is to be found in the *Proceedings* (4).

Two business men, who had little interest in botany until their retirement, made significant contributions to Indiana taxonomy. J. O. Cottingham, of Indianapolis, took up the study of the fleshy fungi. He often brought dried specimens to the meetings of the plant taxonomy



group. In 1947 appeared the first of a series of eight reports on "Higher Fungi of Marion County." It was he who first proposed that the plant taxonomy group, which had been meeting unofficially and informally, be made a regular division of the Academy. He was a friend of Charles C. Deam. After his death in 1962, at the age of ninety, his collections became a part of the herbarium at DePauw University.

Charles M. Ek, of Kokomo, after his retirement revived his interest in botany which he studied in undergraduate days at Indiana University. He was a friend of Deam, Friesner and Potzger and often accompanied them on field trips.

No person has contributed more to the study of plant taxonomy in Indiana than Charles C. Deam, of Bluffton, Indiana. He developed an early interest in botany, which he did not regard as a hobby, but as a profession. He was a born collector; with the help of Mrs. Deam he assembled an herbarium of some 60,000 sheets, an arboretum, and a large botanical library. He is said to have visited every herbarium east of the Mississippi. While not directly connected with any educational institution, he gave assistance to teachers in many institutions. He had a Model T Ford in the early days, which he outfitted for camping, long before the advent of modern luxury outfits. Thus he was able to stop wherever and whenever night caught him and resume activity early next morning. With his crony, E. B. Williamson, also of Bluffton, a bank president, an iris-grower and a student of dragonflies, he roamed the state. He visited every county and every one of the 1016 townships. He kept meticulous records of his trips, which he marked with red ink on topographic maps.

Dr. Deam gave particular attention to the oaks and described a number of hybrids. The Deam oak, a hybrid between the chinquapin and white oak, is on a plot of ground which he bought and gave to the state. Most of his herbarium was sold to Indiana University for a nominal sum before he died, and the rest went to the University upon his death, as well as his botanical library.

I think it must have been in 1941, when an informal group of plant taxonomists met at Quaker Haven, a camp-ground of the Society of Friends on Dewart Lake in Kosciusko County. The next morning after our arrival Deam came to breakfast bleary-eyed and dispirited. He said: "Well, boys, you can't count on me today. I didn't sleep a wink last night. I'll trail along, but don't expect anything from me." He soon forgot his physical infirmities in the excitement of field study. No one in the group showed more interest or zeal, waded more deeply into the swamps, nor came up with more specimens than he did.

He was much interested in the Academy. He joined in 1900 and his first paper was presented in 1904, entitled "Additions to the Flora of Indiana." He continued to make additions to the flora throughout his long life of 88 years. He was president of the Academy in 1923. Because of his interest in trees, he was in the Indiana State Department of Forestry, in one capacity or another, from 1909-1940.

Although he was the author of numerous listings of plants of the state, the work of his lifetime appears in the form of four books: *Trees of Indiana*, *Shrubs of Indiana*, *Grasses of Indiana*, and *Flora of Indiana*,



all of which are authoritative books of reference on the subjects that they cover. For some time after the publication of the *Flora of Indiana*, an Academy committee consisting of the late Doctors Friesner, Yuncker and Kriebel cooperated with Dr. Deam in keeping information in regard to the flora of the state. No doubt a similar committee should be engaged in this task at present. Only thus can we keep green the memory of one of our greatest taxonomic botanists.

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