

THROUGH THE LOUPE

A FOCUS ON

Henry Chandler Cowles

1869-1939

Henry Chandler Cowles was an American botanist and ecologist who was professor of Ecology at the University of Chicago from 1901-31. He is best known for his pioneering work in plant community succession on the nearby Lake Michigan Dunes. He helped spawn the field of ecology in North America and inspired many to choose the ecological sciences for a career. His impact will be evident to anyone attending the Fall Foray at Indiana Dunes.



Henry C. Cowles (National Park Service Archives)

Cowles graduated from Oberlin College (Ohio) in 1898 and obtained a PhD from the University of Chicago for his landmark study of vegetative succession in the Indiana Dunes of Northwest Indiana. Cowles' translation of texts written by Danish botanists and "oecologists" made him one of the principal popularizers of the term "ecology" in the United States. His works inspired several students and future accomplished ecologists and led to the preservation of Indiana Dunes within the Indiana State Parks and the National Parks systems. In 1915, He was one of

the founding members of the Ecological Society of America. He also served as special field assistant of the United States Geological Survey.

In "The Ecological Relations of the Vegetation on the Sand Dunes of Lake Michigan" Cowles wrote:

The province of ecology is to consider the mutual relations between plants and their environment. Such a study is to structural botany what dynamical geology is to structural geology. Just as modern geologists interpret the structure of the rocks by seeking to find how and under what conditions similar rocks are formed today, so ecologists seek to study those plant structures which are changing at the present time, and thus to throw light on the origin of plants structures themselves.

Again, ecology is comparable to physiography. The surface of the earth is composed of a myriad of topographic forms, not at all distinct, but passing into one another by a series of almost perfect gradations; the physiographer studies landscapes in their making, and writes on the origin and relationships of topographic forms. The ecologist employs the methods of physiography, regarding the flora of a pond or swamp or hillside not as a changeless landscape feature, but rather as a panorama, never twice alike. The ecologist then, must study the order of succession of the plant societies in the development of a region and he must endeavor to discover the laws which govern the panoramic changes. Ecology, therefore, is a study in dynamics. For its most ready application, plants should be found whose tissues and organs are actually changing at the present time in response to varying conditions. Plant formations should be found which are rapidly passing into other types by reason of a changing environment.

These requirements are met par excellence in a region of sand dunes. Perhaps no topographic form is more unstable than a dune. Because of this instability plant societies, plant organs, and plant tissues are obliged to adapt themselves to a new mode of life within years rather than centuries, the penalty for lack of adaptation being certain death. The sand dunes furnish a favorable region for the pursuit of ecological investigations because of the comparative absence of the perplexing problems arising from previous vegetation. Any plant society is the joint product of present and past environmental conditions, and perhaps the latter are much more potent than most ecologists have thought. As will be shown in another place, even the sand dune floras are often highly modified by preexisting conditions, but on the whole the physical forces of the present shape the floras as we find them. The advancing dune buries the old plant societies of a region, and with their death there pass away the influences which contributed so largely to their making. In the place of the rich soil which had been accumulating by centuries of plant and animal decay, and in place of the complex reciprocal relations between the plants, as worked out by a struggle of centuries, the

advance of a dune makes all things new. By burying the past, the dune offers to plant life a world for conquest, subject almost entirely to existing physical conditions. The primary motive, then, which prompted this present study was the feeling that nowhere else could ecological principles be subjected to a more rigid test.

Henry Cowles' best-known class at the University of Chicago was a course called Botany 36. Groups of 15 students visited Lake Michigan, Lake Superior, and Lake Huron. Sound familiar? Some classes went on forays as far as California, Oregon, Washington, and British Columbia, Canada, to study physiography and local plant communities. Among Cowles's students who advanced American ecology were Victor E. Shelford, William Skinner Cooper, Paul B. Sears, George Damon Fuller, Walter P. Cottam, Arthur G. Vestal and May Thielgaard Watts.



Professor Cowles and his students enjoy a lunch break on one of their field excursions. One of his students, Victor Shelford, would go on to create the Nature Conservancy; another, May Thielgaard Watts, initiated the first Rails-to-Trails project, the Illinois Prairie Path. (University of Chicago Department of Botany Records, University of Chicago Library).

Of note, May T. Watts penned "Reading the Landscape of America", and in this author's opinion is one of our finest pieces of natural history writing. Chapters 4 and 5 should be required reading for the Indiana Dunes Foray. Chapter 4: Picnic in a Gritty Wind (Or The Sand Dunes of Indiana) discusses the dynamics of sand dunes and plant strategies for survival in this turbulent aeolian system. Chapter 5: History Book with a Flexible Cover (Or The Records in a Quaking Bog) - discusses Mineral Springs Bog and related flora and plant adaptations to sterile sandy

environments.¹ Cowles' impact on her learning and understanding of ecosystems is evident throughout the book.



¹ In honor of Henry Cowles, the United States Secretary of the Interior designated Mineral Springs Bog as "Cowles Bog", in 1965. This botanically diverse site will be the focus of one of our field trips during the 2023 Fall Foray.

Cowles stands on a dune with early English ecologist Arthur Tansley. Tansley wrote of his friend: “During the first decade of this century indeed Cowles did far more than anyone else to create and to increase our knowledge of succession and to deduce its general laws. By acute and thorough observation and by lucid exposition he became the great pioneer of the subject”. (University of Chicago Department of Botany Records, University of Chicago Library).

For more history on the Indiana Dunes National Park see Chapter 3 of Wildflowers of Indiana by Nathanael Pilla and Scott Namestnik. See you atop the Dunes over Labor Day weekend!

Robert Ayotte

Literature Cited

The National Park Service Indiana Dunes National Park: *Henry Chandler*. Accessed 22 June 2023 from Cowles:<https://www.nps.gov/people/henry-chandler-cowles.htm>

Watts, May Theilgaard. 1957. Reading the Landscape of America. Nature Study Guild Publishers: Rochester, New York.