

HENRY CHANDLER COWLES

PIONEER ECOLOGIST



VICTOR M CASSIDY



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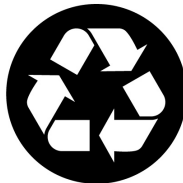
The author dedicates this book to his wife

DONNA

Whom he will love forever.



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PART ONE:
BIOGRAPHY



INTRODUCTION



Photographs always show him outdoors—and always wearing a tie. In his professorial mode as Henry Chandler Cowles of the University of Chicago, he wears a dark suit, vest, white shirt, bowler hat, and tie as he escorts his European colleagues through the Indiana Dunes under the summer sun. In his role as “Doctor Cowles,” the jovial, cigar-smoking mentor to generations of ecology students, he leads expeditions in calf-high boots, knickers, white shirt, floppy hat—and tie. Short and a bit stout, with a large, well-shaped head and a ready grin, he’s someone who seems easy to like.

Cowles (it’s pronounced “coals”) was a botanist, ecologist, field teacher, and conservationist. At the end of the nineteenth century, he made hundreds of field observations of the sand dunes landscape that rings the southern and eastern shores of Lake Michigan. His study demonstrated that the outdoor environment is a dynamic system in which plants, soil, moisture, climate, and topography interact.

Ecological Questions

Ecology, which Cowles helped to pioneer in North America, investigates the interrelationships between living organisms and the natural environment.

Before Cowles came on the scene, botanists had asked why plants grow where they do, how vegetation changes over time, and whether there is a pattern to the changes, but no one had

systematically investigated these questions. Science had yet to clarify the role of vegetation in creating sand dunes—and the effect of the dunes environment on the plants that grow there. The role of wind in shaping dunes vegetation was incompletely understood.

As Cowles looked for answers, he discovered a natural phenomenon called *plant succession*. Though succession was observed and described in antiquity—and was known to many scientists before Cowles—he investigated and described it more comprehensively than anyone else before him. Succession studies have advanced dramatically since Cowles' day, but ecologists still acknowledge his pioneering contributions.

Plant succession denotes the way that communities of plants come into a landscape, flourish, and create conditions for their replacement by other plant communities. Succession is easy to follow in the lightly vegetated dunes landscape. No plants grow at the lake edge, because waves wash constantly over the land. At the back of the beach, where waves come less often, a few plants grow on the sand and stabilize it with their root systems. Over many generations of growth, reproduction, and decay, these pioneers produce humus, which makes it possible for a new group of plants to move in and replace them. A third generation eventually follows this second generation, and a fourth replaces the third, until an ending point, called *climax*, is reached. The climax community—at the dunes it's an oak forest—does not change until something disturbs or destroys it. If the forest burns down, for example, succession starts all over again, but usually from an intermediate stage.

Cowles could face away from Lake Michigan, hike inland, and see the results of centuries of plant succession. As he walked through space, he walked through time. Today, visitors to the Indiana Dunes National Lakeshore can follow his footsteps on a "Succession Trail" that starts on the beach and passes through the successive plant communities.

Cowles' basic ideas, which he published in a long, multipart article called "The Ecological Relations of the Vegetation on the

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Sand Dunes of Lake Michigan" (1899)¹ have withstood more than a century of testing, discussion, and refinement. He followed "Ecological Relations" with important studies of Chicago-area plant communities, underlying rock and its effects on vegetation, the causes of vegetative cycles, prairies, and more.²

Through his publications, lectures, teaching, travels, and leadership of an International Phytogeographic Excursion that brought European scientists to the United States in 1913, Cowles won professional respect for the new science of ecology and a place for American ecologists in the international scientific community. A great joiner, he signed on with many scientific organizations, made presentations at conferences, and helped to found the Association of American Geographers and the Ecological Society of America. He forged connections with every important ecologist of his time and leading botanists, geologists, and geographers.

Later in his career, Cowles advanced scientific education and conservation through the Illinois State Academy of Science, Friends of Our Native Landscape, Geographical Society of Chicago, Chicago Academy of Sciences, and other organizations. He surveyed Illinois natural areas, providing expert data that convinced the state legislature to purchase ecologically important lands for parks. Prior to his time, only historic sites were preserved. During 1916, he testified in federal hearings on behalf of the proposed Sand Dunes National Park in Indiana.³

¹ Henry Chandler Cowles, "The Ecological Relations of the Vegetation on the Sand Dunes of Lake Michigan," Parts 1-4. *Botanical Gazette* 27 (February, March, April, May 1899): 95-117, 167-202, 281-308, 361-91. Reprinted in this volume.

² Henry Chandler Cowles, "Plant Societies of Chicago and Vicinity"; "The Influence of Underlying Rocks on the Character of the Vegetation"; "The Causes of Vegetative Cycles"; and "The Persistence of Prairies" are reprinted in this volume.

³ Cowles' testimony is reprinted in this volume.

This initial effort, though unsuccessful, strengthened the movement to save the dunes that triumphed long after his death.

Born to Botanize

Born in 1869, Cowles was the son of a Connecticut market gardener. His earliest memories were of walks in the woods with his mother, where she taught him the names of plants and trees. In youth, he raised flowers and vegetables on the family farm and roamed the woods, where he found, identified, and collected wild plants. He began reading *Gray's Manual of Botany*, the authoritative flora, when he was just seventeen years old.

High school geology helped Cowles to see relationships between rock, soil, topography, and plant life. In college and graduate school, he outgrew simple plant identification and learned how to read vegetative patterns in the landscape. He evolved an intuitive method of nature study, much like Darwin's, that relied upon close observation, experience, and a highly disciplined thought process. This method brought him success at the Lake Michigan dunes and in other early studies.

As Cowles was completing his dunes work, Frederic E. Clements, a Nebraska grasslands ecologist, developed the numerical and statistical survey techniques used in science today. As Clements' statistical methodology supplanted the intuitive approach, Cowles responded by training students in Clements' techniques, but resisted them in his own work. He published relatively little after 1901, transferred his ambition to his students, and employed his field skills to teach, do personal research, and survey natural areas.

Colleagues always wondered why Cowles published so little of his research. A few weeks after his death in 1939, his widow, Elizabeth, told a friend that she too regretted that he had not published more. "I feel that one reason that he did not ... was that the recognition of his authorship of an idea did not have for him the urgency which the testing of that idea and its

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promulgation among his colleagues and students, if found sound, held." He did not "hunger and thirst" for recognition, she added, but preferred doing research and teaching to writing up his results.

There was talk, during Cowles' final years, of "shaping his voluminous notes on his particular contribution to physiographic ecology into book form," but this did not happen. He "said more than once 'All I have done is written in my students, it is not lost because I have not published it; they have published it for me.'" However, "Being his student as well as his wife," Elizabeth "privately felt that nobody else could say it quite so clearly and well."⁴

Though Cowles' intuitive approach to nature study is completely out of professional fashion, it's alive and well in today's environmental restoration movement. The professionals and volunteers who restore damaged natural areas venture daily into the unknown. They never know how nature will respond to their initiatives—whether an endangered plant will grow where they place it, for example, or what will happen when they remove invasive species. In making site management decisions, these people combine observation, intuition, and experience with their knowledge of botany and ecology. Cowles is thus very relevant to the most challenging ecological work of our time. His spirit helps heal the land.

Field Teacher

Between 1897 and 1934, Cowles taught physiographic ecology, ecological anatomy, geographical botany, experimental ecology, applied ecology, field ecology, and related courses at the University of Chicago. His students included Victor E. Shelford, the father of animal ecology; George D. Fuller, who became his

⁴ Elizabeth Cowles to C. C. Adams, 1 November 1939. C. C. Adams Papers, University of Western Michigan, Kalamazoo.

assistant and successor at Chicago; William Skinner Cooper, who refined his theory of plant succession with fieldwork on Isle Royale in Lake Superior; Paul B. Sears, who became professor of conservation at Yale University and an eloquent writer on ecological subjects; Walter P. Cottam, who became chair of the botany department at the University of Utah and co-founder of the Nature Conservancy; and many others. In 1980, Douglas D. Sprugel published a “pedagogical genealogy” that traced Cowles’ influence to 1950 on some fifty American plant ecologists.⁵ These men and women completed their careers in the 1970s and there is now no living memory of Cowles’ teaching.

Students flocked to Cowles because he gave vivid, authoritative lectures, had incomparable field skills, and was happy to be alive. Instead of pushing his opinions on students, he encouraged them to think independently and welcomed a variety of viewpoints. He took many weekend research trips to sites near Chicago and often brought some of his better students along. When he made a discovery in the field that might become a research project, he encouraged students to pursue it, guided their work, and delighted in their successes.

Cowles was best known for Botany 36, a four-week field ecology course that took students into wilderness areas all over North America. In August of 1916, May Thielgaard (Watts) enrolled for Botany 36.⁶ Led by the Professor, as the class called him, a party of about fifteen students traveled through the Lake Superior region of Michigan and Wisconsin to study plant communities in beaches, canyons, bogs, forests, and more. The group worked hard all day, cooked over open fires, slept in tents, endured rain, mosquitoes and black flies—and had a

⁵ Douglas D. Sprugel, “A ‘Pedagogical Genealogy’ of American Plant Ecologists,” *Bulletin of the Ecological Society of America* 61, no. 4 (December 1980): 197–200.

⁶ The papers of May Thielgaard Watts at the Sterling Morton Library of the Morton Arboretum in Lisle, Illinois, include May Thielgaard’s student notebook from Botany 36.

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wonderful time. Thielgaard wrote this admiring ditty about her teacher:

Get on your boots and follow him,
He's half a mile in front,
It's our own Dr. Cowles himself
Out on a lichen hunt.

It's our own Dr. Cowles you know;
They've lost the pattern since
Of all our friends afar and near
He surely is the prince.

CHORUS

Each year we hunt for courses.
Not that we may learned be.
But if you want the reason,
It's not the course, it's he.⁷

Photographers, including Cowles' wife, Elizabeth, accompanied these expeditions and some 10,000 images have survived. Of these, 4,500 are now digitized and available on the Internet as *American Environmental Photographs, 1891–1936*. Though most of the photos show plants and landscapes, the Professor and his students appear in many. We see groups in Packard touring cars traveling on a narrow mountainside road, a mock wedding ceremony with the Professor presiding, a laughing gang of wilderness explorers gathered around a No Trespassing sign, and May Thielgaard (Watts) poling the Professor through a Wisconsin wetland on a raft.⁸

⁷ Ibid.

⁸ See <http://memory.loc.gov/ammem/collections/ecology/index.html>. According to Judith Dartt of the University of Chicago Library (UCL), the botany department ecology photographs were taken by a number of different individuals who were typically members of the field party. Roughly 10,000 photographs exist, but the 4,500 on the website were chosen because they conform to the

Why this Book?

After Cowles' died, his widow apparently discarded or destroyed most of his papers, saving only his diaries, a few letters, and some family photographs. None of his manuscripts survived and we have just a few tiny pages of undated, barely readable field notes. Some papers were left behind in the Cowles' family house near the University of Chicago when Elizabeth Cowles moved out near the end of her life. These somehow ended up on the curb and were taken away as garbage. A lack of primary material has retarded work on Cowles and made a book-length biography impossible.⁹

Three scholars have done important research on Cowles. In 1999, Sarah Gibbard Cook published *Henry Chandler Cowles (1869-1939) and Cowles Bog, Indiana*, a 93-page booklet. Largely biographical, Cook's text includes an appendix with a

standards set for the Library of Congress/Ameritech American Memory grant that funded the scanning project. In original format, the images are a mix of glass lantern slides, glass plate negatives, and prints in a variety of sizes. The American Environmental Photographs, 1891–1936, were digitized by the Special Collections Research Center, UCL, for the Library of Congress American Memory website.

⁹ Nobody knows why she did this. Harriet Cowles, the daughter, who probably helped destroy the papers, apparently felt that nobody would be interested in her father's work and that there was little point in saving his manuscripts and letters. During the 1980s, the UCL began to collect historical materials on Cowles. At that time, the complete botany department photograph collection (found in a basement on campus) was preserved and transferred to the Department of Special Collections. In the 1990s, records of the botany department and papers of Professor Paul Voth were acquired. In 1997, the botany department photographs were digitized and put on the *American Environmental Photographs* web site, which includes an online essay on HCC and his contributions to ecology, a chronology of field trip courses, a biographical guide with links to individuals in the photographs, and a selected bibliography on the history of American ecology. This work was done by Daniel Meyer, Associate Director, Special Collections Research Center and University Archivist at the UCL, and Judith Dartt. We thank Mr. Meyer for supplying this information.

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partial chronology and bibliography. Cook was the starting point for this book.¹⁰

Professor Eugene Cittadino of New York University has published two long papers about Cowles: “A ‘Marvelous Cosmopolitan Preserve’: The Dunes, Chicago, and the Dynamic Ecology of Henry Cowles” (1993) and “Borderline Science: Expert Testimony and the Red River Boundary Dispute” (2004). The author has drawn on both of these papers, especially in his accounts of Cowles’ activities as an expert witness. *Sacred Sands: The Struggle for Community in the Indiana Dunes* (1983) by J. Ronald Engel, describes the long battle for the Indiana Dunes National Lakeshore and Cowles’ role in it. Professor Engel kindly supplied some original materials that he used in writing *Sacred Sands*.¹¹

Fortune smiled on this project. Just as the author began, Cowles’ daughter, Harriet, gave family papers to the University of Chicago Library. Soon after, the Ecological Society of America donated class notebooks of several of Cowles’ students to the University of Chicago Library. The University of Illinois Archives supplied materials that illuminated Cowles’ working partnership with Stephen A. Forbes, the father of Illinois ecology.

As research proceeded, the author decided to reunite Cowles’ fragmented legacy—to write a biography, reprint the best of his written work, and publish updated reference material. If this book is a success, it will inspire and facilitate future work on Cowles—and a reconsideration of his role in ecological history. Ecology has grown immensely since his day, but he

¹⁰ Sarah Gibbard Cook, *Henry Chandler Cowles (1869–1939) and Cowles Bog, Indiana*. Revised 1999 [original manuscript was written in 1980.]

¹¹ Eugene Cittadino, “A ‘Marvelous Cosmopolitan Preserve’: The Dunes, Chicago, and the Dynamic Ecology of Henry Cowles,” *Perspectives on Science* 1, no. 3, (1993): 520–59; Eugene Cittadino, “Borderline Science: Expert Testimony and the Red River Boundary Dispute,” *Isis* 95 (2004): 183–219; and J. Ron Engel, *Sacred Sands: The Struggle for Community in the Indiana Dunes* (Middletown, CT: Wesleyan University Press, 1983).

remains a great pioneer who gave this important branch of science an excellent start. Through his teaching he birthed an entire generation of ecologists. Through his conservation advocacy he helped protect Illinois wilderness for his own generation, for ours, and for those yet to come. Most of all, he loved the land and taught us to cherish it.

Acknowledgments

This book would have been impossible without the full cooperation of the University of Chicago Library, Special Collections Research Center, and its staff. Thanks go to Daniel Meyer, Associate Director, Judith Dartt, David Pavelich, and especially Barbara Gilbert. Linda Estelle, Executor of the Cowles Estate, was tremendously helpful as was Harriet Cowles (Waller), who gave the Cowles family papers to the University of Chicago and met with me in St. Louis. On behalf of the Ecological Society of America, Prof. Robert K. Peet of the University of North Carolina donated student notebooks from Cowles' classes to the University of Chicago that enabled me to bring the reader into his classroom. Daniel Meyer, Noel Pavlovic, and Eugene Cittadino read an earlier draft of this manuscript, found errors, and made valuable suggestions. Others who helped include Dr. John Arnold, Julia S. Bachrach, Lee Botts, Patricia P. Burg, Sarah Gibbard Cook, L. Ron Engel, Roberta Fountain, Christine Giannoni, Sheila Hoyos, Corasue Nicholas, Randy Nyboer, Joanna Olmsted, Laurel Ross, Tim E. Smith, Michael Steibert; and George Yaskievich. Help also came from the following institutions: Bancroft Library, University of California-Berkeley; Berlin-Peck Memorial Library, Berlin, CT; Chesterton Public Library, Chesterton, IN; Chicago Academy of Sciences; Chicago Historical Society; Filson Historical Society, Louisville, KY; John Crerar Library, University of Chicago; Johns Hopkins University Library, Baltimore, MD; Indiana University Northwest Library, Gary, IN; Nebraska Historical Society, Omaha, NE; Newberry Library, Chicago, IL; New York Botanical Gar-

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dens Library, New York, NY; Northwestern University Archives, Evanston, IL; Oberlin College Archives; Prairie Club, Elmhurst, IL; Sterling Morton Library, Morton Arboretum, Lisle, IL; University of Georgia Library; University of Illinois Archives; University of Western Michigan Archives; Wisconsin Historical Society; and Yale University Library.

I would also like to thank my publisher, Thomas Sigel, Josh McClary, Production Editor, and Jessica Sanchez, Marketing Manager at Kedzie-Sigel Press for making this project a reality. I also extend thanks to Harp Mando for creating the cover and interior design.

Note on Sources

Abbreviations used after first reference in notes

HCC Henry Chandler Cowles

HCW Harriet Cowles Waller

UCL University of Chicago Library

In citing works in the notes, short titles are generally used. Works frequently cited are identified by the following abbreviations after first reference:

EC Borderline

Eugene Cittadino, "Borderline Science: Expert Testimony and the Red River Boundary Dispute," *Isis* 95 (2004): 183–219.

EC Dunes

Eugene Cittadino, "A 'Marvelous Cosmopolitan Preserve': The Dunes, Chicago, and the Dynamic Ecology of Henry Cowles," *Perspectives on Science* 1, no. 3, (1993): 520–59.

HCC Papers

The primary source for original material on Cowles is the Henry Chandler Cowles Papers at the University of Chicago Library, Department of Special Collections.

HENRY CHANDLER COWLES: PIONEER ECOLOGIST

HCW Address

Harriet Cowles Waller, "An Address To Be Given by Harriet Cowles Waller During the Henry Chandler Cowles Memorial Symposium at the Annual Meeting of the Ecological Society of America on August 11, 1983." The University of Chicago Library has a transcript of this talk.

SAF Papers

The Stephen A. Forbes Papers in the University of Illinois Archives, Champaign.

Sacred Sands

J. Ron Engel, *Sacred Sands: The Struggle for Community in the Indiana Dunes* (Middletown, CT: Wesleyan University Press, 1983).

UCBDR

The University of Chicago Department of Botany records are housed in the University of Chicago Library, Department of Special Collections.

USSC

Cowles gave testimony before the Supreme Court of the United States. The transcript of his remarks (In The Supreme Court Of The United States *State of Oklahoma* Complainant v. *State of Texas* Defendant United States of America Intervener No. 20 Original October Term 1921). Stenographic Report of Proceedings Had Before Hon. Frederick S. Tyler, Special Commissioner Vol. 27 September 1921, Oklahoma City, Oklahoma.

Chapter 1

BEFORE THE DUNES



Henry Chandler Cowles grew up on a farm in Connecticut during the years that followed the American Civil War. Kensington, where he was born on 27 February 1869, is a hamlet in the scenic, somewhat hilly, center of the state. Nearby are Berlin (population 1,869 in 1850), an early manufacturing town known for tinware, and New Britain, a production center for builders' hardware and carpenters' tools. Hartford, a major city, lies about ten miles northeast of Kensington, and New Haven is roughly twenty-five miles to the south.¹

Henry was the elder son of Henry Martyn Cowles (1831–1915) and Eliza Whittlesey (1839–1888). The family traces itself to a John Cowles who emigrated from England in 1640. According to a genealogy, Henry Martyn Cowles was “a farmer and market gardener; member of the Legislature; deacon in the Congregational Church; Sunday school superintendent; Prohibitionist; constable; assessor; justice of the peace; selectman, and member of the board of relief.” Dwight

¹ *The Connecticut Guide* (Meriden, CT: Emergency Relief Commission, 1935), 167–71; Arthur S. Hughes and Morse S. Allen, *Connecticut Place Names* (Hartford: The Connecticut Historical Society, 1976), 15–19; and John C. Pease and John M. Niles, *A Gazetteer of the States of Connecticut and Rhode Island* (Hartford: William S. Marsh, 1819), 55–58.

(1874–1930), the younger Cowles son, lived locally and never married.²

Eliza Whittlesey was the daughter of a Cleveland judge. While she was visiting a relative in Kensington, she met Henry Martyn Cowles and they married on 31 May 1866. Active in church, Eliza was a teacher in Sunday school. She loved the outdoors and taught her son the names of plants and trees as they walked in the woods. Eliza fell ill while Henry was still a boy and became a permanent invalid. After eight to ten years as a shut-in, she died on 13 September 1888. Henry was devastated by her death.³

The Congregational Church

The Cowles were members of the Kensington Congregational Church, the center of their community. This church, which arose in England in the late sixteenth and seventeenth centuries, came to New England soon after the Pilgrims did and set up many communities, such as Kensington, which were based on its religious principles. Congregationalists believe in the spiritual autonomy of each congregation; that is, its right and responsibility to decide about its own affairs without submission to any higher human authority. They oppose state establishment of religion and advocate civil and religious liberty.

Congregationalist principles regulated community life as Henry was growing up. Kensington's people worked hard and late, went to church every Sunday, and made civic decisions by consensus in town meetings. The young were expected to par-

² Colonel Calvin Duvall Cowles, *Genealogy of the Cowles Families in America*, 2 vols. (New Haven, CT: Tuttle, Morehouse & Taylor, 1929), 779–80. HCC filled out forms for this volume and corresponded with the author.

³ The account of Eliza Whittlesey Cowles comes from the Kensington Congregational Church, *Church Record*, 15 October 1888. The description of Henry as a child comes from HCW Address. The University of Chicago Library Department of Special Collections has a transcript of this talk.

ticipate in church and to become self-reliant. Henry was a committed Christian, who remained a member of the Kensington Congregational Church throughout his life. In Chicago, he joined the University Congregational Church and sometimes worshipped at the Hyde Park Presbyterian Church.⁴

According to a history of the state, Connecticut farmers had “a hard time holding their own” while Henry was growing up. In 1874 the Connecticut Bureau of Labor Statistics surveyed farmers, finding that most of them worked from dawn to dusk and earned less than their counterparts in manufacturing. Farms farther west were more productive, so Connecticut adjusted by raising crops that were “suited to the distinct soil, climate, and seasons of the state such as vegetables, fruits, tobacco, and dairy products,” the history states. The Cowles family grew fruits and vegetables in summer and winter crops in heated greenhouses, selling its produce locally. The family always had enough to eat, but there was never much for extras. Henry needed jobs and scholarships to finance his higher education.⁵

Like most farm boys, Henry (family name: Harry) had plenty to do. He liked growing vegetables and flowers, checked the fields and greenhouses daily, and became his father’s precociously capable assistant. Off and on, from 1880, when he was eleven years old, until 1896, when he was a graduate student, Henry kept a diary in small notebooks. Most of the narrative in this chapter, especially the personal parts, is based upon these diaries.⁶

⁴ *Encyclopedia Britannica*, 15th ed., s.v. “Congregationalists.” See also Clarence M. Webster, *Town Meeting Country* (NY: Duell, Sloan & Pierce, 1945).

⁵ Ruth O. M. Andersen, *From Yankee to American: Connecticut, 1865 to 1914* (Chester, CT: Pequot Press, 1975), 47–48. In 1894, Henry Martyn Cowles, who was then a sixty-three-year-old widower with grown children, apparently sold the farm and moved to nearby Southington, where he remarried and lived for the rest of his life.

⁶ Henry Chandler Cowles, Papers at the University of Chicago Library, Department of Special Collections. HCC Papers include diaries dated 1880, 1881–82,

At the age of eleven and twelve, Henry tended beets, onions, kale, spinach, and flowers, delivered orders in a horse-drawn cart, and kept careful track of the seed supply. "I sent another letter to W. Atlee Burpee & Co. for Cuban Queen Watermelon, Turks Turban tomato, and *dianthus chinensis* [pink] double dwarf mixed," he wrote on 22 January 1882. He described his activities with academic exactitude—"pulled 175 beets," "potted 242 of my tomatoes." He rarely expressed an opinion in his diary, had little to say about his father, and only mentioned his mother when she died.

Each week Henry visited the local library, returned one book, and withdrew another. He favored nonfiction—*Leaders of Men*, *African Adventurers and Explorers*, *Curiosities of Human Nature*, and *History of London*. Without comment, he recorded the deaths of local people, also the famous: Mary Todd Lincoln, Charles Darwin, Ralph Waldo Emerson, and the Bey of Tunis. He subscribed to several periodicals, including a now-forgotten magazine about bird's-egg collecting called *The Young Oologist*.

In 1883, when he was fourteen years old, Henry joined the Young Peoples' Society for Christian Endeavor at church. Quite new at the time, this interdenominational missionary organization was founded, in 1881, primarily as an activity for youth. Society policy stated that young people were expected to run their own meetings and every member was strongly encouraged to participate. Christian Endeavor gave Henry experience in group activities and public speaking. Presentations about Christian Endeavor missions in China and other foreign countries broadened Henry's view of the world. Years later, he told his daughter that he had learned a lot in church.

Throughout his life, Henry joined organizations and used personal contacts to advance his career, creating opportunities for himself by the impression that he made on his elders. Fully grown he was five feet seven inches tall, with brown hair and

1882–83, 1883–85, 1885–86, 1886–87, 1888, 1890–91, 1892–93, 1894, 1895, 1895–96, and 1898. There are datebooks for later dates, but these contain only brief notations and addresses in back.

eyes, a pleasant open face, and a ready laugh. People liked him, but he was never a leader and he functioned best when men with more forceful personalities gave him direction. His father was the first such influence in his life. John M. Coulter, professor of botany at the University of Chicago, introduced him to ecology. Jens Jensen and Stephen Forbes got him into conservation.

Henry always took time for fun. He saw Barnum's circus and listed every single act in his diary. In the sideshow, he saw "a fat woman with whiskers," "a girl with two heads," "trained monkeys, Zulus, [and] the tortures of Inquisition." With chums, he founded the Kensington Weeding Association and was elected president. For several years, the association had an annual picnic. He and his brother, Dwight, merged their respective "museums of curiosities" into The Cowles National Museum. He attended numerous community gatherings where the people of Kensington entertained themselves with group singing, poetry recitals, oratorical contests, and the like.

New Britain High School

Kensington and New Britain were legally united during the 1880s, so Henry was able to attend New Britain High School. John H. Peck, A.M., a classical scholar and pedagogical martinet, was principal of this first-class institution. According to Edith A. Adams in *The High School, New Britain Connecticut, 1850-1950*, a pamphlet that was apparently produced and circulated in New Britain, Peck "never spared himself nor expected others to coddle themselves. Students knew they were in high school on trial, and they must meet the scholastic and citizenship requirements or be expelled."

Henry took the Classical Course, which included Latin prose composition, Caesar, Virgil, and Cicero. He learned to read and write ancient Greek, studying Homer's *Iliad* and Xenophon's military histories. Other courses included mathematics, book-keeping, English and American literature, composition, singing, drawing, and penmanship.

Science at New Britain High comprised physiology, physical geography, physics, astronomy, geology, and botany. The botany texts were *How Plants Grow* (1858) by Asa Gray and *Apgar's Plant Analysis; adapted to Gray's botanies* (1874), by E. A. and A. C. Apgar. Henry cherished these books all of his life because they "seemed to open up for him the entire plant kingdom," his daughter has written. Mr. Elliott, the botany teacher, led the class on field trips and had them examine pollens through a compound microscope.⁷

These classroom experiences and his readings in botany spurred Henry to study nature systematically. Roaming the local woods and fields, he collected plants, identified them by their Latin names, pressed them, and recorded where and when he had found each specimen. On 16 July 1885 he had four hundred dried plants. Ten months later, he purchased Gray's *Manual of Botany*, the authoritative flora, and used it thereafter to confirm his field identifications. Quickly mastering the common varieties, he discovered what he termed "a new kind of [T]rifolium [clover]" in June 1886. At the end of the summer, he identified "white snakeroot, which is new to me." Once he even went botanizing in a snowstorm.

Local newspapers awakened Henry to public affairs. Characteristically, he pursued these interests through organizations. On 9 February 1886, shortly before his seventeenth birthday,

⁷ This account is constructed from: HCC Papers: Diaries; HCW Address; and materials supplied by the New Britain Public Library, New Britain, CT. These include a pamphlet, Edith A. Adams, author & comp., *The High School, New Britain Connecticut, 1850-1950* (n.p., n.d. [1950?]); *New Britain High School, 1884-85, and 1886-87* (Annual Reports: From Report of the Superintendent of Schools); and *Annual Report of the Selectmen, Treasurer, and the Several Departments of the Town of New Britain* for 1885, 1886, 1887, and 1888.

Henry's religious zeal, faithful attendance at church, and willingness to work brought him pleasing recognition. The Kensington Congregational Church *Church Record* mentioned him by name several times over the years. It published extracts from his high school valedictory oration on patriotism and his poem "Ode on America." (Church records are preserved in the Berlin-Peck Public Memorial Library, Berlin, CT.)

he applied for membership in the Grange, the social, educational, and political organization that serves agricultural interests. At Grange meetings, he listened to political debates and heard speeches by U.S. senators. A staunch prohibitionist, he became Chair of Temperance in the Christian Endeavor Society. In July 1887 he canvassed locally for the Prohibition Party, but hated this and soon quit, declaring that "It is none of my business how people vote."

At about the age of sixteen, Henry discovered girls. He had "a bootyful time" at a social on 3 November 1885 and, somewhat later, "a delicious time" with Alice Upson, the deacon's daughter. In spring of the next year, he presented flowers to a sweetheart named "her" and later wrote "her" something in Latin. The two went riding in June and he spent the entire day of 5 July with "the best of all my findings." "*Quam amo* [she I love]" may have been a second interest. She appeared in October, but did not last the winter. On 11 February 1887 Henry went out walking with "my new and best 'her.'"

Henry found ways to combine learning with romance. "Our geology class met at the home of Mr. Marlin Wiard to view diatoms, rhizopods, and other minute forms of animal and vegetable life," he wrote on 12 December 1887. "We saw some very minute oysters. Perhaps—does it harm to say it?—the best time was afterwards, for I walked home with her [underlined in the original], and had a very sweet time, of course." Sometimes, after a day of botanizing, he would bring plant specimens to a female classmate. As the two identified and pressed the plants, her parents no doubt exchanged knowing looks. Some of these encounters led to moonlight walks.

Henry got along with almost everyone, except for Mr. Peck, the principal of his high school. "I am on the war-path," he declared on 28 February 1888. "Prof. Peck handed back my [graduation speech] and growled out, 'Won't do, don't do you credit' and so on and so forth. 'Have to be rewritten.' But will it, though. We shall see. It may be and then again it may not be. Really, Mr. Peck, there is a bare chance of its being rewritten, very bare; to be sure, but then, you know, dying people cling to

a straw." It seems that no one blinked until a female teacher took Henry aside, consoled him, and explained that he simply had to rewrite the speech. Even after that, Peck made changes. On graduation day, Henry spoke his own words, ignoring most of the unwelcome improvements.

On 27 March 1888 Henry graduated first in his class from New Britain High School. His Class Night prediction was that "I become famous as a prohibition orator . . . also as a musician and a poet. . . . In the future, I am to be an orator, go to the West Indies, marry a Cuban lady, get divorced, come back home, and live the remainder of my days with the love of my youth, Little Mary, whoever that may be." This is complete nonsense, of course, but it suggests that classmates were impressed with Henry's intelligence and speaking skills.

At a loose end after graduation, Henry was offered opportunities. His pastor "desires to have me enter the ministry if I see that it is my duty," he wrote in his diary on 23 August. On 13 September a fruit farmer invited him to become foreman of a peach orchard. On 10 October a relative offered Henry part ownership of an insurance agency for which he would be the salesman. Instead, he earned eighteen dollars a week working for his father, botanized, attended meetings of Christian Endeavor and the Grange, courted girls, and volunteered for the Prohibition Party. In August, he traveled with the party, selling temperance books and campaign buttons in the tent where orators spoke. This was apparently the end of Henry's political career. There is no record that he joined another political party or worked on behalf of any candidate for public office.

Oberlin College

No diary is extant between 10 October 1888, when Henry was living in Kensington, and 6 April 1890, when much of his first year at Oberlin College was behind him. Those nineteen months are a blank and we do not know what Henry was doing, when he decided on college, and why he chose Oberlin.

He probably worked for his father, built up a savings account, and applied for college scholarships. Oberlin may have been chosen because it was an accommodating place for a young man with Henry's background. Founded in 1833 by a Presbyterian minister to train clergy and teachers for the West, Oberlin was a religiously observant school where students were expected to attend chapel. Oberlin also had a tradition of openness. It became the nation's first coeducational college and one of the first to admit blacks. Henry, who had neither money nor high-level social contacts, might have felt isolated in an elite eastern college. These things did not matter at Oberlin. In 1889, when he enrolled, there were 812 men and 901 women in the college, for a total student body of 1,713.⁸

Henry's manner of living did not change much during his first years at Oberlin. He went faithfully to church, joined Christian Endeavor and the Grange, got active in clubs, courted a succession of sweethearts, and botanized whenever he could. He roomed in the houses of faculty members and sometimes played cards with them. In his freshman year, he studied analytic geometry, Horace, rhetoric, and Latin composition. He became so proficient in classical languages that he composed odes in Latin and delivered a Greek oration to his graduating class. He would later say that he did "not at all regret" the seven years he spent studying Greek and Latin.⁹ Other college work included French, German, chemistry, botany, and geology. On 12 December 1890 he made sixty mistakes in a French test,

⁸ John Barnard, *From Evangelicalism to Progressivism at Oberlin College, 1866–1917* (Columbus: Ohio State University Press, 1969), chap. 3; Oberlin College Archives Finding Guide: RG 30/17, Albert Allen Wright (1846–1905) [description of A. A. Wright Papers]; and *General Catalogue of Oberlin College, 1833–1908* (Oberlin, OH: Oberlin College, 1909). Oberlin may possibly have been chosen in part because Henry's maternal uncle, Henry Whittlesey, lived in nearby Cleveland. He may have provided temporary room and board and kept a benevolent eye on his young nephew.

⁹ HCC, "The Economic Trend of Botany," *Science* 61, no. 1049 (12 February 1915): 225.

sputtering that “it is beyond the power of language to describe the fiendish character of the same.”

Chemistry, especially lab, was more to his taste and he advanced to qualitative analysis. Prof. Albert Allen Wright taught him botany, vegetable histology, cryptogamous forms, and general and glacial geology. Wright also paid Henry fifteen cents per hour to mount plants in the Oberlin herbarium and appointed him his assistant in the botanical laboratory.

Wright would later state in a letter of recommendation that Henry was already “an excellent field botanist” when he arrived at Oberlin with a “quick and sure and wide knowledge especially of vascular plants.”¹⁰ According to him, Henry spent his vacations in the field and “brought to light many new species” in the “pretty well worked region” around Oberlin. One of these was *Dirca palustris* or leatherwood, a low, woody shrub with small yellow flowers that grows in moist woods. In spring 1890 Henry discovered the first known specimen in Lorain County, Ohio.

On 26 April Henry and a friend sought *Dirca palustris* and other specimens for Professor Wright. They began the day in a pouring rainstorm, but persevered and found every plant they sought. “When we wished to go home,” Henry writes, “we found ourselves on the wrong side of the Black River, two miles from a bridge, so we walked through the river with our shoes on, with the water up to our knees!” They “looked and felt like drowned rats” when they got home. That evening Henry delivered *Dirca palustris* to Wright and brought violets and trilliums to a Miss Clark.

The quest for *Dirca palustris* was one of many expeditions that combined everything Henry liked best: botany, outdoor

¹⁰ Albert A. Wright, letter of recommendation, 31 January 1896, HCC Papers. Wright (1846–1905) was professor of geology and natural history (1874–97), professor of botany (1878–91), and curator of the Oberlin Museum (1874–1905).

adventure, and the fair sex. His diaristic accounts of these jaunts tell of encounters with poisonous snakes, conversations with old-time settlers, and suspicious looks from policemen. He usually ended the day with a hearty dinner and a flirtation. At about this time in his life, Henry raised a neat mustache, which hung over his mouth on either side. He kept his hair short, parting it on the left.

Henry's joining ways continued at Oberlin. He attended meetings of the Young Men's Christian Association, an oratorical association, a temperance club, a Greek club, the botany club (he was president), and the Agassiz Association (he was president). Named after the naturalist Louis Agassiz, this association was founded in 1875 on the principle "Study nature, not books." Henry apparently joined the association at its peak, but did not stay long. He was a member of so many groups that his diary often just states: "Went to all the meetings."

After awhile, Henry loosened up in college. He skipped class and chapel to botanize, partied past midnight, and spent hours playing Halma, a Victorian ancestor of Chinese checkers. Viewing girls less innocently than before, he discovered tobacco, and once consumed "a drink of moonshine whiskey." This from a man who had voted a straight Prohibition ticket in his first election.

Geology eclipsed botany during Henry's final year at Oberlin. On a field trip, he found geodes, which he brought to Professor Wright. "He has none like them," Henry's diary states, "and was a bit surprised that they were formed in trap rock." After graduating with high honors in spring of 1893, Henry worked in town for awhile, and took the train home in August. "My trip was made of more interest," he wrote, "by the geological railway guide, which I carried. From Corry, Pa. to Deposit, N.Y., a distance of three hundred miles, we went over the gray Chemung shales and sandstones of the Upper Devonian. All along this whole distance, valley drift, kames, and boulders are to be seen." By 19 August he had "pretty nearly made up [his] mind to specialize in Geology instead of Botany."

The University of Chicago

Professor Wright probably pointed Henry toward the University of Chicago, which was a perfect place for him.¹¹ The university was founded in 1890 by the Baptist Education Society and John D. Rockefeller, the oil baron. Marshall Field, owner of the Chicago department store that bears his name, donated land in the recently annexed suburb of Hyde Park. William Rainey Harper, the first president, envisioned a university that would combine an American-style undergraduate liberal arts college with a German-style graduate research facility.

The University of Chicago held its first classes in 1892, so it was just two years old on 2 January 1894 when Henry enrolled in a new department headed by glacial geologist Thomas C. Chamberlin. On his first day, he and Professor Chamberlin “talked over matters,” and he decided to take general geology, geographic geology (sedimentation), and paleontology.

At Chicago, Henry studied with Chamberlin and Rollin D. Salisbury, the physiographer, hunted fossils along the Calumet River south of the city, and joined the geology club and the University Congregational Church. He conversed with at least one “fair damsel,” got into an all-night card game, and went downtown to an evening lecture by Henry George, the economist. In March, he applied for a fellowship. There is no diary from 18 April to 28 June, so we do not know precisely what happened, but it seems that he got no fellowship, ran out of money, went home, and found a teaching job through church connections. On 7 September he was enroute to Gates College in Neligh, Nebraska.

¹¹ Charles Chamberlain was a year ahead of Cowles at Oberlin and preceded him to the University of Chicago. Professor Wright knew some of the scientists at Chicago and was able to place promising students there, like Chamberlain and Cowles. According to EC Dunes, Chamberlain expected to study botany at Chicago and complained to President Harper when no courses were available. To pacify him, Harper recruited Coulter to lecture at Chicago and later appointed him chairman of the department of botany.

Scandal at Gates College

Neligh is located on a small plateau on the north bank of the Elkhorn River in northeastern Nebraska. Nearby are areas of geologic and natural importance—today's Ashfall Fossil Beds State Historical Park and Niobrara State Park. Gates College was founded in 1882 by the Congregational Church and survived only sixteen years. During Henry's ten months at Gates, the college struggled to meet its payroll and was torn apart by scandal.

All went well at first. On the day after his arrival, Henry began to meet people, fixed his lab, which was "in horrible shape," looked for a place to live, and announced that "I like the place immensely, especially the view from College Hill." On Sunday he went to church, found everyone "delightfully cordial," and inspected a hill north of town where the flowers and soil were "almost entirely new" to him. He taught physical geography, geology, zoology, chemistry, physiology and botany to "some of the cream of the students." Later in life, he would joke that he had occupied "not a chair, but a settee" of the sciences at Gates since he taught so many subjects. Soon he was active in church, playing tennis with friends, and riding horseback with a young lady.

Henry also did some serious reading at Gates. According to his diary, he read the *Omaha Bee* and *Omaha World Herald* every day and absorbed ten weekly journals: *Scientific-American*, *Journal of Education*, *Public Opinion*, *Harper's Weekly*, *Christian Advocate*, *Epworth Herald*, *Golden Rule*, *Congregationalist*, *Outlook*, and *Advocate*. He also read six monthly periodicals: *Popular Science Monthly*, *North American Review*, *Review of Reviews*, *Missionary Review*, *Century*, and *Forum*. On top of all this, he especially liked the Sunday newspaper funnies.

In April 1895 a local newspaper accused Charles E. Pascoe, who had recently joined the Gates College senior class, of plagiarism. The charges were proven and Gates' faculty met on 19 April to consider the case. Twenty-four hours later, the faculty voted to let Pascoe graduate if he fulfilled certain conditions.

These conditions [unspecified in Henry's diary] were not fulfilled and it was later learned that Pascoe was three semesters' short of credits toward graduation. Someone was apparently pulling strings to get him a degree that he had not earned.

On 4 June Henry and other faculty members received threatening letters. Six days later, the Gates faculty met to determine which students should graduate. As Henry tells it, "All went fairly smoothly until we reached [Pascoe's] name when we engaged in a general free-for-all scrimmage . . . Dr. Ellis [president of Gates: he supported Pascoe's graduation] accused me of misrepresenting things to him [at an earlier time in a committee meeting] and his wife insulted me outright, practically calling me a liar. The scrap ended in [Ellis'] recommendation for graduation with Miss Chellis' [a faculty colleague] and my emphatic protest. We prepared statements of our side of the case for presentation to the trustees."

On 11 June a meeting of the trustees declined to hear Henry, Miss Chellis, and student representatives, who argued that graduating Pascoe amounted to an abandonment of academic standards. On commencement day, 12 June, five students refused their degrees and demanded Dr. Ellis' resignation. Two days after that, a colleague informed Henry that "my work had been good but that I had told too many things." According to this individual, someone blamed "that boy on the faculty" [i.e., Henry] for causing all the trouble.¹²

¹² The Neligh story is reconstructed from Cowles' 1895 diaries (HCC Papers) and contemporary newspaper clippings: "A Personal Word" [letter by Herbert E. Gregory] *Neligh Leader*, 14 June 1895; "Thompson's Yeoman Article: Why the Seniors Refused their Diplomas," *The Yeoman* (Neligh, Antelope County, Nebraska) 21 June 1895; "Why Ten of the Seniors Accepted Their Diplomas—The Standard of Gates Not Lowered" [article signed by P. H. Finrock, Secretary of the Gates College Faculty] *The Yeoman*, 28 June 1895; "A Trustee's View of the Pascoe Controversy" [letter signed by O. A. {name illegible}] *The Yeoman* 5 July 1895; "To the Trustees of Gates College" [letter signed by P. H. Finrock] *Neligh Leader*, July 13, 1895; "The displeasure with Dr. Ellis..." [unsigned commentary] *Neligh Leader*, 19 July 1895; "Voted by the Faculty of Gates College," [report on Gates College board meeting] *Neligh Leader*, 26 July 1895; "Norfolk Gets a College," *Omaha World Herald*, 8 September 1895.

For a few days, Henry got away, leading students on a plant-collecting trip from Neligh, about sixty miles northward to the Niobrara River. He traveled alone in a “lop-sided, dirty-canvassed, shaky-wheeled, jammed-full prairie schooner,” while the class used other conveyances. Everyone camped outdoors and numerous specimens were found. By the end of his tenure at Gates, Henry reported that he had collected and pressed 1,046 species and varieties of local plants.

On his return, Henry sat through more acrimonious meetings as he quietly negotiated his return to the University of Chicago. “My Dear Friend Cowles,” wrote Professor Chamberlin on 22 June, “[I] am very glad to learn of your desire to study with us the coming year. I have seen Dr. Harper [university president] and he has expressed a desire to do what he can in the matter of a fellowship.” Chamberlin also offered Henry paid work during the fall term “compiling paleontological data—especially the distribution of species, and the compilation of analytical geological maps.” Later, he sent Henry a “most flattering letter” that offered him “some splendid work in Paleobotany, which is to begin with some collections this summer.” Henry accepted “with avidity,” resigned from Gates College on 16 July, and was soon Special Field Assistant with the U.S. Geological Survey under Chamberlin’s supervision.¹³

August and September were spent hunting for ancient vegetal remains in the Southern Iowa Drift Plain. According to geologists, rock and soil (i.e., glacial drift) in this part of south central Iowa were pushed ahead of the Des Moines Lobe, or southernmost point of glacial advance in the state. Henry looked for subsoil exposed by highway and railroad cuts and excavated very dark layers called *old soil*. He also consulted with well diggers. Discouraged after seven solitary, fruitless

¹³ Thomas C. Chamberlin to HCC, 22 June 1895. Thomas C. Chamberlin, Letterbook 6, University of Chicago Library.

days in the sun, he sought Chamberlin's advice and was told, "Stay and dig away."¹⁴

On 21 August Henry found "a bonanza," a "nice lot of sticks and vegetal earth," including one stick that was two feet long. Two weeks later, he discovered "the best specimens yet" and on 24 September he excavated "as much as a bushel" of material. After crating the fragile specimens, he hired two railroad section men to transport them to a depot on a handcar. When the job was done, he set them up to cigars.

John Merle Coulter

All this activity could not disguise the fact that Henry had been drifting—and restless—since his graduation from Oberlin. Finances abruptly ended his first year at Chicago. Gates College was a stopgap and he understandably looked elsewhere during his eventful year in Neligh. Though he was relieved to escape the mess at Gates, he did not enjoy his solitary excavations beneath the Iowa sun. During his second graduate year at Chicago, he failed a test in crystallography and did unsatisfac-

¹⁴ *Ibid.*, 9 August 1895. The account of Iowa geology comes from *Geology of Iowa: Over Two Billion Years of Change* by Wayne I. Anderson (Ames: Iowa State University Press, 1983), 215–30. Susan F. Schultz writes in "Thomas C. Chamberlin: An Intellectual Biography of a Geologist and Educator" (Ph.D. diss., University of Wisconsin-Madison, 1976) that Chamberlin "designated the forest bed between his Kansan and his Iowan tills the 'Aftonian' for its exposure at a railway excavation near Afton Junction, Iowa" (p. 227). Cowles visited Afton, but his diary does not state clearly that he excavated there.

Paul Sears writes in *The Biology of the Living Landscape: An Introduction to Ecology* (London: Allen & Unwin, 1962), 77, that Cowles was assigned to find a geological formation and failed because it did not exist. This incident is said to have convinced Cowles that he would never succeed in geology and so he turned to botany. Nothing that the author has seen in Cowles' diaries or his correspondence with Chamberlin supports these assertions. Cowles remained in the department of geology for months after his return from Iowa and the record shows that Coulter actively recruited Cowles into the department of botany.

tory work for Professor Chamberlin, while he corresponded with universities in New York and South Dakota. He did not seem to know what he wanted.

John Merle Coulter (1851–1928) came to his rescue. He led Henry back to botany, introduced him to ecology, directed his thesis research, and hired him to teach at Chicago. Coulter and Cowles were similar in background and belief. Son of a Presbyterian missionary, Coulter lost his father early in youth and was raised by his mother in Hanover, a small Indiana town. After studying Latin and science at Hanover College, he spent five months in 1872 as an assistant geologist with the Ferdinand V. Hayden Expedition that explored Yellowstone and the Grand Tetons. When Hayden discovered that Coulter was collecting plant specimens in his spare time instead of playing cards like the other men, he appointed him expedition botanist.

While he was teaching plant taxonomy at Hanover College in 1875, Coulter founded the *Botanical Gazette* “to afford a convenient and rapid means of communications among botanists.” This professional journal, which is still published, became a leader in its field and a major outlet for Henry. In 1881 Coulter and his brother Stanley compiled the first Indiana flora, cataloging plants that Henry would later study at the Indiana Dunes. In 1893 Coulter became president of Lake Forest College, north of Chicago, expecting to build the college into a major university.¹⁵

After about a year at Lake Forest, Coulter concluded that he could never raise the money that the college required. At roughly the same time, the University of Chicago received a \$1 million endowment to create a botany department and erect a

¹⁵ Andrew Denny Rodgers III, *John Merle Coulter: Missionary in Science* (Princeton, NJ: Princeton University Press, 1944) is the source of this history of Coulter’s life. Coulter corresponded with William Rainey Harper, president of the University of Chicago, whose letters are in the Department of Special Collections at the UCL. See also “Henry Chandler Cowles,” an unpublished memoir by Charles J. Chamberlain in the Department of Special Collections at the UCL.

building for it. In 1894 President Harper, who had known Coulter for some years, asked him to deliver botany lectures on Saturday mornings at the university. Roughly a year later, Harper followed this with an invitation to found a botany department. In 1896 Coulter left Lake Forest College to become head professor of botany at Chicago.¹⁶

Henry attended Coulter's Saturday botany lectures and apparently approached him after one of them. "Talked with Prof. Coulter about my work," he wrote in his diary for 1 October 1895. "[H]e is a fine man to meet and is likely to be of much assistance to me, as my first work [on glacial vegetal remains] must be a study of native woods." On 4 January 1896 the two men talked about Henry's future, and Coulter began to draw a very willing Henry into his orbit. On 29 February Henry had "quite a talk with Dr. Coulter [who] strongly encouraged me to take up some good work in botany." On 21 March they had a "satisfactory talk . . . about next year's work." The two went botanizing on 30 March and the following day. Soon after, Henry joined the botany department for good. Coulter got a capable, enthusiastic botanist with teaching experience, which was precisely what he and President Harper wanted for the new botany department. They envisioned staffing it with two senior professors and "promising younger men."

Coulter introduced Henry to ecology through an extension course that he began to teach at Chicago on 11 April 1896. Ecology was very new at the time, having originated in Europe during the 1860s. Coulter knew what was happening, saw ecology as a coming thing, and wanted it to have a presence at the young, ambitious University of Chicago. Eastern colleges viewed ecology as an upstart pseudoscience.

¹⁶ According to the *University of Chicago Annual Register* for 1893–94, the Department of Botany employed John Coulter as "Professorial Lecturer in Botany" and Henry L. Clarke as his assistant. Coulter gave 9:30 Saturday morning lectures on plant morphology, plant anatomy, plant physiology, and advanced laboratory work. Mr. Clarke taught plant evolution, special laboratory work, and elementary practical botany.

Origin of Ecology

The notion of nature as an interdependent system goes back to the Greeks, but its modern history begins with Charles Darwin, who “made ecology inevitable,” says Paul Sears in *Charles Darwin: The Naturalist as a Cultural Force* (1950). Sears explains that Darwin’s work “carried in it the seed of two aspects of natural science. One of them—the science of variation and inheritance, now called genetics, he had clearly predicted. The other was implicit in his thesis, and to it in 1866 [Ernst] Haeckel [German zoologist and proponent of Darwin’s theory of evolution] gave the name Oecology.” Darwin “really made it impossible,” Sears continues, “to think of life apart from environment. Biochemistry had already, in its earliest phases, shown life to be dependent upon a continuing interchange of material and energy with the environment. But Darwin went even further, asserting as he did that environment had from the beginning built itself into the very form and organization of life. And so Darwin, dealing primarily with the interrelations of life and environment, was thus himself one of the first and greatest of ecologists.”¹⁷

Botanists were the first people after Darwin to study the interrelationships between organisms and the environment. Plants are visible and they stay put, which makes them easier to study than animals. Gottlieb Haberlandt, the German botanist, pioneered autecology—the study of the response of individual organisms to their environment—in his *Physiological Plant Anatomy* (1884). Among other things, he explained why

¹⁷ Paul B. Sears, *Charles Darwin: The Naturalist as a Cultural Force* (NY: Charles Scribner’s Sons, 1950). Though Cowles parted from Chamberlin and Salisbury, he acknowledged that they had taught him dynamic geologic processes—the advance and retreat of the glaciers, how melting ice created the Great Lakes, and how water levels rose and fell to erode river valleys. He drew on this knowledge in his studies of the Indiana Dunes and later, as a professor of ecology, he expected his students to learn geology.

identical plants grow thicker, denser leaves in sun than in shade.¹⁸

Eugenius Warming, the Danish botanist, became a key influence on Cowles. As Sears tells it in *The Biology of the Living Landscape* (1964), Warming made “a minute study” of the glaciated Danish landscape, where “natural forces were . . . at work to restore an equilibrium. Drifting dunes were being anchored by vegetation, lakes being converted to swamps and bogs, while plant succession both on dune and bog was moving on toward stabilized climax.” In *Plantesamfund* [Plant Ecology] (1895), Warming demonstrated that “plant communities arise and progress toward stability by succession,” Sears writes, “and that this is in effect, part of a geologic process.”¹⁹

Charles J. Chamberlain, who attended Coulter’s lectures as a student and later joined the University of Chicago faculty, recalled in a memoir that “none of us could read [Warming’s] Danish except a Danish student, who would translate a couple of chapters, and the next day Coulter would give a wonderful lecture on Ecology. . . . Cowles, with his superior knowledge of taxonomy and his geology, understood more than the rest of us, and became so interested that he studied Danish and, long before any translation appeared, could read the book in the original. . . . The treatment of such sand dunes as Warming knew, started Henry on his study of the comparatively immense moving dunes south of the University.”²⁰

Plantesamfund was translated from Danish into German and published in 1896 as *Lehrbuch der ökologischen Pflanzengeogra-*

¹⁸ Gottlieb Haberlandt, *Physiological Plant Anatomy*, trans. Montagu Drummond [of 4th German ed.] (London: Macmillan, 1914).

¹⁹ Paul B. Sears, *The Biology of the Living Landscape: An Introduction to Ecology* (London: Allen & Unwin, 1962), chap. 6. This book is one of many sources on the history of ecology, which present a variety of factual material and interpretations. Our purpose here is simply to set Cowles in context.

²⁰ See also “Henry Chandler Cowles,” an unpublished memoir by Charles J. Chamberlain, UCL.

phie [Textbook of Ecological Plant Geography]. When this German language translation appeared in July 1896 Henry prepared a synopsis for Coulter, who reviewed the book in *Botanical Gazette* (July–December 1896). “The geographical distribution of plants has received much attention for many years,” Coulter wrote in this review, “but the earlier observers could do little more than accumulate facts and outline general zones. With the development of plant physiology,” he continued, “it became possible to organize these facts upon a scientific basis, and this organization introduces us into the great modern field of ecology of which geographical distribution is a conspicuous part.” Henry was so taken with Warming, ecology, and plant geography that Coulter encouraged him to assemble a field course in plant geography for summer of 1896. He promised that the course would become permanent if successful. Henry was on his way to becoming a teacher of ecology.

We are getting ahead of ourselves. On Saturday, 25 April 1896, Henry and two friends went botanizing in Dune Park, Indiana. “This was my first experience in a sand dune country,” he wrote. “We climbed up the wonderful piles of sand and saw acres and acres stretching up and down the lake, billowy like a prairie or vast drifts of snow. The sand dune flora is very characteristic and new to me.” Henry did not know it then, but he had found the place that would inspire his greatest work and make his name.²¹

²¹ In HCW Address, HCW says that Cowles was visiting the Chicago World’s Columbian Exposition in Chicago in 1893, passed by the Indiana Dunes in a train, and was so taken with them that he alighted at the first opportunity and walked back to inspect them. Variant versions of this story place the incident later. Cowles’ diary and his introduction to “Ecological Relations” confirm that he first saw the dunes in 1896. He may have concocted this fable for Harriet when she was a small child or she may have invented it herself