

History of Paleobotany in Indiana

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The first known report of the discovery of fossil plants in Indiana was that in 1843 by the first State Geologist, Dr. David Dale Owen (11). Because the current year marks the Sesquicentennial of David Owen's birth (1807), it seems only fitting and proper at this time to record his interests and activities in this relatively new science of paleobotany. Furthermore, any account of David Owen's geological activities must necessarily include more than a passing mention of two other men of reknown—Colonel Richard Owen, David's younger brother, and Dr. Leo Lesquereux, later known as the "Father of American Paleobotany." Richard Owen, three years junior to David, served as his geological assistant on numerous surveys throughout the middle west, and succeeded him as State Geologist of Indiana after his brother's death. Leo Lesquereux, beginning in 1854, was hired by David Owen as paleontological assistant for the geology surveys and description of the coal floras of Kentucky, Indiana, and Arkansas.

David and Richard Owen were born in New Lanark, Scotland, sons of a wealthy mill owner, Robert Owen. In 1827, after scientific training (including majors in chemistry) in private schools in Switzerland and in Glasgow, the two brothers accompanied their father to New Harmony, the scene of his famous socialistic "experiment" on the banks of the Wabash River. After a year spent at University of London studying chemistry and geology, David returned to this country to matriculate at the Ohio Medical College at Cincinnati, from which institution he received the M.D. degree in 1835. Further geological experience was gained as an assistant in the reconnaissance of Tennessee, followed by a position which involved the classification and organization of the large mineral collection of that famous pioneer of American geology, William McClure.

In the year 1837 David Owen was appointed to the post of Principal Geologist of Indiana (Fig. 1). The prime purpose of this position was for Owen to conduct a geological reconnaissance of the state. The governor of the state, James Whitcomb, was so impressed with the thoroughness and scientific value of Owen's report, that when Whitcomb became commissioner of the Federal Land Office in Washington the following year, he selected Dr. David Owen as the leader of a mineral survey of some 11,000 sq. miles of the Northwest Territory.

As an indication of Owen's energy and efficiency, it might be mentioned that this federal appointment did not reach him at his home in New Harmony until August 17, 1839, yet he managed to recruit, equip, and train 139 men in rapid time, so that, by his tireless efforts in the field, he managed to submit his final report to Washington less than five months later (as required by the terms of his appointment).

In 1843 David Owen discovered 20-25 casts of the trunks of fossil trees standing upright in a shale of Carboniferous age on the banks of

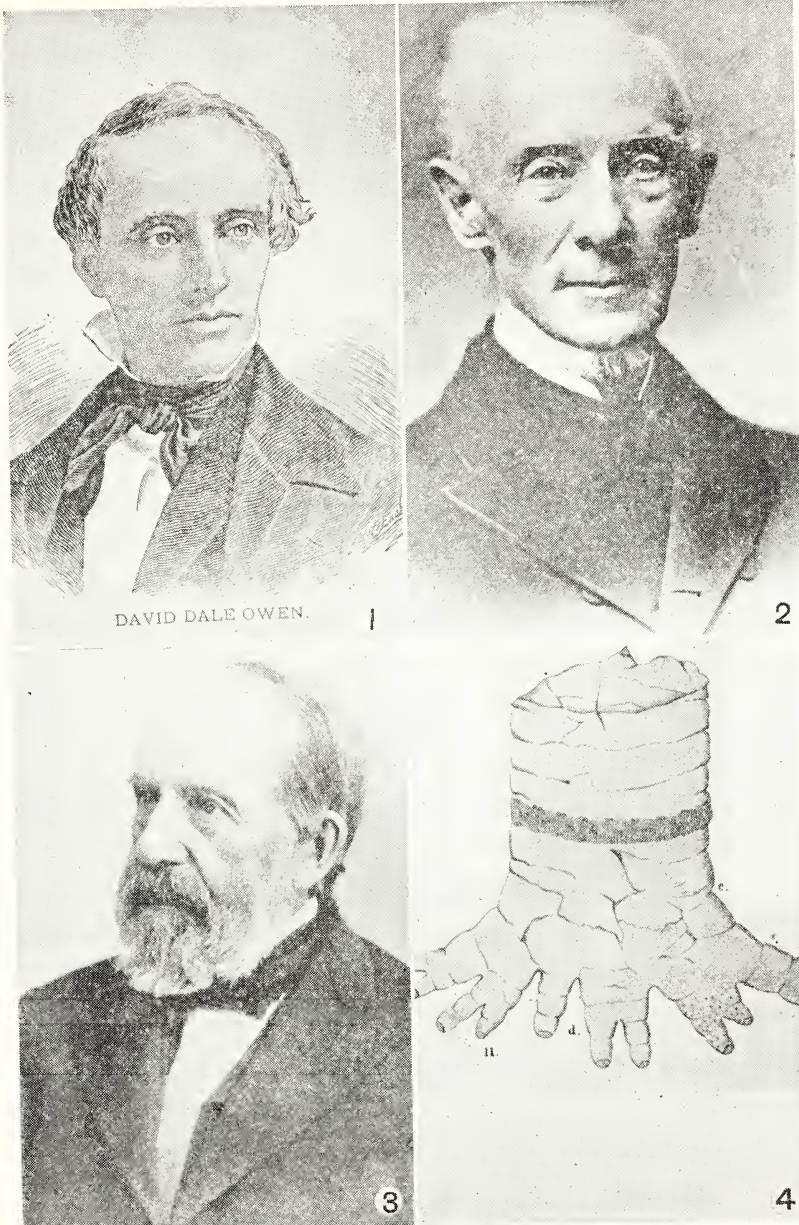


Figure 1. David Dale Owen (1807-1860), about the time of his appointment as the first State Geologist of Indiana.

Figure 2. Colonel Richard Owen (1810-1890), taken at the time of his retirement from the faculty of Indiana University.

Figure 3. Leo Lesquereux (1806-1889), taken at about age 60.

Figure 4. *Didymophyllum* (*Sigillaria*) *Owenii* Lesqx., the first fossil plant described from Indiana. This was a sandstone cast of a stump of a decorticated tree of Upper Carboniferous age. The paired scars (shown in the median band) represent aerating channels (parichnoi) which were formerly connected with similar structures in the leaves.

Big Creek, approximately twelve miles southeast of his home in New Harmony. He published two papers describing these fossil trunks (11, 12), but erroneously described them as palm trees. However, his misidentification of these trees as palms is readily forgivable when one remembers that the formal science of paleobotany was founded only fifteen years earlier in France by Adolphe Brongniart, and that only a smattering of paleobotanical literature had found its way to New Harmony by that time.

Owen presented one of these trunks, measuring two feet high by ten inches in diameter, to the Academy of Natural Sciences in Philadelphia (Fig. 4). At the same time his skilled painting and descriptions of the fossil trunks *in situ* were transmitted to London where they were presented by his friend, Sir Roderick Murchison, at a meeting of the British Association for the Advancement of Science. This presentation brought Owen to the attention of the "Father of Modern Geology," Sir Charles Lyell. During the course of Lyell's second trip to the Americas, he spent some time as a house guest of David Owen, and also accompanied him on a visit to the now-famous fossil tree site.

The years 1847-1852 were spent by David Owen as leader of a gigantic geological survey of more of the Northwest Territory, chiefly the area now comprising Wisconsin, Minnesota, Iowa, and parts of Illinois and Nebraska. Richard Owen, after serving as a captain of infantry in the Mexican war, assisted his brother with this survey of the Northwest, then took a position as professor of science at the Western Military Institute of Kentucky. The 638 page report of this survey was published by Congress and included some steel engravings of fossils by David Owen, the first time this method of illustration had been used for fossil specimens.

At this point, it becomes necessary to outline rather briefly the background of Leo Lesquereux, leading up to his close relationship with the Owen brothers.

Leo Lesquereux (Fig. 3) was born in 1806 at Fleurier, Switzerland, the son of an exiled French Huguenot couple. After a thorough schooling at nearby Neuchatel, young Lesquereux (at the age of twenty) took a position in Saxony as tutor in French to the family of General von Wolffskel. After a year of tutoring, Lesquereux asked the General for permission to marry his daughter, the Baroness Sophia. His request was tentatively accepted, with the proviso that he prove his ability to support his wife in the manner to which she was accustomed. Thereupon Lesquereux returned to Switzerland and won a competitive examination for the principalship of a high school. Supplementing his regular salary by tutoring after school hours, he found that he was able to earn the magnificent sum of \$500 a year. In 1830 he decided this income was adequate, so returned to Saxony to marry the Baroness Sophia. A young army lieutenant named von Moltke (later to become the chief of staff of the German army) served as his best man at the wedding. Misfortune soon struck, however, for Lesquereux began to have increasing difficulty with his hearing, and was forced to resign his teaching position. In desperation he travelled to Paris for treatment by a famed ear specialist. This putative "specialist" burst his Eustachian tubes,

and the resulting brain infection for a time threatened his sight. Lesquereux finally returned to Switzerland stone deaf, and never heard another sound for the rest of his life. However, he trained himself to read lips in three languages—a major accomplishment when one considers that full beards were common in those days!

As the teaching profession was now closed to him, Lesquereux was forced to join his father in his small watch factory in order to support his family. As an intellectual outlet to his menial task as a watch engraver, he read widely on botanical subjects, taking a major interest in the structure and classification of the mosses. At this time the Swiss government offered a prize for the best essay on the manner of formation and preservation of peat, and Lesquereux set out to win it. He invented an instrument for sampling peat bogs, and spent all his spare time investigating under a microscope the results of his peat-drilling experiments. Not only did he win the prize handily, but he came under the favorable notice of an illustrious member of the prize committee, Louis Agassiz, professor of natural history at the Academy of Neuchatel. Lesquereux was the first to determine the true causes of peat formation, thus unconsciously, perhaps, making the first step in the science of coal geology. After a brief political appointment as "Director of Peat Bogs" in Switzerland, he was commissioned by the king of Prussia to investigate peat bogs in northern Europe. This position permitted him to travel widely and to meet most of the best-known geologists and paleontologists in their laboratories.

In 1845, at the urging of Agassiz, who was now teaching at Harvard University, Lesquereux and his family emigrated to the United States. His first employment in this country was to classify plants collected by Professor Agassiz on his Lake Superior expedition. Next, William Sullivant, America's leading bryologist, asked Lesquereux to collaborate with him, and they published two editions of "*Musci Exsiccati Americani*," an authoritative work on American mosses.

It is interesting to note that Lesquereux had no direct association with the science of paleobotany per se until 1851, when (at the age of 45) he was employed by the Pennsylvania Geology Survey to study the fossil coal flora of that state. The resulting "*Coal Flora of Pennsylvania, etc.*," published in three volumes and an atlas (8, 9), still remains the most outstanding publication on this subject in the western hemisphere.

David Owen was appointed the first State Geologist of Kentucky in 1854. Having become acquainted with the fame of Lesquereux's work with the Pennsylvania Survey, Owen wasted no time in hiring him as his paleontological assistant. After four years together on the Kentucky Survey, David Owen was appointed State Geologist of Arkansas, and he took Lesquereux with him to study the coal flora of that region. In 1859 David Owen was reappointed State Geologist of Indiana. In failing health at that time, Owen accepted with the understanding that his brother, Richard, and Leo Lesquereux were to conduct the actual field work in Indiana. On November 13, 1860, David Owen died, and his brother succeeded him as State Geologist. The following year the Indiana state legislature passed a law which still exists today—the

State Geologist is to be made a member of the Indiana University faculty. Thus, Richard Owen (Fig. 2) became the first professor of geology at Indiana University.

In Owen's "Report of a Geological Reconnaissance in Indiana" is included Lesquereux's description of the fossil plants associated with the various coal seams of this state (6). By this time Lesquereux was the acknowledged authority in this specialized field, and consequently his services were widely sought by state, federal, and private agencies. During the next two decades a list of his more important publications of interest to paleobotanists includes: "Fossil Coal Flora of Arkansas", "Fossil Plants of Illinois", "Fossil Plants from the Tertiary of Mississippi", "The Cretaceous and Tertiary Floras of the Western Territories", and "Species of Fossil Marine Plants from the Carboniferous Measures" (7). He was the first elected member of the National Academy of Sciences and the recipient of many honors, both here and abroad.

In 1884, John Collet, the 4th State Geologist of Indiana, commissioned Lesquereux to write a sort of textbook for inclusion in his annual report. This text was entitled "Principles of Paleozoic Botany" and included descriptions and illustrations of the most common fossil plants (10). In his introduction Collet stated, "It will enable everyone to study and analyze the beautiful specimens of fossil plants abundantly found in our Coal Measures." Unfortunately, his enthusiasm has been shared by too few in this state. After the completion of this text in 1884, Lesquereux was too old (78) to carry on any further field work. Nevertheless, he still continued to identify numerous fossil plants which were sent to his Columbus, Ohio, laboratory right up to the time of his death five years later.

In 1896, David White, a young paleobotanist (who later became Director of the U. S. Geological Survey), described nineteen specimens of fossil plants from the whetstone quarries of Orange County, Indiana (14). Utilizing this flora he was able to correlate Indiana's Whetstone Beds with rocks and floras of mid-Pottsville age in southern Pennsylvania. This was the first example of stratigraphic correlation of widely-separated areas (and different coal basins) by means of plant fossils.

George H. Ashley in 1899 wrote a very comprehensive report on the coal deposits of Indiana (1), which included not only a list of the fossil plants of Carboniferous age previously described from Indiana, but also the known collecting sites for fossil plants in twenty Indiana counties underlain by coal-bearing rocks. Unfortunately, however, most of these collecting sites are no longer of any value due to erosional forces and man's activities since that time.

After the turn of the century, interest in paleobotany in Indiana seemed to go into a period of decline for the next fifty years. Some exceptions which might be mentioned are: T. F. Jackson's reports (4, 5) on some rather poorly-preserved fossil plants from Monroe County, and W. S. Benninghoff's description (2) of a coal ball flora from a mine near Petersburg, Pike County.

Within the past five years paleobotanical interest in Indiana has been reawakened, as witnessed by the appearance of papers by Guennel (3), Wood and Canright (15), and Shutts and Canright (13). It is

hoped that this trend will be continued—following the early trails blazed by the illustrious Owen brothers and their good friend, Leo Lesquereux, the “Father of American Paleobotany.”

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