

NEW HARMONY, INDIANA, A CENTURY AND A HALF OF SCIENCE AND ENGINEERING

Nils I. Johansen
University of Southern Indiana
8600 University Boulevard
Evansville, Indiana 47712

ABSTRACT: Events concerning local resource development in the New Harmony area (Posey County, Indiana) are recounted beginning with the communal settlements of the early 1800's and ending with the oil boom prior to World War II. The natural resources and the people who described and used them are highlighted.

KEYWORDS: New Harmony, history, resource development.

INTRODUCTION

Posey County lies in southwestern Indiana and constitutes that corner of the State. The Wabash River forms the County's western boundary with Illinois, and the Ohio River forms its border with Kentucky (Figure 1).

Topographically and geologically, Posey County shows evidence of a turbulent past. The bedrock, either exposed or near the surface, is part of the Pennsylvanian System. Layers of shale, limestone, and sandstone are intermixed with thin coal beds. The major mineable coal seams are deeply buried and are mined today using modern underground methods. The same coal seams lie almost at the surface in Warrick County, where they are mined using surface mining methods. The coal beds dip gently westward below Vanderburgh and Posey Counties toward Illinois.

The bedrock was subjected to faulting following deposition. The Wabash Valley Fault System transects the area from the southwest to the northeast, creating a horst and graben bedrock topography. The age of faulting is post-Pennsylvanian, perhaps Permian, in age (Nelson and Lumm, 1987). The bedrock surface is buried by unconsolidated material ranging in composition from Illinoian till and Wisconsinan slack-water deposits to recent floodplain deposits and wind-blown soils near the major waterways.

The second to last or Illinoian glaciation reached Posey County, and the glacier's southern boundary followed the present-day Big Creek drainage in Posey County. Big Creek may have been an old ice-marginal drainage way. During the Wisconsinan or last glaciation, the ice did not extend this far south, but Posey County was significantly impacted by the melting glaciers to the north. The Wabash River served as the major drainage for the region, and high water, either from ice dams or simply excessive runoff from the retreating ice, affected the area. Flooding along the Wabash River caused intermittent backwater

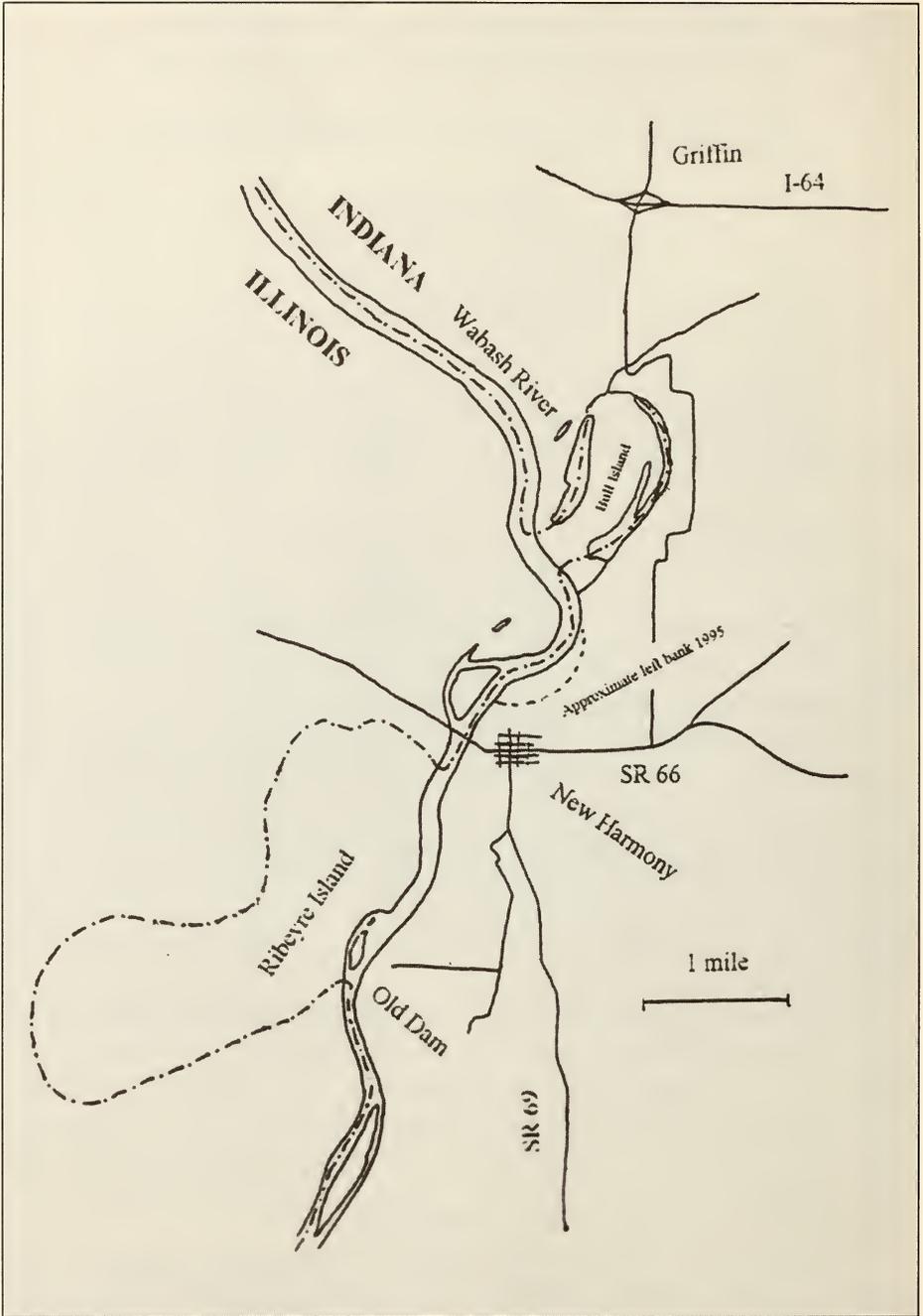


Figure 1. New Harmony and vicinity.

flooding along many of its tributaries, resulting in the formation of slack-water deposits. The town of Poseyville lies on such an old lake bed. The flat topography and the black, rich soils provide mute testimony to past glacial activity.

The Wabash River was the temporary outlet of the Great Lakes as long as ice blocked the present-day St. Lawrence River. When the water from glacial Lake Maumee (Lake Erie) broke through the moraine near Fort Wayne, the flooding that resulted along the Wabash River was instrumental in the development of the Maumee Terrace. This is the same terrace system upon which the Harmonist settlers from Pennsylvania founded their town of Harmonie, today's New Harmony.

WABASH RIVER

The Wabash River continues to have a major influence on Posey County, its natural resources, and the development of those resources. The first accounts of the utilization of the natural resources of the New Harmony area were sketchy references to the taming and channeling of the Wabash River by the Harmonists. George Rapp and his Millennialist followers established Harmonie in 1814. To operate their gristmill, they channeled the river through the bayou southward for about a mile to a place known today as "The Old Dam." Here, the river flowed into the area from the west and made a right angle bend to the south. By locating their grist mill here, the Harmonists took advantage of a bedrock ridge which extends to the west and is formed by a series of Pennsylvanian-age channel sands or sediment-filled river channels. This accident of bedrock topography causes the Wabash River to drop several feet in elevation across the channel sands, providing a corresponding head of water that was used to operate the mill.

Man-made changes to the Wabash River over the next two hundred years profoundly affected the town of New Harmony and the Wabash River itself. The Harmonists had established a thriving economic enterprise in Pennsylvania, and their move to the banks of the Wabash necessitated continuing contact back East. In the early days of the settlement of Harmonie, the river was the only major transportation and communications route. Overland transportation was, for all practical purposes, non-existent, and sending goods either to the East or South involved the use of the Ohio and/or Mississippi Rivers. The waterway made trade possible because river transport could move bulky materials, such as limestone for buildings and coal for fuel. The Harmonists and the community they founded depended on trade; they were more than simply a group of Millennialists awaiting the second coming of Christ. Their business activities provided a surplus for trade. For example, the Harmonists grew fibers suitable for making rope. The old ropewalk, where raw rope dried in lengths before being shipped, stretches across one end of the town and is a major tourist attraction in New Harmony. By one account, in 1824, Harmonist commerce reached 22 states and ten countries. In 1820, the value of the goods manufactured in Harmonie reached \$50,000. As a result, Posey County exceeded all but one other Indiana county in income from trade (Pitzer and Elliott, 1979).

EROSION AND MEANDERS

The Wabash River, especially from Vincennes to its confluence with the Ohio River, has a meandering course. The river moves through a series of loops that tend to enlarge, cut themselves off, and then re-establish themselves as the river flows south. This serpent-like waterway moves across its floodplain as the course of the river changes. Any obstruction in one part of the channel leads to course changes elsewhere over time. The entire floodplain is marked with old meander scars. Since the town of New Harmony is located on a terrace, the site is not subject to flooding, unless the water level in the Wabash is extremely high. The gradual shift of the main channel to the bayou of the Harmonist cut-off eventually blocked navigation on the Wabash River upstream from the "Old Dam" location and formed modern Ribeyre Island.

In January 1826, the keelboat *Philanthropist* (called the "Boatload of Knowledge" because of its cargo of utopian educators, part of Robert Owen's social experiment in communal living) arrived in New Harmony. The boat came upriver from the Ohio River, and the passengers disembarked at the town. Today, the rapids and low water across the "Old Dam" make the Wabash River unnavigable here except during periods of extreme flooding, and then the rapids are hazardous. River traffic from the Ohio River to New Harmony essentially became impossible as a result of the rechanneling of the Wabash River. The opening of the watercourse across the bayou in 1814 made it possible for the Wabash River, during periods of high water, to widen this new course at the expense of the old channel. The final shift in the channel occurred after 1826, but the exact date is unknown. A sketch dated 1834 and attributed to Charles-Alexander Lesueur shows a significant flow in the original "bayou" (Carmony and Elliott, 1980).

The U.S. Geological Survey map of 1903 (the New Harmony, Indiana-Illinois quadrangle) shows the main channel extending around modern Ribeyre Island and a "cut off" where the original bayou was located. The U.S. Geological Survey quadrangle map of 1959 shows that the channel had completely changed.

The changing meanders also profoundly affected the area at another location. In 1920, the meander forming the loop around Bull Island, just upstream from New Harmony, was cut off, leading to the formation of a meander loop just north of the town itself. This meander has been eroding the Maumee Terrace north of New Harmony at the rate of 50 feet per year (U.S. Army Corps of Engineers, 1992; Shaver, 1979), and, if left unchecked, the town itself will be threatened by the year 2000. A permeable jetty system was built in 1986, but the average rate of bank erosion continued essentially unchanged after its construction. The U.S. Army Corps of Engineers and representatives from the town itself are aware of the problem and are working to ameliorate the danger.

TRANSPORTATION ENGINEERING

Overland transportation to and from New Harmony developed slowly. Trails were improved as southwestern Indiana was settled. These trails included the

overland trail to Mount Vernon, the old Buffalo Trace from Vincennes to Louisville, and the Red Bank Trail to Evansville and Henderson, Kentucky. These early roads were not user-friendly, to use a modern term. A description of the day-long, overland trek from Mount Vernon to New Harmony in January 1825 is instructive as it tells of a rough road and slow-moving wagons. Mud gummed up the wagon wheels and affected horses and people adversely (Wilson, 1964). A major engineering feat was celebrated when this road was improved by using a plank surface (*i.e.*, became a corduroy road), a technique known since the Middle Ages (Schia, 1991). Kelley (1951) provides a revealing description of the construction of this road. She writes that the road was graded to a width of 18 feet with essentially two lanes, one of plank and one of soil. The construction must have started in the mid-1840's and was completed in 1851. The planks that covered the road were eight feet in length and two inches thick. Their width varied from four to 18 inches. A variation of the same road-building method is occasionally used today when a road is constructed across soft soils. Logs are felled across the roadway to form a corduroy foundation for the road surface. As recently as the construction of the trans-Alaska oil pipeline in the 1970's, a similar technique was used to preserve the permafrost environment by careful hand clearing and preservation of the vegetation mat before adding base materials for access roads or the pipeline work pad itself.

Kelley (1951) also discussed improvements to the roads in Posey County over time. She credits John B. Elliott as the driving force behind the improvement of the county roads to all-weather or gravel roads. This change may have occurred as early as the 1870's (Josephine M. Elliott, pers. comm., 1996), predating the "Good Road" movement by at least 50 years. John B.'s son, John S. Elliott, would eventually obtain a degree in Civil Engineering from Purdue University and become the engineer in charge of construction of the current steel truss bridge which crosses the Wabash River at New Harmony.

LOCAL RESOURCES

When the Harmonists first founded their town of Harmonie, they literally carved a community out of the wilderness. The only reliable link with the outside world was the river. In a matter of months, they cut lumber for buildings and used local clay to make bricks. From outcrops along the Wabash and Ohio Rivers, they shipped blocks of limestone and sandstone for buildings. An early map of New Harmony shows the town clay pit just to the south of the original settlement. A description of the bricks and their production (Pitzer and Elliott, 1979, p. 269) includes a reference to some writing on one brick in German: "Harmonie der 25 Mai 1823 ist ein sehr schoner Tag wir haben 2400 Bachstein gemacht. Morgenstund hat Gold im Mund." (Harmonie 25 May 1823 is a very beautiful day we have made 2400 bricks. Morning hour has gold in [the] mouth.) The last portion is a Germanic rime phrase (known not only in Germany but also in Scandinavia) that is roughly equivalent to "the early bird gets the worm."

Iron tools must have been imported because no evidence exists indicating that iron was made from local ores. Bog iron was mined in northern Indiana, and the coal near Terre Haute formed the basis for iron making in central Indiana (Wayne, 1970).

Coal for fuel was probably exploited very early in Posey County. Numerous thin coal seams lie exposed in the area, and excavation would pose no problems. The coal could be loaded on a boat and transported to New Harmony or elsewhere.

The source of water power has already been described. The Harmonists operated their grist mill from the very beginning of the settlement. When Robert Owen bought the community for his social experiment, he bought a fully functional town, including cleared fields, beasts of burden to plow and transport, animals for food and wool, and sturdy structures for a variety of purposes. The land itself was also a valuable resource.

About 80% of the County is actively farmed. The main crops are corn, wheat, and soybeans (U.S. Department of Agriculture, 1979). The County also possesses two recreational areas: Hovey Lake and Harmonie State Park. The surface soils are placed in three broad categories (Yeh, 1982): eolian deposits, fluvial deposits, and marsh and swamp lands. Windblown sand deposits occur along the bluff of the Wabash River. Windblown silt or loess covers all of the upland. More than 60% of Posey County is covered by fluvially deposited materials. The soils make good farmland, whose main problem is drainage, necessitating the use of ditches or field tiles. The combination of soft, silty topsoils, poor drainage, and frost action causes the roadbed break-up and stability problems that test the ingenuity of today's road builders.

INTELLECTUAL RESOURCES

Owen and his followers are best remembered for their utopian community and intellectual pursuits. New Harmony was essentially an outpost for intelligentsia. At the time, the western frontier was the edge of the eastern forest. The western prairies started just beyond New Harmony and the Wabash River in eastern Illinois. Connecting routes to the east and south were along the rivers.

Owen's social experiment, according to some of his critics (Wilson, 1964), had one major flaw—it was top heavy. The emphasis was on intellect and not on people who would be actual producers, laborers, farmhands, and others with similar pursuits. A brilliant mind does not assure that the crops are planted and harvested on time or that the pigs are fed. Despite this, a tremendous surge in resource development occurred in the community of New Harmony. The new nation was in the midst of its westward and northward expansion. The Ohio River was a finger pointing into the wilderness; at the end of the pointer was a mother lode, an enormous intellectual resource unparalleled elsewhere on the western frontier, the people of New Harmony. Robert Owen's "Boatload of Knowledge" brought together a group of scientists and naturalists who would influence resource development on the new frontier. A world class geologist, William Maclure, was

in the company of great scientists like Thomas Say and Charles-Alexandre Lesueur. Two of Robert Owen's sons would grow up to be naturalists casting long shadows.

William Maclure was Robert Owen's partner in the New Harmony experiment. At that time, Maclure's reputation as a geologist and educator was firmly established. His map of the geology of the eastern part of the continent and his lecture in 1809 to the American Philosophical Society established him as the "Father of American Geology." Maclure was a member of the Academy of Natural Sciences of Philadelphia and served as its President from 1817 until his death in 1840 (Pitzer, 1989).

Maclure was instrumental in attracting other natural scientists and educators to Owen's social experiment. He convinced the former President of the Philadelphia Academy, Gerard Troost, to come to New Harmony. Troost, a Dutch geologist and mineralogist, would later be a Professor of Geology in Nashville and the State Geologist of Tennessee. Troost spent the years between 1825 and 1827 in New Harmony. However, he did not arrive on the *Philanthropist* but arrived a month earlier in New Harmony by traveling overland (Wilson, 1964). Thomas Say, Professor of Natural History at the University of Pennsylvania and the "Father of American Entomology," was another of Maclure's friends from the Philadelphia Academy. Say accompanied Maclure on the boat to New Harmony. Lesueur was the third member of Maclure's group of scientists. He was a French naturalist and artist, whom Maclure had first met in Paris. He would later accompany Maclure on geologic expeditions to the West Indies and elsewhere in the United States prior to assuming the duties of Curator for the Philadelphia Academy.

The scientists of New Harmony were visited by many of the outstanding minds of the times, both from within the United States and also from Europe. Sir Charles Lyell, one of the founders of modern geology, and Lady Lyell visited in 1846. Lyell's interpretation and dissemination of the concept of uniformitarianism was trail blazing, and the concept is still one of the cornerstones of modern geology (Tarbuck, 1994).

Prince Maximilian of Wied spent the winter of 1832-1833 in residence. The Prince, himself a naturalist, commented in his diary on the flora and fauna and described hunting trips in the general area. He spent considerable time with Say and Lesueur studying local collections, and he spoke highly of their quality. The Prince also made a few remarks regarding the natural resources of the County. He described the muddy roads but also commented on the fertile, black soils. The record of his trip, *Travels in the Interior of North America, 1832-34*, was published in Koblenz between 1838 and 1840. Translations into French and English soon followed. (Notes from an annotated, unpublished translation of the manuscript were generously provided by Dr. Josephine M. Elliott of Historic New Harmony.)

David Dale Owen arrived in New Harmony with his brother Richard in 1828. David Dale went to Cincinnati to obtain a medical degree, not in order to prac-

tice medicine, but to receive a solid foundation in the sciences. During the summer of 1836, David Dale Owen served as an assistant to Troost, then the State Geologist of Tennessee, and in 1837, after completing his degree, he was appointed geologist for the State of Indiana. He traversed the State over the next year and a half. Owen's report is an extremely impressive document (Owen, 1837). The report established the stratigraphy of the State, gave the approximate geologic age of the rock formations, and described the major geologic resources of Indiana — coal, limestone, and sandstone. Owen also correlated the rock formations of Indiana with those in Europe of similar age and lithology, extending stratigraphic correlations across the Atlantic Ocean. He was one of the first geologists to accomplish this. His report failed to mention only two of the resources that have contributed to Indiana's economy since statehood — petroleum and gypsum. The Drake well in Pennsylvania was not drilled until more than 20 years after Owen's original work. Gypsum, since the mineral is not exposed in outcrop, was not discovered until the 1950's.

In 1839, David Dale accepted a federal appointment to survey the mineral lands of the United States, leading to investigations of the lands to the north and west of Indiana. His report (Owen, 1852) to the Commissioner of the General Land Office in Washington, D.C., is a massive document. The introduction presents a concise summary of his geologic findings as well as practical advice on the logistics of performing geological surveys across large areas with essentially no infrastructure. His principal assistant was another New Harmony resident, Joseph Granville Norwood, who would later become State Geologist of Illinois (Kimberling, 1966). The town of New Harmony, Indiana, became the headquarters for federal geological surveys. During this time, Owen also remodeled the old Harmonist Granary, the "Old Fort," which housed the Maclure collection and literally tons of material from his own trips. When Sir Charles Lyell visited New Harmony in 1846, he examined the collections and, with Owen, visited points of interest in the local area (Shaver, 1987).

In 1854, Owen was appointed State Geologist of Kentucky and, in 1857, State Geologist of Arkansas. In 1859, Indiana again appointed him State Geologist, but due to ill health, he accepted with the proviso that his brother, Richard Owen, would start the work of the new survey. Following David Dale's death in 1860, the second Indiana Survey was completed by Richard. This survey included a detailed investigation of the coal and sandstone resources of the State.

The Civil War interrupted the work of the geological survey. Richard Owen emerged from the war as a colonel and resumed his scientific work, which led to a life-long affiliation with geology and Indiana University. He served briefly as the first President of Purdue University, and, in 1885, he became one of the charter members of the Indiana Academy of Science — only three of the milestones in the career of a geologist from a small town in southwestern Indiana.

The geological tradition continued at New Harmony after Richard Owen's departure. In 1869, Edward Travers Cox of New Harmony and a former asso-

ciate of Richard Owen was appointed State Geologist of Indiana. His 1875 report (Cox, 1876) contains a brief reference to Posey County in the analysis of an 18-inch coal seam ("George Heldferl's coal") near St. Wendel. In 1879, his assistant, John Collett, succeeded him as State Geologist. The beacon of the frontier illuminated the way for resource development, not only in a County in southwestern Indiana but for the entire State as well as much of the Midwest and South, ranging from Arkansas, Illinois, and Iowa to Michigan, Wisconsin, and Minnesota. During the period from 1830 to 1860, geologists from New Harmony accounted for more survey participants than from any other group, a total of 14 of 56 projects or one quarter of the total (Johnson, 1977). Quite impressive for a small town without a university.

THE LAST CHAPTER

As mentioned previously, David Dale Owen did not include oil and gas in his survey report of 1837-1838. This chapter in the development of Posey County was not written for a long time. The Wabash Valley Fault System guarded information unknown to the early geologists. Although oil seeps had been reported in Indiana, a big strike did not occur until 1886 when the Trenton Gas Field was discovered in central Indiana. Oil was discovered in the Illinois Basin the same year. The Illinois Basin is a large structural basin centered in Illinois that covers about 60,000 square miles. Posey County and the Wabash Valley Fault System are on the eastern edge of the Illinois Basin. The oil is found in the sandstones and limestones of the basin, and the source rock is probably the black organic shales that occur throughout the formation. Oil was discovered in the Indiana portion of the Illinois Basin in 1889 when a well was drilled in Terre Haute. Small discoveries were made throughout southwestern Indiana from 1912 to 1938, but the oil traps were relatively small and difficult to locate from the surface. This difficulty was overcome with the advent of geophysical exploration techniques that enabled geologists to evaluate formations at depth. In 1938, a discovery was made near Griffin that led to the development of the oil industry in southwestern Indiana. As the faults are an integral part of the oil traps, the Wabash Valley Fault System is outlined by the oil wells that stretch, much like pearls on a string, up and down the fault trace.

An interesting footnote exists to the oil story. The Harmonists, having returned to Pennsylvania after selling Harmonie to Robert Owen, had a share in the early development of the petroleum industry in that State.

SUMMARY

New Harmony, Indiana, a living, historical community, was the location of two communal social experiments. Although Robert Owen's secular experiment was short-lived (1824-1826), the scientists he gathered and their followers left a permanent stamp on resource development across Indiana and in the central portion of the United States. The area experienced a resurgence during the pre-World War II oil boom. Today, New Harmony is a major tourist attraction, draw-

ing people from all over the world. In its academic depth and its historic restoration, the site proudly displays its rich heritage of resource development on the frontier.

ACKNOWLEDGMENTS

The field and library work for this project were funded by the Historic New Harmony organization of the University of Southern Indiana, whose generosity is gratefully acknowledged. The support of Drs. Josephine and John Elliott of Historic New Harmony with their detailed knowledge of unpublished manuscripts and oral history is gratefully acknowledged, as is the support of Dr. Jane Thompson Johansen for editorial help and her insight into the town of New Harmony.

LITERATURE CITED

- Carmony, D.F. and J.M. Elliott. 1981. New Harmony, Indiana: Robert Owen's seedbed for utopia. *Indiana Mag. Hist.* 76: 161-261, 202.
- Cox, E.T. 1876. Geological survey of Indiana, made during the year 1875. 17th Annu. Rep. Geol. Surv. Indiana, Indianapolis, 601 pp.
- Johnson, M.E. 1977. Geology in American education: 1825-1860. *Geol. Soc. Amer. Bull.* 88(8): 1192-1198.
- Kelley, A.E. 1951. *The plank road. The Old Swimmin' Hole Press, Greenfield, Indiana*, 140 pp.
- Kimberling, C. 1996. David Dale Owen and Joseph Granville Norwood: Pioneer geologists in Indiana and Illinois. *Indiana Mag. Hist.* 92: 2-25.
- Nelson, W., J. Lumm, and D.K. Lumm. 1987. Structural geology of southeastern Illinois and vicinity. *Dep. Energy Natur. Res., Illinois State Geol. Surv. Circular* 583, 70 pp.
- Owen, D.D. 1839. A geological reconnaissance and survey of the State of Indiana in 1837 and 1838. *Indiana Geol. Surv. Bull.* B61, 121 pp. (edited for reissue in 1987 by H.H. Gray).
- _____. 1852. Report of a Geological Survey of Wisconsin, Iowa, and Minnesota; and incidentally a portion of Nebraska Territory. Lippincott, Grambo & Co., Philadelphia, 638 pp.
- Pitzer, D.E. 1989. The original boatload of knowledge. *Ohio J. Sci.* 89(5): 15.
- _____. and J.M. Elliott. 1979. New Harmony's first utopians. *Indiana Mag. Hist.* 75(3): 225-330.
- Schia, E. 1991. Oslo innerst i viken - liv og virke i middelalderbyen. H. Aschehoug & Co, Oslo, Norway, 218 pp. (in Norwegian).
- Shaver, R.H. 1979. Geologic story of the lower Wabash Valley with emphasis on the New Harmony area. *Dep. Natur. Res., Geol. Surv. Occas. Paper* 27, 14 pp.
- _____. 1987. A field guide and recollections—the David Dale Owen years to the present—a sesquicentennial commemoration of service by the Geological Survey. *Dep. Natur. Res., Geol. Surv. Spec. Rep.* 44, 65 pp.
- Tarback, E.J. and F.K. Lutgens. 1994. *Earth science*, 7th ed. Macmillan College Publ. Co, New York, 638 pp.
- U.S. Army Corps of Engineers. 1992. Initial assessment report—Wabash River, New Harmony, Indiana. Sec. 14, 1946 Flood Control Act, U.S. Army Corps Eng., Louisville Dist., 19 pp.
- U.S. Department of Agriculture. 1979. Soils survey of Posey County, Indiana. U.S. Dep. Agr., Soil Conserv. Serv., Purdue Univ. Agr. Exp. Station, 155 pp.
- Wayne, W.J. 1970. Native Indiana iron ores and 19th Century ironworks. *Dep. Natur. Res., Geol. Surv. Bull.* 42E, 25 pp.
- Wilson, W.E. 1967. *The angel and the serpent.* Indiana Univ. Press, Bloomington, Indiana, pp.
- Yeh, P.T. 1982. Engineering soils map of Posey County, Indiana. Joint Highway Res. Proj. JHRP-82-6, Purdue Univ., West Lafayette, Indiana, 41 pp.