Contemporary Exhibit Highlighting the Development of American Geology in New Harmony, Indiana

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New Harmony, Indiana

- Founded in 1814 by a group of Harmonists led by Father Rapp that moved from western Pennsylvania.
- In 1824, the town of New Harmony was sold to Robert Owen, social reformer from Scotland, and William Maclure to establish a utopian society.

Modified from King and Beikman (1974).
New Harmony, Indiana

- First group of scientists, artists, and educational reformers arrived in New Harmony in January 1826.
- New Harmony served as the headquarters of geological surveys of the Middle West from ~1830 to 1860.
New Harmony Geology

New Harmony is underlain by sandstones, limestones, shales, and coal of the Bond Formation (Pennsylvanian). This bedrock unit is overlain either by floodplain deposits of the Wabash River, or wind blown silt (loess) deposited during the last Ice Age. Important localities for early geologists near New Harmony included:

1. Mumford Hills – erosional remnant of loess and/or marl deposits; may be fault controlled.
2. Loess – Sir Charles Lyell while visiting D.D. Owen recognized this sediment as wind blown.
Working Men’s Institute (WMI)

• Founded in 1838 by William Maclure to enable laborers to pursue self-education.
• Maclure’s bequest in 1840 funded 144 Institutes in 89 Indiana counties.
• WMI in New Harmony is the last remaining Institute and the longest continually operating public library in Indiana.

Portrait of William Maclure in foyer of WMI.
Goals of the New Exhibit

• Importance of New Harmony to the development of American Geology in 19th Century (Keppler House exhibit dismantled 2007).
• Maintain “treasure trove” feel of Museum and use WMI specimens.
• Minimal modification of historic display cabinets.
• Work with stakeholders to ensure information is accessible.
• Teaching kits that provide hands-on activities to visitors and used by teachers in their classrooms.
Geology Exhibit - Old

- Cabinets original to building (circa 1895)
- Specimens displayed haphazardly with minimal to no labeling
- Four small cases & three large cases
New Geology Exhibit

- “New Harmony: Crossroads of Geology”
- Panels with information about historic connections of New Harmony to Geology
- Arranged in groups with specimens labeled
New Geology Exhibit
New Harmony: Crossroads of Geology

William Maclure

William Maclure (1763-1840) is known as the “Father of American Geology.” He published the first geologic map of the United States in 1820. This map was also the first geologic map in the world, pre-dating William Smith’s (1769-1839) geologic map of England and Wales by six years. Maclure updated his geologic map and published it in 1818 with the American Philosophical Society in Philadelphia (below).

Prior to a modern geologic time scale, Abraham Werner (1749-1817) proposed the relative ages of various rocks. The Werner model was used by American geologists in the early 19th Century, and by Maclure for his 1818 geologic map of the United States (above). Although this model is no longer used today, it provided a simple way to distinguish rock units for these early scientists.

GEologic TIME SCALE

- Youngest
  - Alkaline or Tertiary
    - Poorly consolidated sands, gravels, and clays
- Intermediate
  - Strataformed rocks (diverse and well-stratified sediments)
  - Transitional
    - Folded & deformed sedimentary rocks
- Oldest
  - Igneous and metamorphic (crystalline) rocks

This geologic time scale was published by the Geological Society of America in 1859. It is divided into three eons (Cenozoic, Mesozoic, and Paleozoic), periods, and epochs. The geologic time scale was first proposed in the 19th Century to explain fossil variations through time. Numerical ages and magnetic records (alternating black and white rocks) were added in the 20th Century. The geologic time scale continues to be refined in the 21st Century as new fossils are discovered and new technology allows us to date rocks and minerals.

Geology: A New Science

James Hutton (1726-1797), the first geologist, published two books entitled “Theory of the Earth” in 1785 concluding that “we see no vestige of a beginning... no prospect of an end.” Hutton proposed that rocks represent a record of the slow, everyday processes that take place on Earth’s surface. He also established that some rocks formed from magma in the Earth, or lava that erupted on the Earth’s surface.

During the 19th Century, the geologic time scale and concepts for the Earth continued to evolve. Charles Lyell (1797-1875) published “Principles of Geology” in 1830. Geology was further developed in America by Charles-Alexandre Lesueur (1778-1846), David Dale Owen (1807-1860), Gerard Mosby (1776-1850) and Richard Owen (1801-1892) in New Harmony, Indiana. The geologic time scale continues to be refined as new fossils and dates are discovered.

A Changing Community

Harmonists in Indiana

In 1814, the Harmonists purchased land in southern Indiana and began building a new community under the leadership of Johann Georg Rapp (1797-1847). The Harmonists moved to Indiana from Harmony, Pennsylvania, a small community about 30 miles north of Pittsburgh. Local geological materials such as clay, sandstone, and limestone were important to building their new Indiana town. Furthermore, timber, fertile soils, and the Wabash River provided other important natural resources. In 1824, the Harmonists moved back to Pennsylvania, founding the town of Economy. Interestingly, the geology and natural settings of all three communities are similar, which illustrates that the Harmonists recognized the importance of geological and other natural resources.

The Utopian Era

Robert Owen (1771-1858) and William Maclure purchased the town of New Harmony from the Harmonists to establish a utopian society of artists, scientists, and social reformers in 1824. The first group of scientists, artists, and reformers arrived in New Harmony in January 1825. This arrival has been traditionally referred to as the “Revelation of Knowledge.”

Working Men’s Institute

Maclure was committed to education and the development of the natural sciences. While in New Harmony, he established “The Dispensary,” a newspaper sharing insights into science, the arts, and education. In 1838, Maclure founded the Working Men’s Institute to provide a learning resource to commoners. Upon his death in 1840, his estate allocated funds to open similar institutes across Indiana. This WMH is the only one that remains open, and is the longest continually operating library in Indiana. The current WMH building was constructed in 1894, funded in part by Dr. Edward Murphy. WMH houses extensive geological collections and related books.
19th Century Geological Enterprise in New Harmony

David Dale Owen

David Dale Owen (1807-1880) gained his geological knowledge from interactions with William Maclure and Charles-Alexandre Lesueur in New Harmony. In 1836, he was appointed the State Geologist of Indiana (1837 to 1839) and worked as the State Geologist of Kentucky from 1834 to 1837; he returned as Indiana State Geologist from 1839 to 1860. His geologic studies focused on the economic importance of natural resources, such as ores and coal, to the westward expansion of the United States. David Dale used several buildings in New Harmony for his geologic studies. Most notable is the use of the Harmonist Granary as his 3rd laboratory from 1843 to 1856, and the first home of the U.S. Geological Survey. His 4th geology laboratory is located next to the Granary, and is easily identified by its geologic themed weather vane modeled after three fossils: a belemnite, Archimedeas (corkscrew shape), and a fish.

These mineral samples are from the Fossner District of southern Illinois and western Kentucky. These include ores and industrial minerals important to the westward expansion of the United States.

Richard Owen

Richard Owen (1810-1890) worked under the guidance of his brother David Dale Owen in 1849 to conduct a geological survey of northern Minnesota and the shores of Lake Superior. Following David’s death in 1860, Richard Owen became the second State Geologist of Indiana. In 1864, he became Professor of Natural Science at Indiana University, where he taught for 15 years. He served as the first president of Purdue University briefly in 1872.

Edward Travers Cox

Edward Travers Cox (1821-1907) served as an assistant to David Dale Owen in conducting the early geological surveys of Kentucky. In returning to New Harmony, Cox and Sampson collected and studied plant fossils from Rush Creek. From 1862 to 1868, there was little geological work conducted in Indiana because of the Civil War. In 1869, the Indiana General Assembly passed an Act “providing for a geological survey...and creating the Office of State Geologist...” In accordance with this Act, Governor Baker appointed Edward Travers Cox as State Geologist of the newly created Geological Survey. Overall, Cox completed ten reports for the State, and established the Indiana Geological Survey. The Working Men's Institute houses the Edward Cox Collection, and several of his mineral specimens are displayed to the left.

New Harmony Geology

New Harmony is underlain by sandstones, limestones, shales, and coal of the Bond Formation (Pennsylvanian). This bedrock unit is overlain either by floodplain deposits of the Wabash River, or wind-blown silt (loess) deposited during the last Ice Age. Important localities for early geologists near New Harmony include:

1. Manford Hill - a structural remnant of base and thrust deposits, may be fault controlled.
2. Stones - little Charles Point with shifting O.B. Olson recognized this feature as several layers.
3. Cox Quarry - limestone and breccia exposures studied by O.B. Olson, K. Olen, R. Cox, and I. Cox.
4. Rush Creek - quiet bed locality. O.B. Olson obtained site with the Charles boxy, collected and studied extensively by L. Squander, R. Cox, I. Cox.

Cross-section of geological formations from photographs to the left are from the Indiana Geological Survey report authored by Cox in 1899. Please note the addition of the geologic signs of the formations to this cross-section and the westward slope of the rocks into the Wabash River.
New Geology Exhibit
Transitional to Today...

James Sampson

James Sampson (1806-1890) arrived in New Harmony in 1822. He collected natural history specimens, especially land and freshwater shells. Sampson also collected Pennsylvanian plant fossils. Specimens he collected can be found in the collections of the Working Men's Institute and in the Smithsonian in Washington, D.C.

Archaeology: New Harmony

In May to June 2014, an archaeology field school from the University of Southern Indiana (USI) completed an excavation of Community House No. 1 on the grounds at the Working Men's Institute. The excavation was led by Dr. Michael Strezewski, Associate Professor of Anthropology at USI.

Geology Continues to Thrive in Southern Indiana

USI Geology Program

Geologic studies conducted by David Dale Owen, Richard Owen, and Edward Cox paved the way for economic development and westward expansion of the United States in the early 19th Century. Their work continues in southern Indiana through the Geology program at University of Southern Indiana (USI) and the Indiana Geological Survey (IGS). Current studies include assessing surface and groundwater resources, flooding risk and erosion of the Wabash River, and seismic risk of the New Madrid and Wabash Valley fault zones. Additionally, the USI geology program conducts field trips to New Harmony to explore both the geology of the area and the historic implications of New Harmony to American geology.

Indiana Geological Survey

Although the Indiana Geological Survey is currently located in Bloomington, it has its origins in New Harmony, Indiana. The Survey continues to emphasize studies that assist with economic development and education. For more information on Indiana's Geology, please visit www.isgs.indiana.edu.

Geologic Hazards

Seismic Risk in Indiana

The New Madrid and Wabash Valley Fault Zones are an active area of seismic activity. One of the largest earthquakes in the continental United States occurred in 1811 near New Madrid, Missouri (estimated to have a magnitude greater than 8.0 on the Richter Scale). As part of an ongoing study of these earthquakes, a seismograph station is located in New Harmony, Indiana. These data are used to assess seismic risk in our region and to better constrain the extent of these faults.

Acknowledgments

This exhibit is made possible through funding and support provided by:

Historic New Harmony
New Harmony Outreach & Engagement Grant
Darrel Bigham Faculty Engagement Award, Historic Southern Indiana
Endowment for New Harmony Studies
Applied Engineering Center, University of Southern Indiana
Indiana State Museum
Outreach & Engagement

• Teaching kits for elementary and middle school teachers, as well as home school groups.
• Includes fossils, minerals, test kits, informational panels, and guides.
• Southwest Indiana and southeast Illinois.
Conclusions

• New Harmony, Indiana was home to many geologists in the early 19th Century, who made fundamental contributions to the development and establishment of American Geology.

• Museum exhibits and teaching kits provide Geology Departments with visibility and engagement opportunities, and make geology more accessible to the general public.

• Specifically, New Harmony provides field trip opportunities to examine both the geological setting of southwest Indiana and historical connections to geology.
Acknowledgements

• New Harmony Outreach & Engagement Grant and Endowment for New Harmony Studies Grant
• Catherine Cotrupi, Christine Crews, and Connie Weinzapfel, Director, Historic New Harmony
• Trustees of the Working Men’s Institute and Ryan Rokicki, Director
• Darrel Bigham Faculty Engagement Fellowship for 2014-15, Historic Southern Indiana
• Indiana State Museum
• Indiana Geological Survey