Significance of Nineteenth Century Surveys Conducted by the Geologists of New Harmony, Indiana

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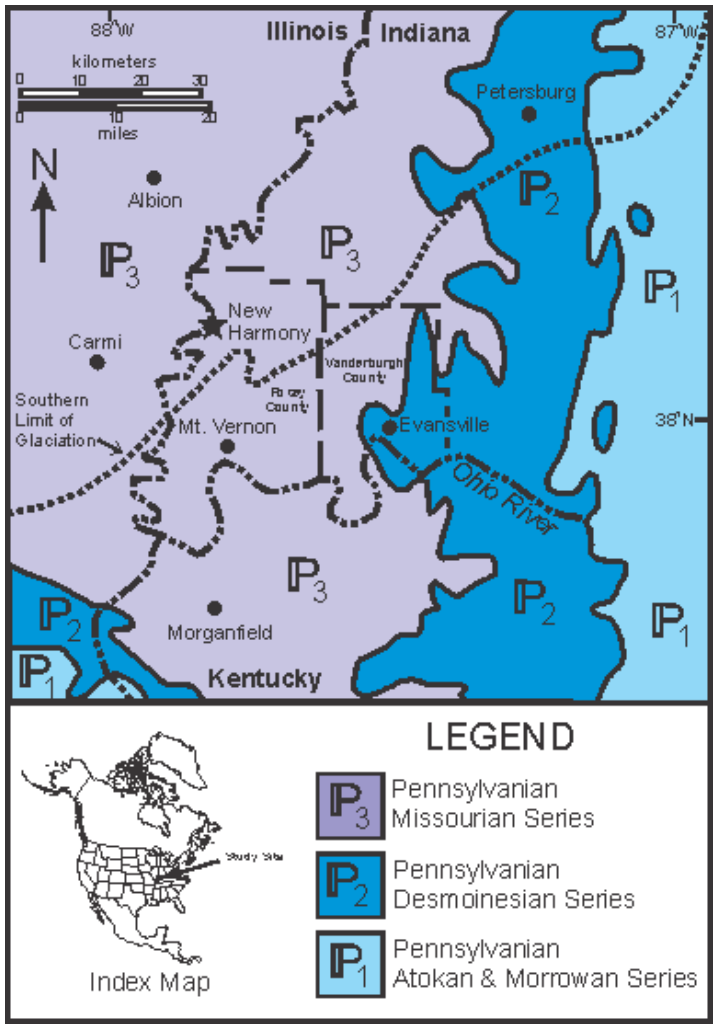
New Harmony, Indiana



Modified from King and Beikman (1974).

- Founded in 1814 by a group of Harmonists led by Father Rapp that moved from western Pennsylvania.
- In 1825, the town of New Harmony was sold to Robert Owen, social reformer from Scotland, and William Maclure to establish a utopian society.

New Harmony, Indiana

- First group of scientists, artists, and educational reformers arrived in New Harmony in January 1826.
- William Maclure, David Dale Owen, Richard Owen, Edward Cox, and Gerard Troost spent time in New Harmony, Indiana.
- New Harmony served as the headquarters of geological surveys of the Middle West from ~1830 to 1860.

Watercolor of New Harmony by Karl Bodmer (1832).

Why New Harmony, Indiana?

- Harmonists constructed a town that was entirely self-sufficient with over 180 buildings, including dormitories, businesses, redware and brick kilns, Rapp-Owen Granary, and the Harmonist Church.
- Owen and Maclure purchased the remote river town on the frontier to establish a model community where education and social equality would flourish; focus on art, education, and science in a hands-on learning environment.
- Maclure recruited Virginia Poullard DuPalais (artist), Charles-Alexandre Lesueur (zoologist), Thomas Say (conchologist), and Gerard Troost (geologist), to teach art and science at the New Harmony School.
- Opportunity to make new scientific discoveries on the frontier.

Virginia Poullard DuPalais (1804-1864)

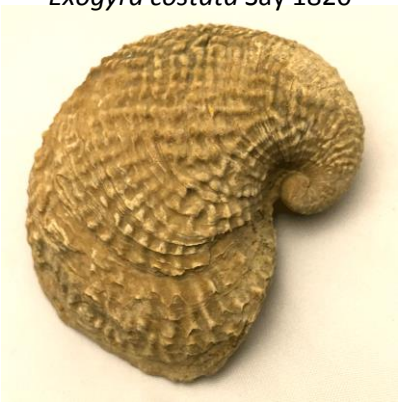
- Member of Lesueur's party who traveled on the "Boatload of Knowledge" arriving in January 1826 at New Harmony.
- Taught sketching and watercolor at the New Harmony School.
- Prepared illustrations for scientific publications in New Harmony.

Above: Portrait of Virginia Poullard DuPalais courtesy of Working Men's Institute. **Right:** Watercolor sketches courtesy of Archives and Special Collections at Purdue University.

Thomas Say (1787-1834)

Chesapecten jeffersonius (Say 1824)

Exogyra costata Say 1820



Left: Portrait of Thomas Say by Charles Willson Peale (1818). Courtesy of the Academy of Natural Sciences of Philadelphia. **Right:** Named and described several fossils, including *Chesapecten jeffersonius* (Say 1824) and *Exogyra costata* Say 1820.

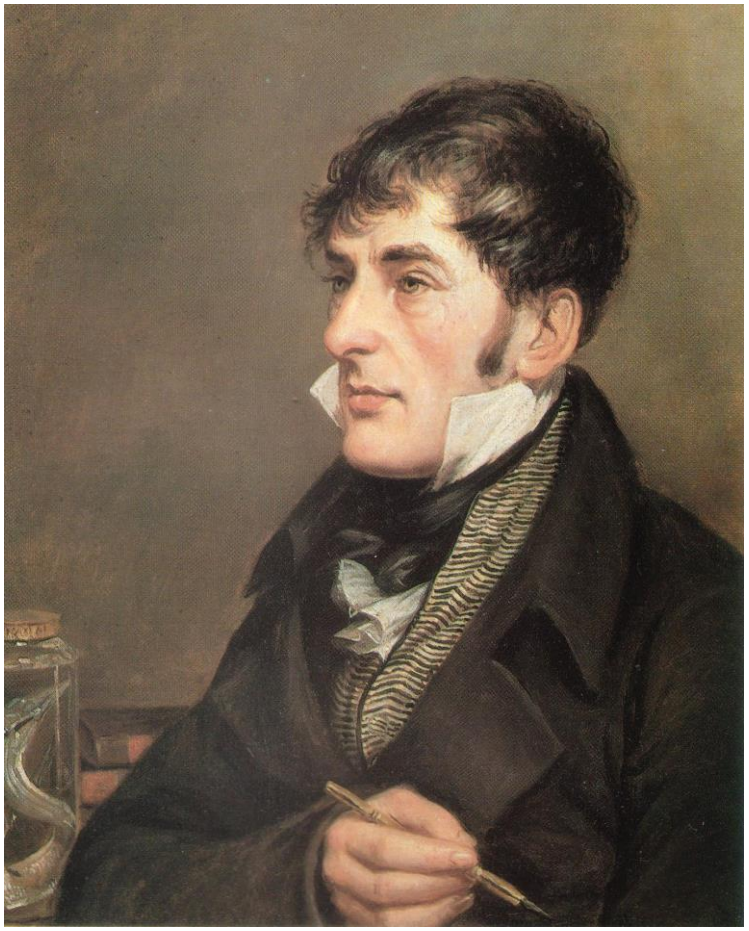
- Member of Long's expedition to the Rocky Mountains in 1819.
- Lived in New Harmony from 1826 until his death in 1834.
- Zoologist with expertise in conchology and entomology.
- Lucy Sistare Say produced most illustrations for his publications.

Charles-Alexandre Lesueur (1778-1846)

- Zoologist and artist on the Baudin Expedition to Australia and Tasmania (1800-1803).
- In 1815, Lesueur met Maclure, traveling with him across Europe, then to Philadelphia.
- Lived in New Harmony from 1826 to 1837.
- Appointed curator of Muséum d'Histoire Naturelle du Havre.

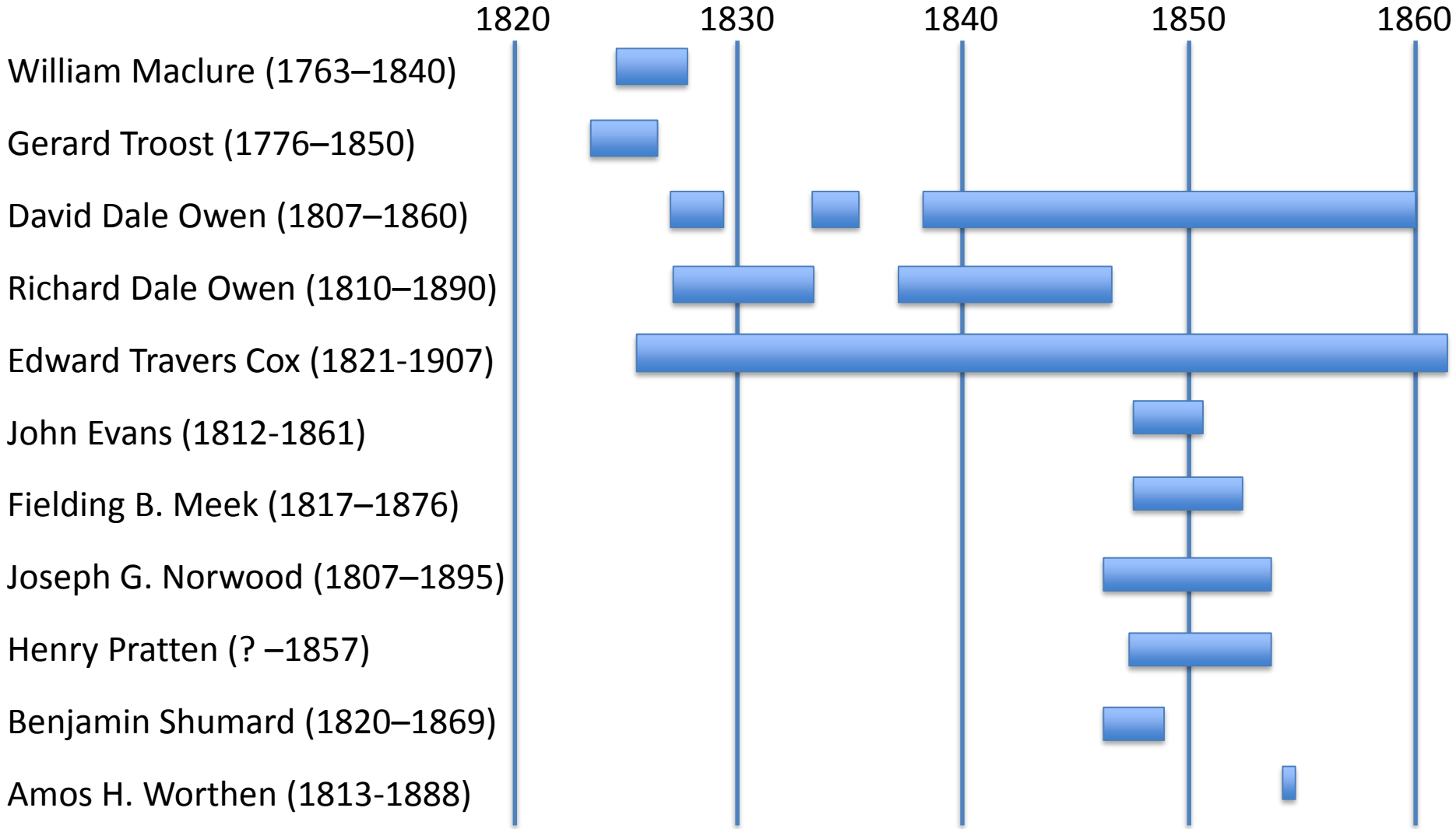
Maclurites magna
Lesueur 1818

Carcharhinus obscurus
(Lesueur 1818)



Left: *Maclurites* image from Kimberling (2010). Shark's tooth image courtesy of Smith (2015). **Right:** Portrait of Charles-Alexandre Lesueur by Charles Willson Peale (1818). Courtesy of the Academy of Natural Sciences.

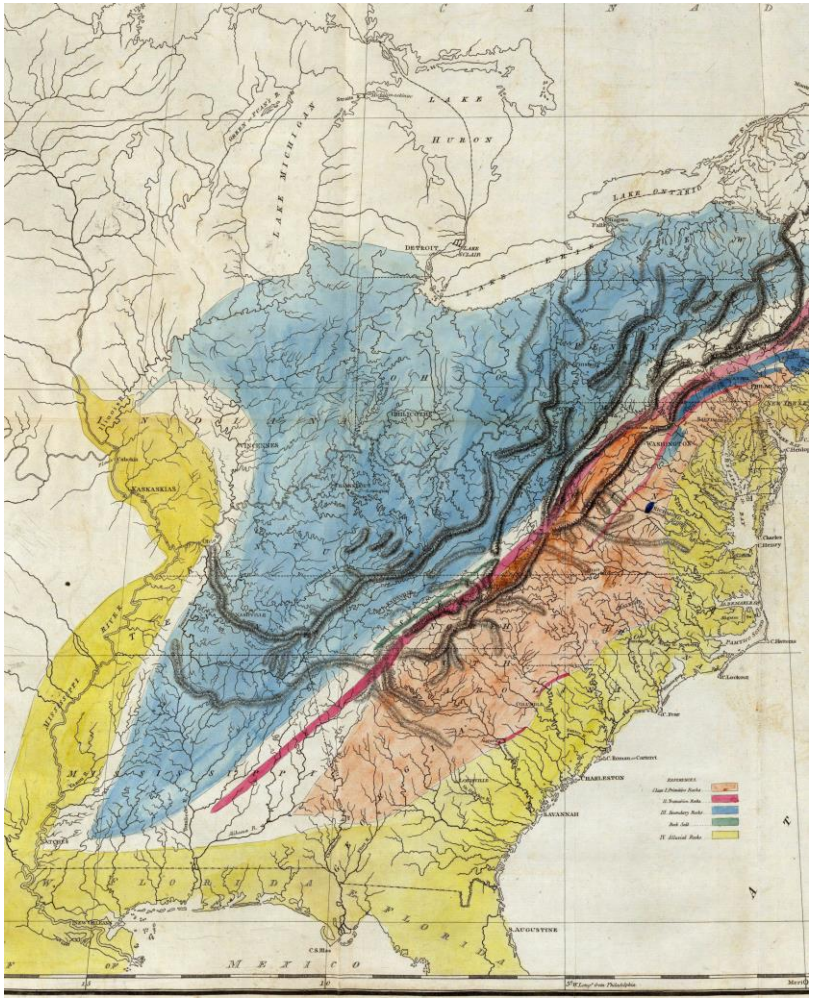
Geologists in New Harmony



New Harmony also visited by James Hall in 1841 and by Sir Charles Lyell in 1846.

William Maclure (1776-1850)

- Published first regional geologic map of the eastern United States in 1809.
- President of the Philadelphia Academy of Natural Sciences from 1817 to 1840.
- Lived and worked in New Harmony, Indiana from 1825 to 1827.
- Established the Working Men's Institute in New Harmony, Indiana in 1838.
- "Father of American Geology"



Geologic map of eastern United States in American Philosophical Society Transactions (Maclure, 1809).

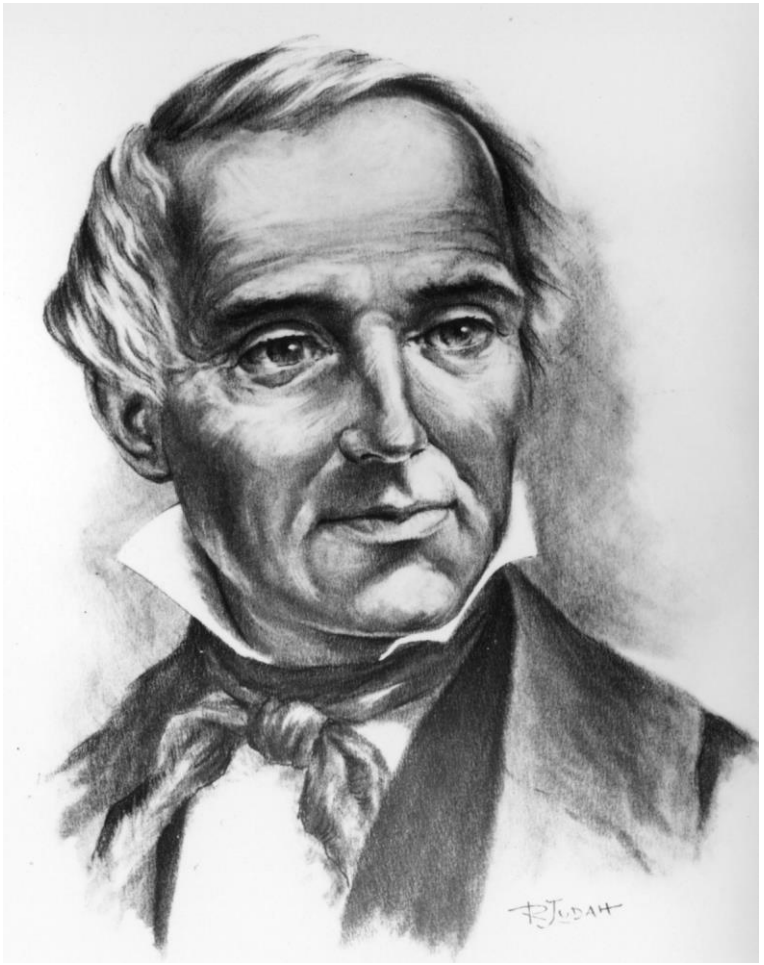
Gerard Troost (1776-1850)

Gerard Troost portrait in oil by Charles Wilson Peale (1824). Courtesy of Academy of Natural Sciences.

- Doctor of Medicine, University of Leyden; Master in Pharmacy, University of Amsterdam in 1801.
- First President of the Philadelphia Academy of Natural Sciences (1812-1817).
- Lived and worked in New Harmony, Indiana from 1825 to 1827.
- Taught mineralogy at University of Nashville beginning in 1827.
- Tennessee State Geologist (1831–1850).
- Established method for conducting state geological surveys; mentored David Dale Owen.

David Dale Owen (1807-1860)

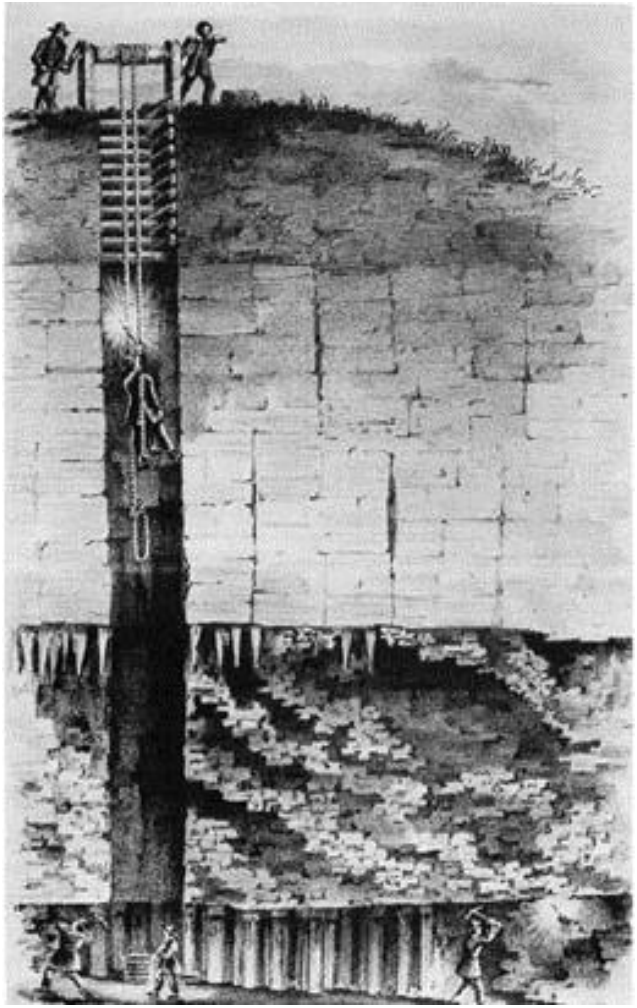
- Studied chemistry and geology at University of London (1831–1833).
- Assistant to Geological Survey of Tennessee by Gerard Troost in 1836.
- Earned medical degree from Ohio Medical College in Cincinnati in 1837.
- Geological surveys of Indiana (1837-1838; 1859-1860), Kentucky (1854-1857), and Arkansas (1857-1859).
- Led federal geological surveys of Iowa, Wisconsin, Illinois in 1837, plus Minnesota in 1847.
- Proposed Seneca Sandstone for Smithsonian Institution in 1846.



David Dale Owen portrait sketch by R. Judah (1856). Courtesy of Indiana University.

Geological Surveys of the Midwest

- Focused on economic resources, chemical analyses, and distribution, age, and physical properties of rocks.
- Reports included geologic maps, field illustrations, and sketches of fossils.
- Indiana legislators recognized importance of geological surveys to economic growth.
- “The Science of Geology, of comparatively modern date, is now universally conceded to be one, not of mere curious inquiry, but of vast practical utility.” –David Dale Owen, 1838



Sketch of lead mine in Upper Mississippi Valley drawn by David Dale Owen (1839).

Owen's 1839 Federal Geological Survey

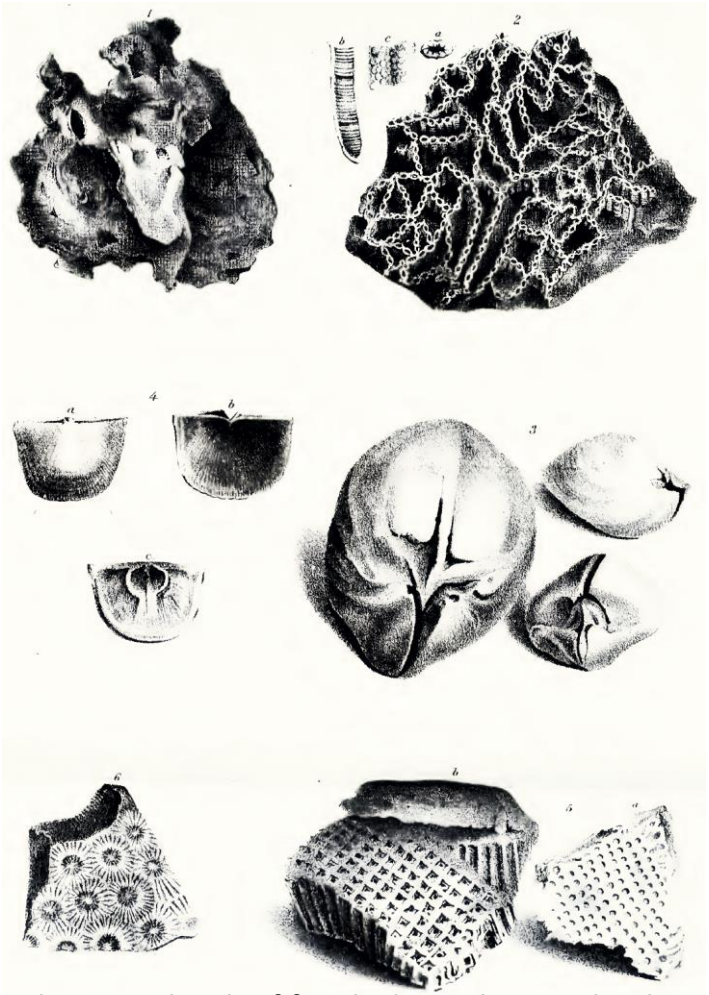


Plate VII. Sketch of fossils drawn by David Dale Owen and included in House Document No. 239.

- Appointed by Congress as a U.S. Geologist in 1839 to survey mineral lands of Iowa, Minnesota, and Wisconsin for the U.S. General Land Office of the Treasury Department.
- Geological report consisted of 161 pages with 25 plates and maps (some with color) completed April 2, 1840: House Document No. 239.
- The geological survey conducted by Owen from 1839 to 1840 "was a feat of generalship which has never been equaled in American geological history"
  – G.P. Merrill, 1964, p. 199.

Owen's 1839 Federal Geological Survey

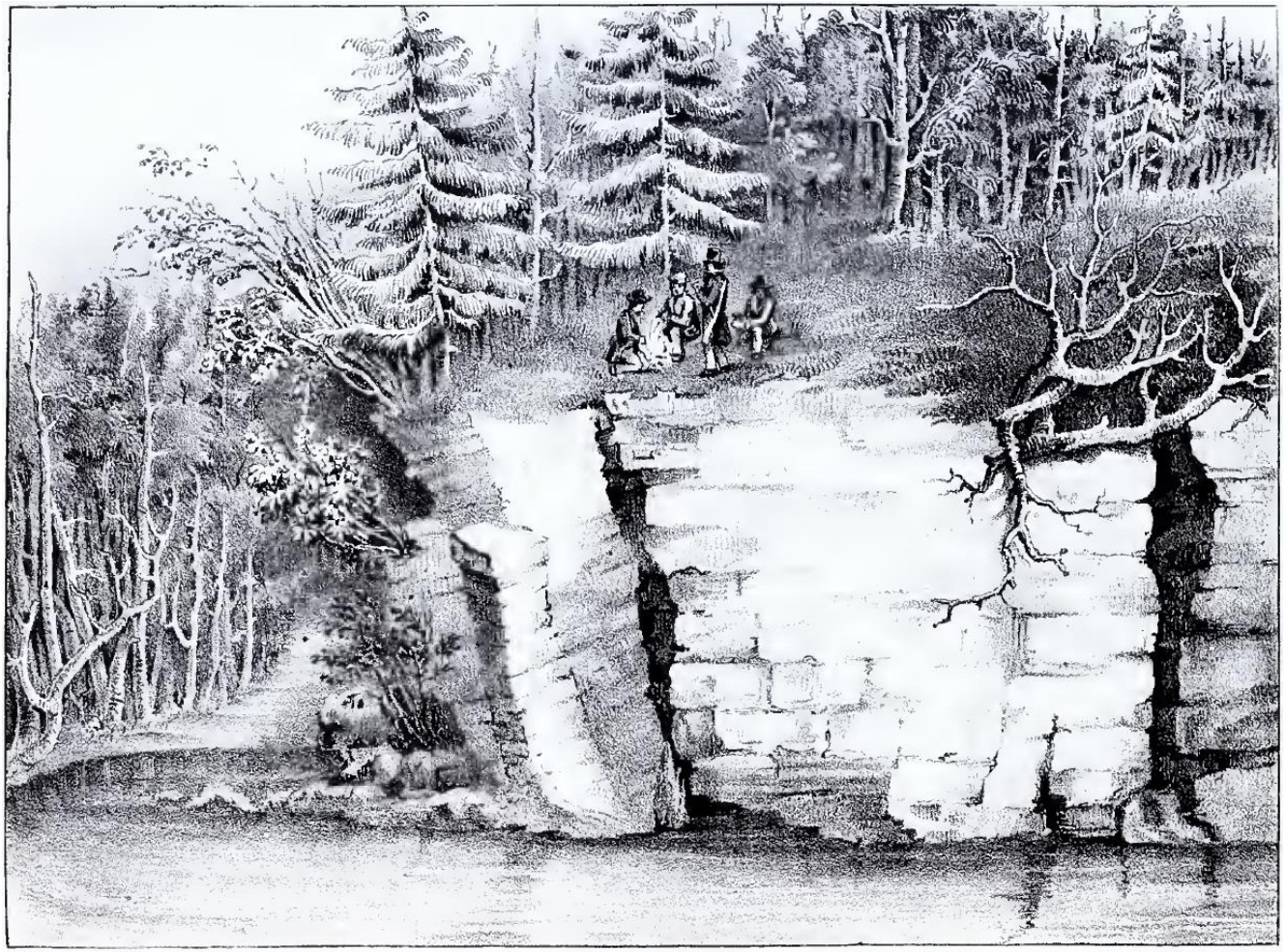
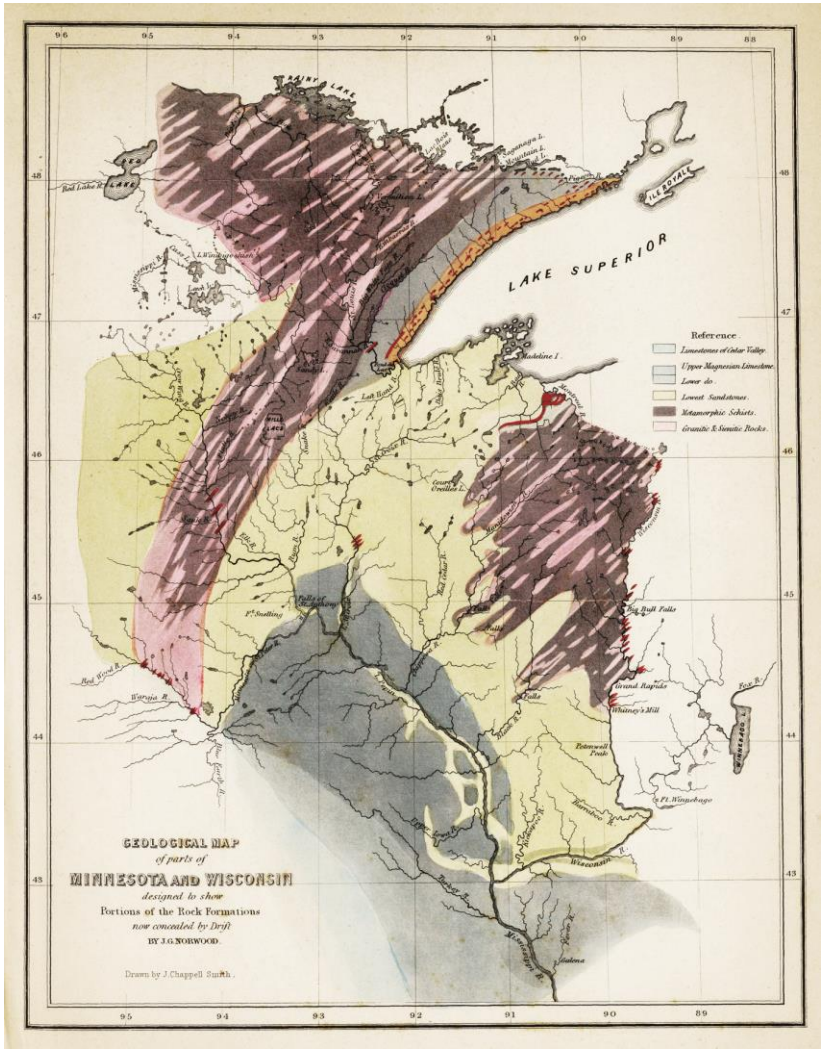


Plate V. Sketch of Cliff Limestone (a.k.a. Galena Limestone, Ordovician) by David Dale Owen and included in House Document No. 239 published in 1840.

Owen's 1847 Federal Geological Survey



Geologic Map of Minnesota and Wisconsin from Owen (1852).

- In 1847, U.S. Congress adopted policy of selling mineral land at a higher price than agricultural land.
- Land Office Commissioner assigned U.S. Geologist Owen the task of surveying Iowa, Minnesota, Wisconsin, and parts of Nebraska in 1847.
- Preliminary study of the mineral content and general geology conducted of the region in 1847.
- Owen and his team of geologists conducted detailed geological surveys in 1848, 1849, and 1850.

Owen's 1847 Federal Geological Survey

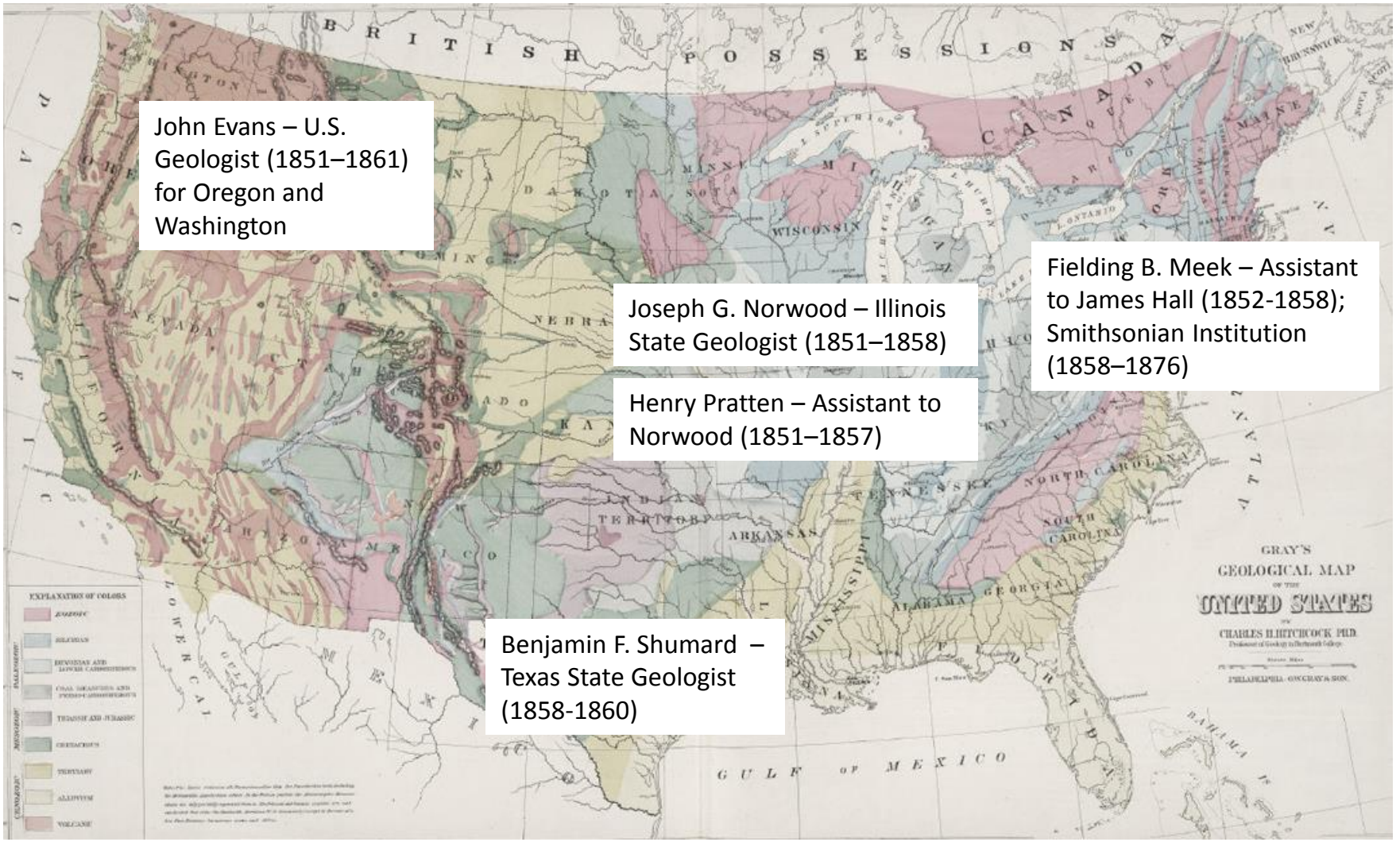
Field Work Hardships and Hazards

Dysentery and cholera complicated field work in 1849; The only reported death of the expedition was Gobert, who died of cholera at Muscatine, Iowa in July 1849.

David Dale Owen account from the Upper Des Moines River in 1849:

> "Our bowsman having discharged his rifle at a deer, had reloaded it, and, in the excitement of the chase, had hastily laid it down beside another gun, on the forward thwart of the canoe, with the muzzle imprudently pointing, in a direct line, towards myself; I being seated, with B.C. Macy, in the center of the canoe. A sudden jerk of the boat caused the discharge of the rifle. Had not the breech of the other gun chanced to lie slantingly across the muzzle of the discharged piece, this Report, in all probability, would have been completed by someone else than its present author. As it was, the ball struck the brass mounting of the other piece, which, together with the stock of the gun, it shattered to pieces, being itself split up into several fragments, and diverted from its original direction. Of the fragments, three passed through, and severely lacerated, the deltoid muscle of my left arm; and two others, probably portions of the mounting, wounded Mr. Macy; one, pretty badly, on the cap of the knee, and another, which was afterwards extracted, on the face." from Owen (1852).

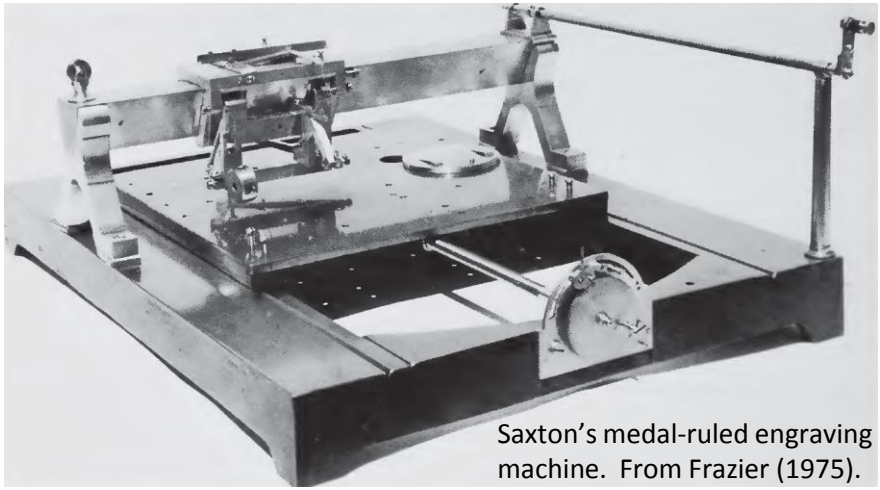
Legacy of Owen's 1847 Federal Survey



Gray's Geological Map of the United States (Hitchcock 1875).

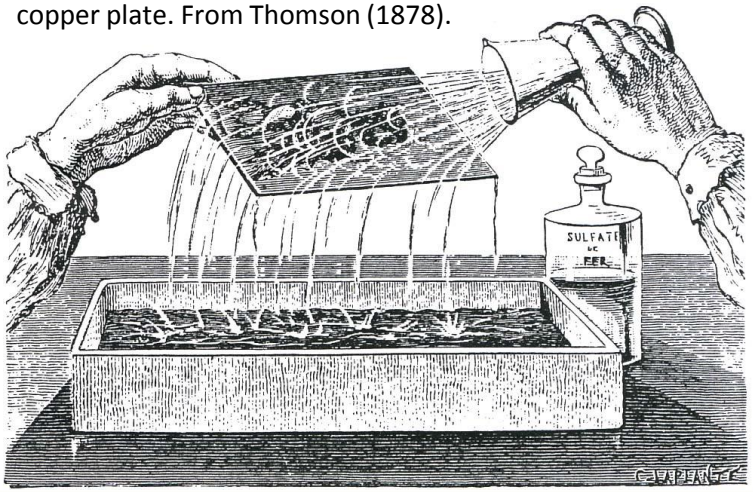
Legacy of Owen's 1847 Federal Survey

- Standardized method of geological surveys and the format of federal geologic reports, including narrative, maps, plates, and illustrations.
- Use of several reproduction techniques, including engravings on copper, engravings on stone (lithography), engravings on steel, medal-ruled on steel, and Daguerreotypes (early photographic technique).



Saxton's medal-ruled engraving machine. From Frazier (1975).

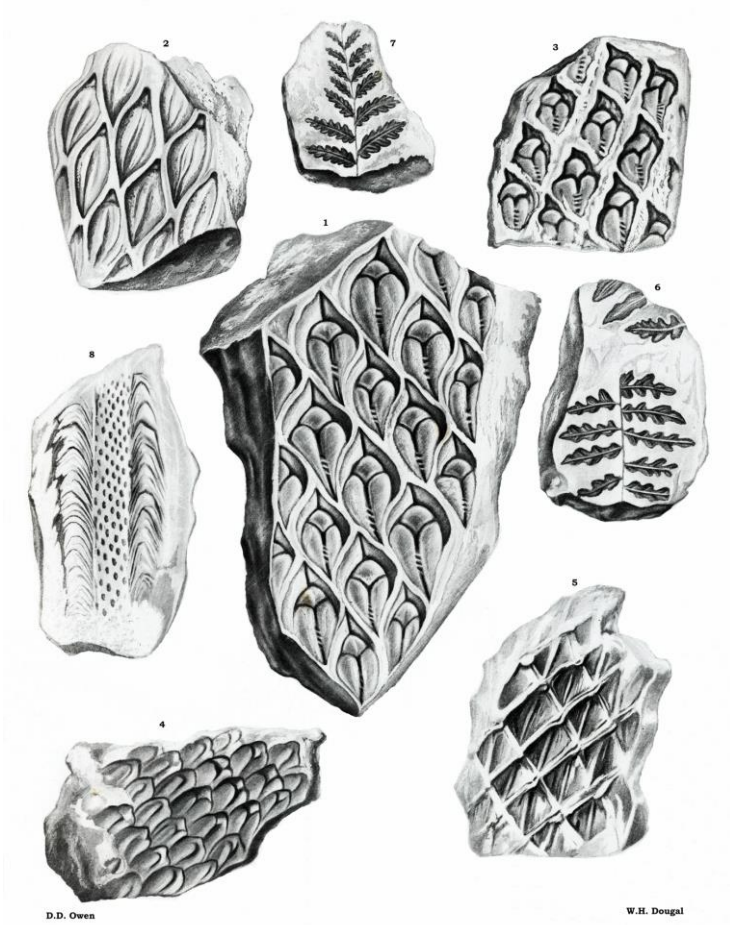
Fixing the Daguerreotype image on silver plated copper plate. From Thomson (1878).



Legacy of Owen's 1847 Federal Survey

Table V. Sketches of Carboniferous marine fossils from Iowa and Nebraska. Owen (1852).

Table VI. Sketches of Carboniferous plant fossils from Iowa. Owen (1852).



Legacy of Owen's 1847 Federal Survey

Table II.A. Medal-ruled on steel trilobite fossils from Iowa and Wisconsin. Owen (1852).

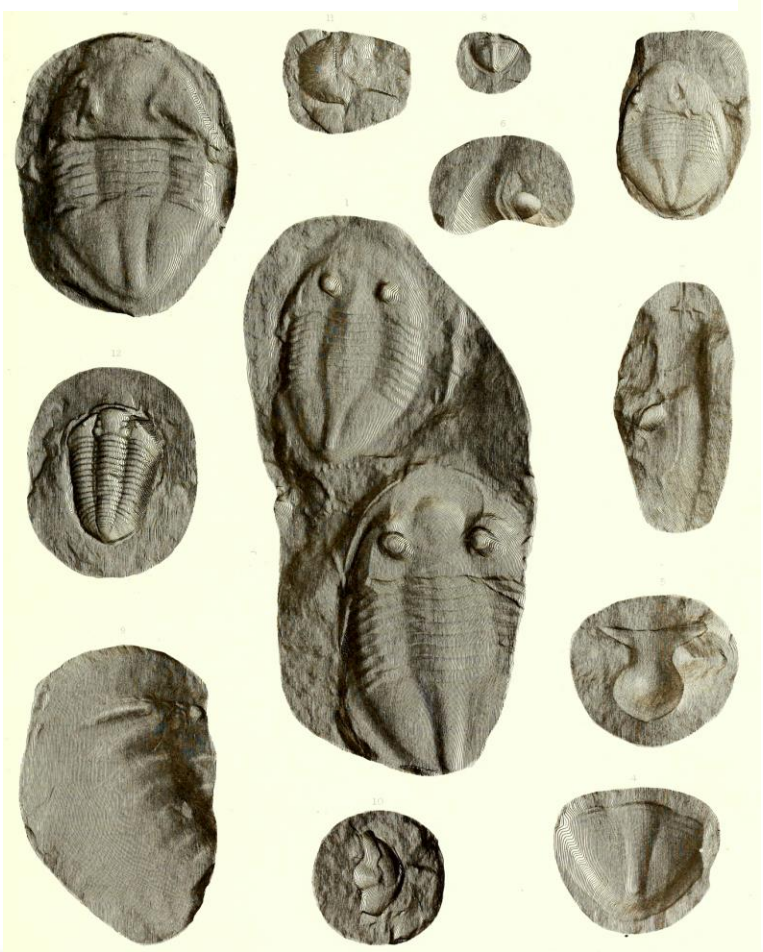
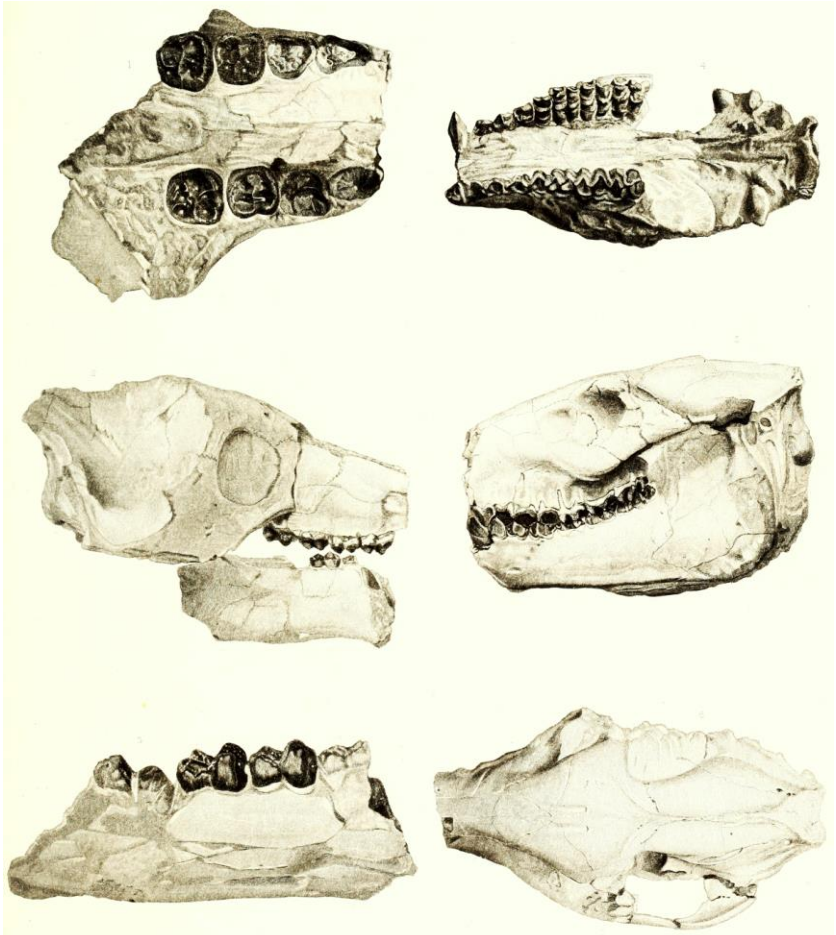


Table X. Engraved Daguerreotypes of *Archaeotherium* and *Oredon* fossils from Nebraska. Owen (1852).

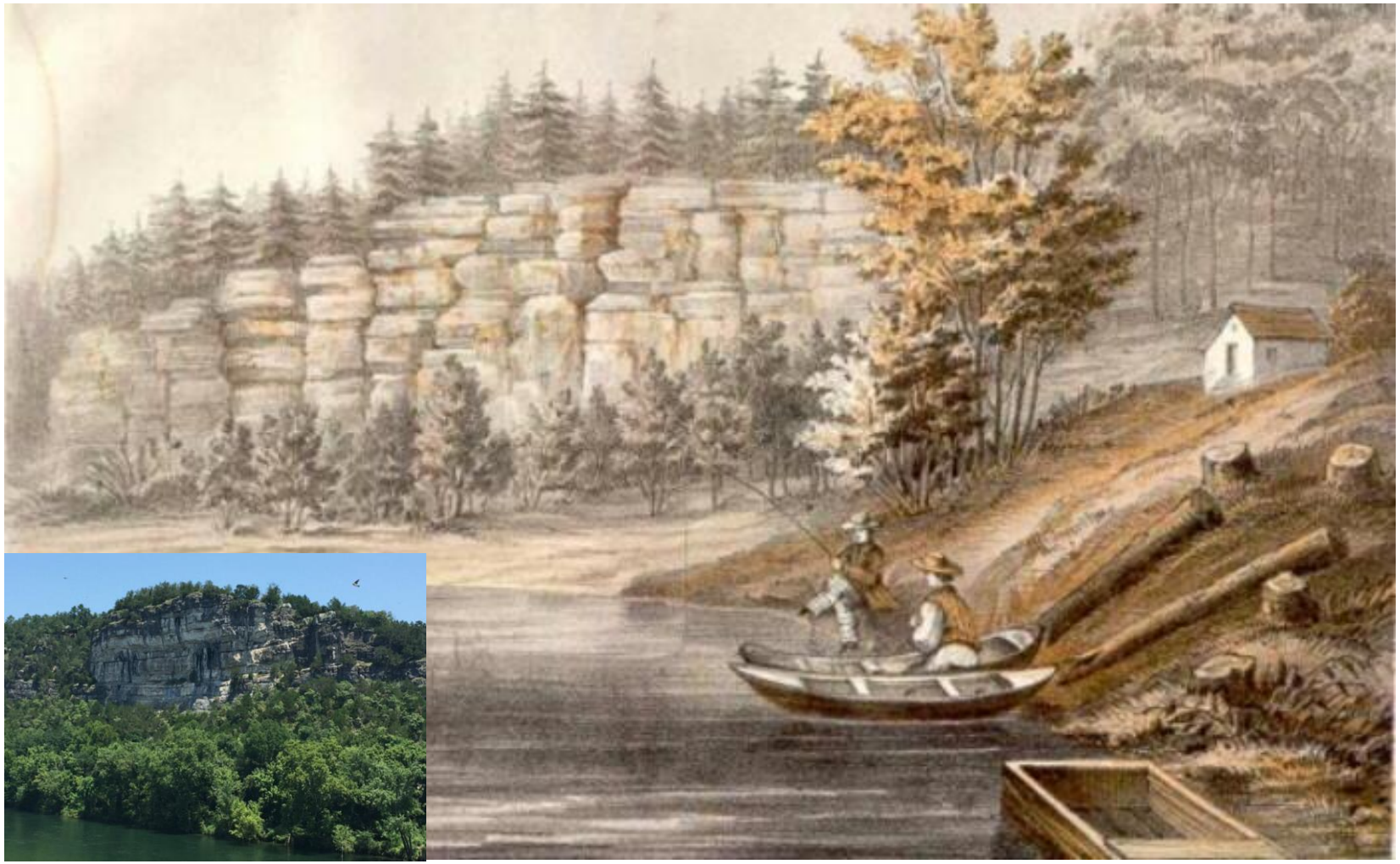


State Geological Surveys by Owen

- Following the federal geological survey of Iowa, Wisconsin, Minnesota, and parts of Nebraska, Owen completed several state geological surveys, further developing methods and illustrative techniques.
- State Geologist of Kentucky (1854–1857).
- State Geologist of Arkansas (1857–1859).
- Geologist of the State of Indiana (1859–1860).

Rapp-Owen Granary served as Owen's third geological laboratory in New Harmony from 1843 to 1859, and headquarters of federal geological surveys until 1856, thereafter moved to the Smithsonian Institution.

State Geological Surveys by Owen



Calico Rocks on the White River in Arkansas (Owen, 1857). Inset photograph courtesy of Boerner (2015).

Indiana Geological Survey Legacy

Richard Dale Owen
(1810-1890)

- Assistant Geologist to David Dale Owen beginning in 1848.
- Completed Geological Survey of Indiana after death of David Dale Owen (1860-1861) and from 1864 to 1869.
- Professor of Natural Sciences at Indiana University (1864-1879).
- First President of Purdue University (1872-1874).
- Died from accidently consuming embalming fluid.

Edward Travers Cox
(1821-1907)

- Assisted David Dale Owen with geological surveys of Arkansas, Indiana, and Kentucky.
- First official State Geologist of Indiana appointed in 1869 and served through 1879.
- Portion of his mineral collection donated to the Working Men's Institute in New Harmony, Indiana.

Conclusions

- New Harmony, Indiana was home to many noteworthy geologists in the early to mid-19th Century, who made fundamental contributions to the development and establishment of American Geology.
- David Dale Owen used numerous illustrations in geologic reports, experimenting with several reproduction techniques including Daguerreotypes and medal-ruled on steel.
- David Dale Owen standardized the method of conducting geologic surveys, setting the precedent for federal geological surveys of the western United States directed in the 1860s and 1870s, and the establishment of the U.S. Geological Survey in 1879.

Acknowledgements

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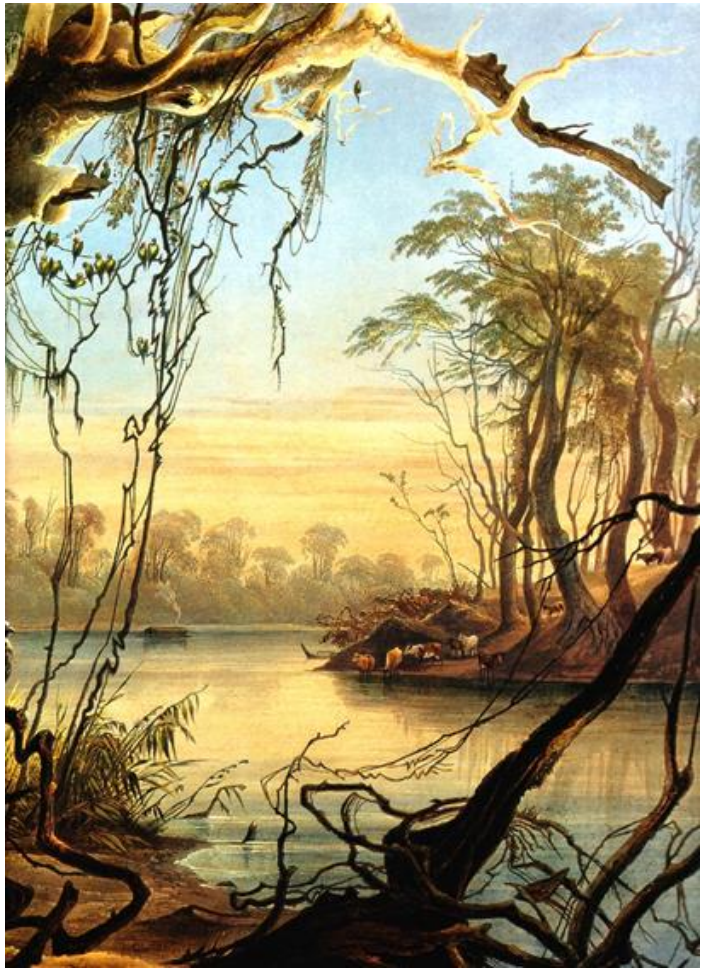
- Ryan Rokicki and the Trustees of the Working Men's Institute for access to original artwork and publications
- Rapp-Owen Granary Foundation
- Indiana State Museum and Historic Sites
- Archives and Special Collections at Purdue University
- Indiana Geological and Water Survey



Confluence of the Fox River and the Wabash River in Indiana. Watercolor by Karl Bodmer (1832).