

Anniversaries

Geology of New York 180 years ago



JAMES AND SARAH HALL THE GEOLOGY OF WESTERN NEW YORK (1843)

Joanne Bourgeois (USA)

First, a clarification: In the history of geology, there are two eminent James Halls--the Scottish Sir James Hall (1761–1832), and the younger, American James Hall (Jr., dropped after his father died) (1811–1898). We are writing here about this American James Hall (Fig. 1), one of the leading figures of 19th century North American geology and paleontology. In particular, his interest in Paleozoic stratigraphy and paleontology led him to studies across the United States and particularly across the region from Wisconsin and Iowa to New York State. James Hall served as New York's state paleontologist (with ups and downs) for much of his career; notably, from 1847 to 1894 he published 13 volumes on the state's paleontology.

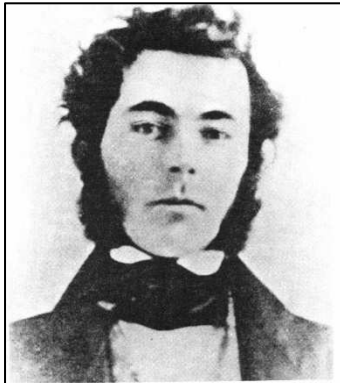


Fig. 1. James Hall at about 30 years of age (Aldrich and Leviton, 1987)

This INHIGEO vignette celebrates the anniversary of Hall's first major work—his 1843, 683-page geological and paleontological report on western New York. While highlighting James Hall's 1843 report here, it's important to credit the three other reports associated with this New York State survey, by Ebenezer Emmons (in 1842), Lardner Vanuxem (in 1842) and William W. Mather (in 1843) (Aldrich, 1974; Aldrich and Leviton, 1987). However, we can use the anniversary occasion to celebrate not only James Hall, but also his spouse and scientific illustrator Sarah Aikin Hall.

The New York State survey was not the first in the United States, but was one of the most thorough of the antebellum period. The first organized geological surveys in the U.S. were sponsored in the 1820s in the states of North and South Carolina. Such state surveys were focused on identifying natural resources of said state; in the following decades, there followed other state surveys, as well as boundary-crossing and territorial surveys sponsored by railroads and by the federal government. In this era, it was not uncommon for a geologist to participate in several different survey areas. This broader experience gave rise to larger-scale concepts such as Appalachian mountain structure by the Rogers brothers, William and Henry, and what came to be known as the geosynclinal theory of mountain building, a theory initiated by James Hall in the 1850s (Dott, 2006). But let's go back to the New York survey and Hall's early career and studies.

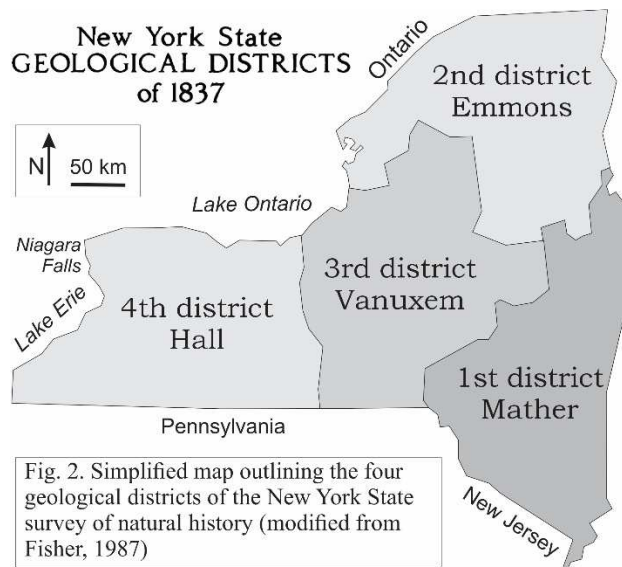


Fig. 2. Simplified map outlining the four geological districts of the New York State survey of natural history (modified from Fisher, 1987)

In 1836, with persuading from Rensselaer geologist Amos Eaton and prodding by former governor DeWitt Clinton (of Erie Canal fame), the New York State Legislature established a Geological and Natural History Survey. Advice came from Massachusetts State geologist Edward Hitchcock, who had recently completed a geological survey and map of his state (McMaster, 2020). The survey organized New York State into four districts, with Ebenezer Emmons in charge of the second district and his student James Hall assigned to assist. William Williams Mather (1804–1859), Timothy Abbott Conrad (1803–1877), and Lardner Vanuxem (1792–1848) were placed in charge of the First,

Third, and Fourth Districts, respectively (Fisher, 1987). However, Conrad was more interested in museum paleontology, and Vanuxem unhappy with the subdivisions, so there was a reorganization. Thus in 1837, 26-year-old James Hall was put in charge of the 4th district; this district included Niagara Falls (Fig. 2, Fig. 3)

James Hall had been born in 1811 near Boston, Massachusetts to English immigrants of modest means. In public school, he became interested in the study of nature. Through connections with Boston natural historians, Hall learned about and was attracted to study at Rensselaer Institute, a newly established, science-oriented college in Troy, New York. There, founding geology professors Amos Eaton (1776–1842) and Ebenezer Emmons (1799–1863) used new approaches to learning, with hands-on laboratory and field trip instruction. The financially strapped Hall walked the 200 miles to Troy to start his college studies. Earning geology degrees in 1832 and 1833, he held various jobs to support his studies followed by an assistantship at Rensselaer. During this period he started to collect and study the Paleozoic¹ fossils of New York State. Hall married Sarah Aikin in 1838; they had four children.



Fig. 3. “View of Niagara Falls from the Canada shore from a drawing by Mrs. Hall” (Hall, 1843, p. 80). Niagara Falls and the Niagara Group were parts of James Hall’s NY geological survey area.

We know much less about Sarah Aikin Hall (d. 1895) than about other spouse-illustrators such as Massachusetts’ Orra White Hitchcock (1796–1863) and England’s Mary Morland Buckland (1797–1857). Sarah Aikin was born in Troy, New York, home of Rensselaer Institute; her father was a lawyer. She and her sister, “Mrs. Brooks” both provided illustrations for James Hall’s earlier publications (Blum, 1987). Illustrations included both landscapes and fossils (Figs. 3 & 4). Many of them are not signed, but James Hall himself wrote in his introduction to the 1843 volume:

The drawings for illustrating the organic remains, have been chiefly made on wood by Mrs. Hall; and although I may be regarded as a partial judge, it is but justice to say that they are executed with fidelity and precision, and the figures will enable any person to identify the fossils of Western New-York.

¹ The term “Paleozoic” postdates Hall’s earliest studies.

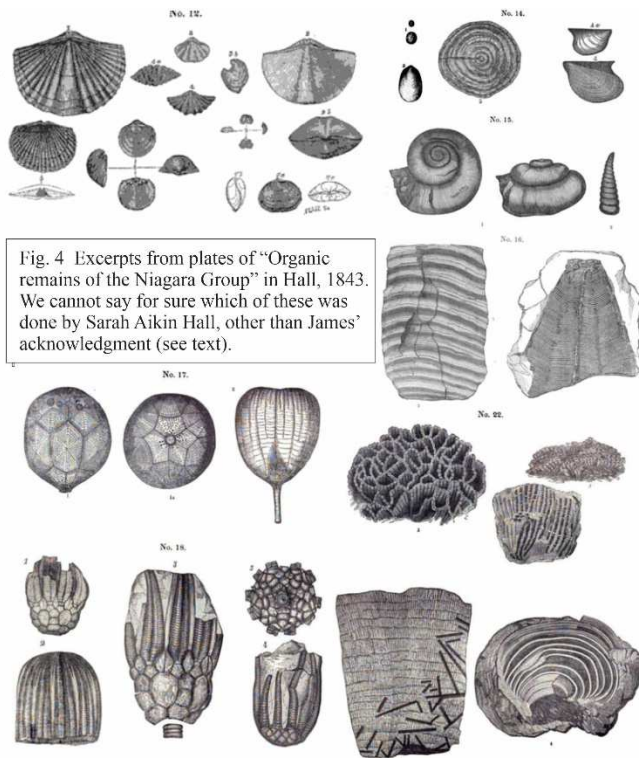


Fig. 4 Excerpts from plates of "Organic remains of the Niagara Group" in Hall, 1843. We cannot say for sure which of these was done by Sarah Aikin Hall, other than James' acknowledgment (see text).

Sarah Hall also pursued her own creative projects and published in 1849 (as Mrs. James Hall) a 144-page book of poetry, *Phantasia, and Other Poems*. Interestingly, she inscribed the book "to Lady Lyell . . . with sentiments of sincere regard and friendship." Charles and Mary Horner Lyell had visited the Halls on Lyell's first visit to North America in 1841–1842. While Sarah seems to have been charmed by Mary, James was not entirely pleased with Charles' pumping him (and others) for geologic information (Dott, 2006).

Young Hall's career blossomed quickly after the 1843 monograph on the fossils and stratigraphy of the Fourth District was published (Dott, 2006). While Hall had dutifully reported on the economic resources of his district, his passion was clearly stratigraphy, especially

biostratigraphy. The group of four New York State surveyors was stratigraphically formalizing, for example, what they called the "New York System" for sub- Old Red Sandstone strata, at a time when in Europe, formal subdivision of the Paleozoic (only itself named in 1838) was a hot topic. James Hall was amongst those who thought the U.S. should formalize its own stratigraphy. The New York reports aroused great interest in Europe, and James Hall would become eminent not only in the U.S. but also with time would gain significant status overseas.

Further Reading

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The Paleontological Research Institute website "Daring to Dig" features Sarah Aikin Hall here: <https://www.museumoftheearth.org/daring-to-dig/bio/hall>

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Author: Prof Joanne Bourgeois
Member (USA):
IUGS International Commission on the
History of Geological Sciences (INHIGEO)

Affiliation
Dept. of Earth & Space Sciences,
University of Washington – Seattle, USA
Email: jbougeo@uw.edu

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