INCREASE ALLEN LAPHAM: WISCONSIN'S FIRST GEOLOGIST

Paul G. Hayes[1]

Ever since my first landing in Wisconsin I have given more or less attention to its geology, improving every opportunity to examine the stone quarries, rock cliffs, &c; and have furnished several papers upon the subject. In 1855 and again in 1869, I published Geological Maps of the state.

–Increase A. Lapham, 1875

Wisconsin engineers claim Increase Allen Lapham (fig. 1) as their professional colleague. So do botanists, zoologists, and archaeologists. Surveyors insist that Lapham's central professional identity is of that calling. A distinguished meteorologist once expressed disappointment because a presentation about Lapham did not stress Lapham's contributions to meteorology, especially considering that Lapham had a substantial claim as a founder of the U.S. Weather Service.

Educators, geographers, limnologists, cartographers, and ecologists all can make a case that Lapham was among the earliest in Wisconsin to practice their disciplines. Lapham served all of these pursuits and therefore all of his collegial descendants can justifiably lay claim to him. His list of plants in the Milwaukee area was the first scientific paper from Wisconsin, his geography the first book published in Wisconsin; he was the first to survey and document the effigy mounds of Wisconsin, and his was the first locally produced geological map. Even his self-assessment was encompassing, according to his Milwaukee acquaintance, Samuel S. Sherman: "When asked by a gentleman well known in scientific circles, in what department of science he was laboring, he replied: 'I am studying Wisconsin' " (Sherman, 1876, p. 51).

Figure 1. *Increase A. Lapham.*

But for the purposes of the North-Central Section of The Geological Society of America, it is justifiable to assert that Lapham was the first important Wisconsin geologist. In fact, geologist may be the identity that Lapham may have taken for himself. It certainly was his first scientific interest, for, as he wrote later in an autobiographical sketch, as a boy of 14 when he was helping his brother Darius as rodman on the Erie Canal being built at Lockport, New York, "I found my first fossils and began my collection" (Quaife, 1917, p. 3). Also, geology was his last professional employment. Lapham served as Wisconsin state geologist for 22 months, leaving that position only months before his death. First and last, therefore, he was a geologist.

Increase Allen Lapham was born March 7, 1811, in Palmyra, New York, the fifth of thirteen children of a Quaker couple, Seneca and Rachel Lapham (Lapham, 1875?). Seneca was an engineering contractor who worked on canals, as did some of his sons—first the Schuykill Canal in Pennsylvania, then the Erie Canal at several places along its route, then the Welland and Miami, Ohio, Canals.

From childhood, Increase Lapham had an insatiable curiosity about the natural world, and he regretted throughout his life that he lacked money to study natural philosophy at Yale College (Thomas and Conner, 1973, p. 18 and 113). Even so, in 1828 and

[1]N63W5795 Columbia Road, Cedarburg, Wisconsin 53012

not yet 17 years old, he published his first scientific paper in Benjamin Silliman's *American Journal of Science*. He was living in Shippingsport, Kentucky, near Louisville, and working as a surveyor's rodman on a canal project when he wrote the paper entitled, "Louisville and Shippingsport Canal and Geology of the Vicinity" (Lapham, 1828, p. 65–69).

Later, he and his brother Darius cooperated on a paper published in 1832 in the same journal, called "Observations on the Primitive and Other Boulders of Ohio" (Lapham and Lapham, 1832, p. 300–303). The Lapham brothers had noticed smoothed boulders of greenstone embedded in clay in the banks of canals near Louisville. They surmised correctly that the boulders had been transported prehistorically from the north, probably from Canada, but they did not know how. They ascribed the cause to a great flood. (Within a decade a theory of continental glaciation would be advanced that would explain how greenstone boulders came to Ohio. Lapham would struggle with this theory for years, although he accepted it in full by the time of his death.) Lapham spent the years 1830 through mid-1836 in Ohio, first in Portsmouth, then in Columbus, where he was for three of those years Secretary of the Ohio Board of Canal Commissioners (Hawks, 1960, p. 17–36). While in Ohio, Lapham was to meet Byron Kilbourn, a young engineer working on the Ohio canals, who soon was to move to Wisconsin territory, where he founded Kilbourntown, one of the three villages that later consolidated as the city of Milwaukee. In 1836, at Kilbourn's invitation, Lapham moved to Milwaukee to work as surveyor and, shortly thereafter, chief engineer of Kilbourn's Milwaukee and Rock River Canal Co. (Hawks, 1960, p. 34).

Lapham arrived at the village that was to become Milwaukee on July 1, 1836, after a 10-day trip from Detroit on the steamboat *New York,* only three days before a Congressional act separated the Territory of Wisconsin from the Territory of Michigan, a move preparatory to conferring statehood upon Michigan. Also, his arrival came only four years after the Black Hawk War ended, an event that effectively opened Wisconsin to Yankee and European settlement. Lapham arrived at a town of 50 houses on mud streets on which Indians still were exchanging furs for trade goods. New houses were encroaching upon Menomonee and Potawotomi wigwams. There were 2,802 persons in Milwaukee County, which then extended all the way to Dodge County and included the present Waukesha County. The village on Lake Michigan was developing as a Lake Michigan port from which were shipped lead and copper from the southwestern Wisconsin mines and furs from the north.

Immediately, Lapham began noticing the natural history of the place, taking long walks on the Lake Michigan shore. In 1838, he published some results of his early observations, "A Catalogue of Plants Found in the Vicinity of Milwaukee," printed at the Advertiser, the first newspaper in Milwaukee. The late Milo M. Quaife of the State Historical Society of Wisconsin considered this paper to be the first scholarly publication in Wisconsin and perhaps the first west of the Great Lakes, at least north of St. Louis (Quaife, 1917, p. 7).

While Lapham's paper was about biology, Lapham certainly would have noticed the bedrock of Milwaukee and its fossils. He recognized that the bedrock here bore the same fossils that he had begun collecting as a boy of 14 in Lockport, and so he realized that the rock here was "Niagara limestone," as it was then called, an important insight. Most importantly, it meant that it would be a waste of time to search the area for fossil fuels, as the Carboniferous Period came much later than the Niagara formation. As he was to write: "It appears then from these facts that we may not hope to add coal to the other sources of mineral wealth with which a kind Providence has so abundantly supplied us" (Lapham, 1846, p. 62).

Lapham was an indefatigable collector of fossils, minerals, plants, and archaeological artifacts. In 1846, he sent a collection of Milwaukee area fossils to paleontologist James Hall of New York. With Hall's help, Lapham determined the correct stratigraphic position for eastern Wisconsin's bedrock, correlating it with New York's. In the 1850s, he unsuccessfully tried to enlist Hall as a collaborator in publishing a full study of American paleontology. After Lapham's death in 1875, the bulk of his fossil and mineral collection was sold to the University of Wisconsin, only to be destroyed when the university's Science Hall burned to the ground in 1884 (Mikulic, 1983. p. 8–9).

The canal for which development Lapham was invited to Milwaukee was abandoned a couple of years after his arrival when everyone realized railroads would do the job faster and cheaper. Only a single mile of canal was dug, a southwest-trending spur from the Milwaukee River just south of North Avenue. Its water powered a mill and provided water

for tanneries, so the project was not entirely a commercial loss. However, with the canal project abandoned, Lapham had to find other ways to make his living. He plunged into a scientific study of his place, and in his subsequent travels throughout Wisconsin, he made copious notes about the state's geology. In 1840, he shared his sense of joy of discovery in a lecture to the Milwaukee Lyceum (of which he was a founder) about the moral virtue and esthetic charms of studying nature:

> *There is not life so long as to be in any danger of exhausting them. There is no condition of life debarred from these pleasures; all may study nature—the poor as well as the rich—old—young—male and female—the ignorant, the learned—all may enjoy the pure and simple pleasures they afford (Lapham, 1840).*

He wrote a book about Wisconsin, the first book published in Wisconsin, in 1844, entitled *A Geographic and Topographical Description of Wisconsin, with Brief Sketches of its History, Geology, Mineralogy, Natural History, Population, Soil, Productions, Government, Antiquities, &c., &c*. He intended it to be sold in the East to attract new Milwaukee settlers. It reveals the breadth of Lapham's interests and the extent to which he had satisfied them in less than a decade. In this book and in a second edition published in 1846, Lapham divided Wisconsin into four zones based on geological considerations: the north, underlain with "primitive" rocks such as granite, a sandstone-based western district, the lead and zinc mineral district of the southwest, and the "limestone district" of eastern Wisconsin.

He had already prowled the Kettle Moraine ridge that extends from near Manitowoc to near Janesville, passing west of Milwaukee, and he puzzled over this tortured landscape of kettles, mounds, and serpentine hills. He attributed the drift of which the ridges were composed to diluvial origin and the kettles to the "easily decomposed" limestone bedrock (Lapham, 1846, p. 13–14). He also speculated that Lake Michigan once must have had a southern outlet down the Illinois River to the Mississippi and that there must have been a barrier across the straits of Mackinac that would have prevented its drainage to the northeast (Lapham, 1846, pp. 133–134).

In these observations, as in the case of the Ohio greenstone erratics, he was struggling for answers. Indeed, there had been a barrier—one of ice—across northern Lake Michigan and the lake in fact had drained southward. Also, the Kettle Moraine landscape was formed by watery violence as two lobes of the great Wisconsin glacier thawed. But the theory of continental glaciation was just then being constructed, arising from the observations in Europe of young Louis Agassiz, who was to come to the United States in 1846, two years after Lapham's first edition was published. Lapham and Agassiz were to meet and to correspond, but years would pass before Lapham fully accepted the idea of a continental ice sheet. For instance, on February 11, 1848, in a lecture on the geology of Wisconsin to the students of Milwaukee High School at the Milwaukee Unitarian Church, Lapham mentioned Agassiz' theory. However, he added, "It is difficult to conceive of glaciers having sufficient extent to scatter fragments of rocks over the whole of the country from the Atlantic to the Pacific Oceans and move large blocks of granite from Lake Superior to the southern boundary of Wisconsin" (Lapham, 1848).

In 1849, Charles Whittlesey, head of a team of geologists working under the direction of David Dale Owen, chief U.S. geologist, surveyed the area of Wisconsin bordering on Lake Superior as well as areas of eastern Wisconsin. For the Iron Ridge area of Dodge County as well as the bedrock from Milwaukee to Madison, Whittlesey relied heavily on Lapham's findings, which were extensively quoted in Owen's (1852) *Geological Survey of Wisconsin, Iowa and Minnesota*. Whittlesey wrote that Lapham's observations were at the time, "so far as I know, the only authority on the rocks south of Lake Winnebago and east of the Rock River" (Owen, 1852, p. 448–451).

In 1855, Lapham finished a geologic map of Wisconsin, the first of two that he would complete during his life, superimposing his geological observations upon a geographical map published by the J.H. Colton Co., a publisher of atlases in New York. Intended for use in schools and to encourage investment in Wisconsin iron, lead, copper, and zinc mining industries, copies of the maps were distributed widely (Edmonds, 1985, p. 174–177).

In 1858, Lapham toured and later reported on the Penokee Iron Range of northern Wisconsin and the copper mining district of Upper Michigan. During this trip, he surely witnessed the extent of the great

cutover of the northern forests, which may have given rise to insights that led to one of his most important contributions. In 1867, he led a three-man commission that issued a "Report on the disastrous effects of the destruction of forest trees now going on so rapidly in the state of Wisconsin." A full century before the Arab Oil Embargo of 1973, Lapham wrote:

> *On this question of fuel, we are to calculate by ages of the Earth, and not by the life of man. Fuel will be required so long as man shall inherit the Earth, for his comfort and for his existence. Without fuel, humanity would cease to exist. Viewed in this light, the deposits laid up during uncounted periods of time…in the shape of coal, petroleum and peat, and which man is now drawing out and using for fuel or wasting, must be exhausted (Lapham and others, 1867, p. 31).*

Here was twentieth-century thinking from a nineteenth-century mind. Two geological insights stand out, that Earth's age is vast and that the planet's store of fossil fuels is finite, thus exhaustible. Nonetheless, here they are in a pamphlet written and printed in Wisconsin not 20 years after Wisconsin became a state and during the most profligate human-caused environmental disaster wreaked upon Wisconsin in the nineteenth century, the cutting of the ancient north woods within half a century.

While still in Ohio, Lapham had played a role as a young man in lobbying the Ohio legislature to establish an Ohio Geological Survey, a measure that succeeded shortly before Lapham left for Wisconsin (Hawks, p. 32–33). As early as 1850, Lapham was promoting a geological survey for Wisconsin. The legislature responded in 1853 by appropriating $2,500 for the project and naming Edward A. Daniels as first state geologist, to be succeeded in 1854 by James Percival, who died only months later. Lapham, although busy with other projects, took time out in the summer of 1856 to complete Percival's report, commenting in doing so that much of Percival's work was based on his own.

The legislature made another try at a joint geological and agricultural survey in 1857, appropriating $6,000 a year for six years and naming Daniels, paleontologist James Hall, and Ezra S. Carr, professor of chemistry and natural history at the University of Wisconsin, as its three commissioners. During the next five years, which were marked by feuding among the principals, Lapham sought vainly to be employed by the survey. The Civil War intervened and Daniels joined the army. In February 1962, the legislature suspended the survey (Hawks, p. 226–235).

In 1873, partly as a result of the efforts of the Wisconsin Academy of Sciences, Arts and Letters, of which Lapham had been a founder three years earlier, the Wisconsin Legislature approved a measure calling for a full geological survey of Wisconsin. On April 10 of that year, Governor Cadwallader C. Washburn named Lapham state geologist (Washburn, 1873). At last, Lapham was in position to conduct a study he long had dreamed of and he could do it on a regular salary and with sufficient staff and support.

He hired two young geologists, Thomas Chrowder Chamberlin and R.D. Irving, and Moses M. Strong, Jr., a mining engineer, as his three chief assistants and set to work. Irving undertook to describe the iron ore deposits, the other strata, and the glacial remains in Douglas and Ashland Counties. Chamberlin was to study an area bounded on the east by the Niagara dolomite, on the south by Illinois, and by the crystalline rocks on the north. Strong was to survey the lead and zinc mining region of southwestern Wisconsin. Each spent the summer in the field, returning in the fall to compile his data and write reports.

By now, Lapham accepted the concept of continental glaciation. His 1873 "Report of Progress and Results," published posthumously in the four-volume *Geology of Wisconsin,* contained a section called "Relation of the Wisconsin Geological Survey to Agriculture." In it, Lapham referred to "the drift phenomena, gleaned from an extended and careful study of the loose materials covering and concealing the more solid rocks, left here by the glaciers of the ice period" (Chamberlin and others, 1877, p. 41). Agassiz's theory at last had persuaded Lapham, probably through the influence of Chamberlin, who fleshed out the theory and provided a sophisticated interpretation of glacial action as the chief sculptor of the Wisconsin landscape.

Lapham remained in charge of the Survey through a second season and reported again on progress in January 1875. A month later, disaster struck. Governor Washburn, a Republican, had been defeated for reelection by William R. Taylor, a Democrat, who paid off a political debt by appointing O.W. Wight, a man without qualifications in geology, as

state geologist. Lapham legally could be removed, it turned out, because the state senate had neglected to confirm his appointment in 1873.

The scientific community was outraged, seemingly more so even than Lapham himself. He returned to his children's farm on the south shore of Oconomowoc Lake and resumed his quiet studies of natural history. "My time is divided between Milwaukee and Oconomowoc. I find it very pleasant to be 'on the farm,' among the lakes and drives…," he wrote to his brother (Lapham, 1875). On September 14, 1875, he finished a paper called "Oconomowoc and Other Small Lakes of Wisconsin, Considered with Reference to Their Capacity for Fish-Production," later published in the annual *Transactions of the Wisconsin Academy of Sciences, Arts and Letters* (Lapham, p. 30–36).

That afternoon, he walked down to the shore of Oconomowoc Lake and set off in a rowboat to do some fishing. At 6:30 p.m., Lapham, dead of a stroke, was found lying in the bottom of the boat just offshore. Coming so soon after his dismissal, his death rekindled public dismay over the way politicians had treated Wisconsin's first genuine scientist.

But his old friend and lifelong correspondent, the eminent botanist Asa Gray of Harvard College, cast Lapham's life appropriately. Calling Lapham "a modest retiring, industrious, excellent man," Gray concluded, "I have the idea that he had a happy, as well as a useful and honored life. What more could be asked?" (Sherman, 1876).

REFERENCES

Chamberlin, T.C., Irving. C.D., and Strong, Moses, 1877, *Geology of Wisconsin,* v. 2: Madison, Wisconsin, Commissioners of Public Printing, p. 45–66.

Edmonds, Michael, 1985, Increase Lapham and the mapping of Wisconsin: *Wisconsin Magazine of History,* v. 68, no. 2, p. 174–177.

Hawks, Graham, 1960, Increase Allen Lapham, Wisconsin's First Scientist: Unpublished thesis, University of Wisconsin.

Lapham, I.A., 1828, Notice of the Louisville and Shippingsport Canal and the geology of the vicinity: *American Journal of Science,* v. 14, p. 65–69.

—— 1840, Unpublished manuscript of a lecture delivered at the Jan. 23, 1840, meeting of the Milwaukee Lyceum: State Historical Society of Wisconsin, Lapham papers.

—— 1846, *Wisconsin: Its Geography and Topography, History, Geology and Mineralogy,* second edition: Milwaukee, Wis., I.A. Hopkins.

—— 1848, Unpublished manuscript of a lecture delivered Feb. 11, 1848: State Historical Society of Wisconsin, Lapham papers.

—— 1875?, Unpublished autobiographical sketch: State Historical Society of Wisconsin, Lapham papers.

—— 1876, Oconomowoc Lake and other small lakes of Wisconsin, considered with reference to their capacity for fish-production: *Transactions of the Wisconsin Academy of Sciences, Arts and Letters,* v. 3, p. 31–36.

Lapham, I.A., Knapp, J.G. and Crocker, H., 1867, Report on the disastrous effects of the destruction of forest trees now going on so rapidly in the state of Wisconsin: Madison, Wisconsin, Atwood & Rublee, p. 31. (Facsimile edition 1967, Menasha, Wisconsin, George Banta Co.)

Lapham, Darius, and Lapham, I.A. 1832, Observations on the primitive and other boulders of Ohio: *American Journal of Science,* v. 22, n. 2, p. 300–303.

Mikulic, D.G., 1983, Milwaukee's gentlemen paleontologists: *Transactions of the Wisconsin Academy of Sciences, Arts and Letters,* v. 71, p. 5–20.

Owen, D.D., 1852, *Geological Survey of Wisconsin, Iowa, and Minnesota:* Philadelphia, Pennsylvania, Lippincott, Grambo & Co., p. 448–452.

Quaife, Milo, 1917, Increase Allen Lapham, First scholar of Wisconsin: *Wisconsin Magazine of History,* v. I, no. 1, p. 1–13.

Sherman, Samuel, 1876, Increase Allen Lapham, LL.D., A biographical sketch read before the Old Settlers' Club of Milwaukee, Dec. 11, 1875: Milwaukee, Wisconsin, the Milwaukee News Co.

Thomas, Samuel, and Conner, Eugene [eds.], 1973, *The Journals of Increase Allen Lapham for 1827–1830:* Louisville, Kentucky, G.R. Clark Press, Inc.

Washburn, Cadwallader, 1873, Unpublished letter to I.A. Lapham, April 10: State Historical Society of Wisconsin, Lapham Papers.