

Utica Lime

*A History of the Utica Lime Industry,
Utica Township, Clark County, Indiana*



THE LIME INDUSTRY IN INDIANA

Vast beds of limestone are located throughout Indiana, from the northwest corner of the state toward the Ohio border and south to the Ohio River. An abundance of quality limestone and an improving transportation network made lime burning a popular and profitable business. By the 1850s, lime production had developed into a significant industry. So common was the practice of making lime, that by this time at least 40 counties in Indiana contained operating kilns (Ault et al. 1974:12).



Chamber opening and limestone wall of a continuous-burning vertical kiln.

CLARK COUNTY COMPARATIVE LIME PRODUCTION

In Clark County, Devonian- and Silurian-age limestone formed 359 to 444 million years ago served as an abundant and accessible source for making lime. Clark County was home to the largest concentration of lime producers working with these deposits in southeastern Indiana, where production began as early as 1818 (Ault et al. 1974:29).

HISTORIC USES AND THE IMPORTANCE OF LIME

Lime, also known as “quicklime,” has been used in a wide variety of applications throughout history. During the first half of the nineteenth century, lime was used primarily by farmers to condition their fields. More specifically, farmers used lime to reduce the pH balance in soils that were too acidic.

In addition to farming, lime was a key ingredient in natural cement and plaster, making it an important building material. You may be surprised to learn that lime was used for the production of dyes, rubber, medicines, explosives, petroleum, glass, abrasives, polishes, ceramics, bleaching powder, ammonia, insecticides, paper, paints, lubricants, candles, and many other products.

METHOD OF LIME PRODUCTION

Lime is commonly produced by the heating of natural limestone in a process known as “calcining.” To calcine limestone, the raw material must be heated to temperatures ranging from 1,350° F to 1,650° F, a temperature hot enough to melt a silver coin. During this process, the heat drives off carbon dioxide (CO₂), leaving calcium oxide (CaO) and small amounts of various impurities.

“LOG HEAP” METHOD

The most common technique for calcining lime during the period of early Indiana settlement was the “log heap” method. Log heaps consisted of nothing more than a bed of fresh-cut logs upon which a heap of brush was piled.



Example of log heap. Courtesy of Colonial Williamsburg.

Chunks of limestone were added to the top of the log heap, which was left to dry for as long as six months. Once the pile was dry, lime-makers set it on fire. The heap burned for approximately 48 hours, reducing the limestone to quicklime, which was recovered after the heap cooled.

“POT KILN” OR “GROUND HOG” KILN

By the 1830s, most lime producers were using “pot kilns,” also called “ground hog” kilns. These devices required construction of a square or cylindrical-shaped, stone-lined chamber on the side of a hill. An arch of limestone was made near the lower section of the kiln, and additional limestone was stacked atop the arch until stone protruded from the top of the kiln. Combustible material was placed under the arch of stone and set ablaze; the process required three to four days of burning to produce the lime. By the 1870s, these intermittent kilns had been largely replaced by “perpetual” or “continuous” kilns.



Local example of a pot kiln.

“PERPETUAL” OR “CONTINUOUS” KILNS

Continuous-burning kilns were commonly of the vertical type. They contain a vertical, cylindrical shaft, typically 6 to 10 feet in diameter, and between 40 and 50 feet in height. Limestone and fuel, such as wood or coal, are loaded into the cylinder in layers. The product is removed from the bottom, and new stone and fuel are loaded from the top. Because the limestone and fuel are in alternating layers, the quicklime is contaminated by fuel ash, which must be separated from the lime. Yet, by eliminating the need to cool and reload the kiln, continuous kilns allowed lime manufacturers to greatly increase production.

EARLY PERIOD OF LIME PRODUCTION IN UTICA TOWNSHIP

By 1826, Samuel Starkweather had built a pot kiln at Utica. Allen Lapham noted on July 6, 1828, the village of Utica contained about 40–50 houses, and the business done there was “very little being principally what arises from the manufactory of Quicklime, and brick, and of supplying Steam Boats with wood” (Thomas and Conner 1973:52–53).

1840s

Annual Census data from the 1840s is available for five lime producers in Utica Township (US Census 1850). The producers included E.J. Higrat, Allen Summers, James Morrow, Napoleon Wood, and Robinson & Pang. If data for one year is aggregated for the five producers, the results are: purchased 2,419 perches of limestone rock (a perch of rock is a little less than a cubic yard); burned 1,230 cords of wood, which cost an average of \$1.50 per cord; produced 19,000 barrels of lime valued at \$9,273; and five owners and nine male hands worked the five lime operations.

While the annual values of lime produced in one year during the 1840s may seem to be rather minimal in today’s dollars, the total value for the above five lime producers is equivalent to approximately \$5 million in 2010.

1850

Utica native Napoleon Bonaparte Wood made significant strides in lime manufacture around 1850 when he improved the ground hog kiln by building a temporary wall in front of the furnace. Wood’s modified ground hog kilns improved fuel efficiency and made his operation more profitable.

Perhaps as a result of these efforts, the first large shipment of lime left Utica for New Orleans at this time. Consisting of 5,000 barrels, the shipment marked a significant increase in the export of lime from Utica (Baird 1909:400; Kramer 2007:92).



Local example of a continuous-burning vertical shaft type kiln.

1860s

Annual lime production at Utica was now measured in the tens of thousands of barrels. As noted by Richard Owen in his 1862, *Report of a Geological Reconnaissance of Indiana*, “large quantities of lime are burned from Devonian rock, in beds about twenty feet thick, with fossils only in the lower layers . . . As nearly as we could ascertain they ship annually from this place 100,000 barrels of excellent white lime” (Owen 1862:106).

Among the leaders responsible for the rise of Utica’s lime industry in the late 1860s was Moses H. Tyler, owner of M.H. Tyler & Company. Like most lime manufacturers, Tyler & Company leased land for the purpose of making lime. His lease with Mitchell P. Howes and his wife, Eliza, was signed on July 31, 1868. The lease language is typical for all such leases agreed to at Utica:

All or so much ground as may be required, by such M.H. Tyler & Company for the erection as of as many patent lime kilns as they may build for their benefit, the lime of said lands and lime quarries commencing at the terminus of the quarry known and designated as the bridge Company Quarries, on Coal Kilns point. All the cliff south of said quarry to his south line adjoining the town of Utica. Also, the quarries that extend up the ravine in the orchard in front of said cliff as far as quarries extend (Clark County 1868b:547).

The lease also stipulated that the Howes were entitled to 1 cent per bushel for all lime burned.

About the same time that Tyler organized his company, the Utica Lime Company began production. With capital stock of \$15,000, and with John T. Cooper as president, the company was organized for the “manufacture and sale of lime, and the purchase or lease of ground for that purpose, and the manufacture of barrels to hold said lime, and the purchase of boats to ship the same in” (Hockensmith 2009:68). Like Tyler, the company leased land from the Howes, but they were to receive 2 ½ cents per barrel of lime, paid semiannually.

Prussian-born Henry C. Emerke was another notable Utica lime producer. By 1857, he and business partner Mechac James were shipping lime to Louisville. On August 31, 1868, Emerke signed a lease agreement with Nicholas Lentz to quarry rock and build kilns for burning lime. Emerke agreed to pay Lentz one-half cent per bushel for all lime burned in his kilns.

1870s

In the spring of 1871, the Utica Lime Company renewed its lease with the Howes. However, it likely would have caught your eye to note a new stipulation in the lease: the company would pay the Howes in royalties equivalent to 10,000 barrels of lime, regardless of whether or not that amount was manufactured (Clark County 1871:229–230; Hockensmith 2009:68).

Two years later, the company transferred its lease with the Howes to the Union Lime & Cement Company, whose ownership was substantially the same as the Utica Lime Company. While the new company acquired the lease agreement at a cost of \$21,000, it continued to operate under the original name.

By the mid-1870s, James Breckenridge Speed, president of the Louisville Cement Company, was the biggest name in the local lime industry. Speed's company first acquired a foothold at Utica through the purchase of the M.H. Tyler and H.C. Emerke companies. Speed's well-financed company included as directors James W. Henning, James B. Speed, James H. Rhorer, and Milton M. Rhorer (Kramer 2007:185).



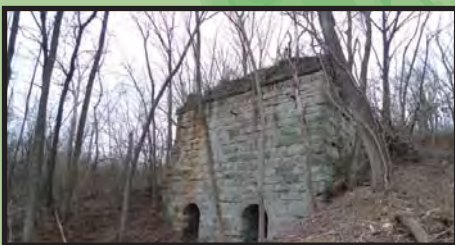
Arches to Moses H. Tyler & Company, Kiln No.1.

As one journalist noted in June 1872 “[t]he limeries are running at full force at this place now. The Louisville Cement Company is making three hundred and twenty barrels per day, and working twenty-six hands. The Utica Lime Company, Messrs Bellknap & Co., are also working a large force of hands” (*National Democrat* 1872:5; Hockensmith 2009:94).

Speed's lime operation at Utica, directed from Jeffersonville, Indiana, was merely one component of a large-scale enterprise. In Utica, the business operated a pair of coal-fired kilns and a pair of wood-fired kilns with a combined capacity of 520 barrels per day. As of late 1881, the company's Utica operation employed about 35 hands (Baird 1909:400; Kramer 2007:18).

THE PEAK AND DECLINE OF THE UTICA LIME INDUSTRY

Utica's lime industry boomed through the early 1880s. However, in 1885, Speed's company relocated its main lime operations to Crawford County, Indiana. He continued to burn lime at Utica, but the operation there appears to have dwindled. Concurrently, all lime operations at Utica declined. On March 31, 1892, *The Evening News* reported that “the Utica Lime Company has shut down their kilns indefinitely” (*The Evening News* 1892; Hockensmith 2009:61).



Moses H. Tyler & Company Kiln No. 2.

Henry C. Emerke's obituary in Jeffersonville's *The Evening News*, July 1899, stated that he was known as “a pioneer lime burner of Utica,” who “lived to see a small industry grow to large proportions and then gradually drop back to almost a standstill”. Following a complete conversion to Portland cement in 1906, Speed abandoned the Utica works entirely.

Utica's proximity to the Ohio River had much to do with the prosperity of its lime industry. However, the river that was once instrumental to Utica's lime industry became a limiting factor, as railroads came to dominate the transportation industry. Given the extreme bulk of lime and its relatively low value per barrel, wagon shipments were cost-prohibitive. Lime operations with ready access to a railroad, which Utica did not have, attained a significant economic advantage.

Competition between independent lime manufacturers and their larger counterparts was another factor in the decline. The formation of the Utica Lime Manufacturing Company on March 11, 1867, supports this theory. Corporation articles indicate that there was a desire to control production and discourage additional lime burners from entering the market. One of the articles aimed to hinder the operations of non-member companies by denying them access to transportation.

Consolidation was also a step in the industry's evolution. The Louisville Cement Company was the one business with enough capital to reduce or eliminate its competition. Any remaining independent companies were left to compete with a well-financed corporation whose primary purpose was the large-scale production of natural and hydraulic cements.

QUARRIES

In the Utica area, quarries were actually exposed limestone bluffs. Due to the immovable nature of limestone bluffs, and the weight and bulk of the mined limestone, Utica kilns were naturally located near the quarries.

During much of the nineteenth century, quarry work was performed by hand using basic tools, such as hand drills, hammers, picks, shovels, wedges, and pry bars. Explosives, such as black powder and dynamite, helped reduce large sections of limestone to manageable sizes.

Drilling typically was accomplished by either the "single jack" or "double jack" method. Single jack drilling involved a single worker who held a steel drill bit against the rock face with one hand while wielding a 3- or 4-pound hammer with the other.

Double jack drilling required one worker to hold the bit and one or two additional workers to strike the bit with long-handled sledge hammers. By methodically turning the bit while striking the head of the bit with a hammer, workers drilled a hole into the rock face. Workers packed the holes with explosives; the blasts created manageable piles of rubble that were further reduced in size by additional charges, or with sledge hammers and steel wedges.

By the late nineteenth century, the more modern, larger lime quarries typically employed steam or compressed air drills. The quarries of Utica remain largely consistent with the size and configuration that they assumed during their last days of operation. Significant limestone quarrying for the purpose of burning lime occurred at these sites from 1826, the time when Starkweather's early pot kiln was constructed, to 1906, when Speed closed the cement company's operation.



Project crew measuring the height of a limestone quarry associated with the Utica Lime Kilns.

IDENTIFIED LOCAL KILNS

MITCHELL P. HOWES' POT KILN

This pot kiln associated with Mitchell P. Howes, also commonly referred to as a groundhog kiln, was built ca. 1850. The kiln opens onto a plot of level ground that has been cleared for development. A quarry that was most likely associated with this kiln is approximately 14 to 16 feet in height. Drill holes are visible in the face of the quarry at three different levels. It is not known if this quarry was used strictly for quicklime, or if it may have been used later to produce dimension stone (Hockensmith 2009:91).



Remaining arch of Howes' ca. 1850 groundhog kiln.

MOSES H. TYLER & COMPANY KILNS No. 1 AND No. 2

Moses H. Tyler & Company kilns No.1 and No.2 are large, double-chambered vertical draw kilns built from quarried blocks of limestone constructed about 1868 to 1869. Kiln No.2 is a three-sided structure built into the side of an embankment, which helped facilitate the loading of limestone into the kiln's combustion chambers. Built of large, dry-laid limestone blocks, the kiln measures approximately 44 feet across the base of the façade, and extends to a maximum height of 38 feet. The side walls, which extend into the steep slope of the bluff, measure roughly 42 feet from the top of the façade to the rear of the kiln (Hockensmith 2009:103–104). Kiln No.1 is very similar in size and construction.

The quarry that supplied stone to Kiln No.1 varies in height from as little as 9 feet to as much as 45 feet. Drill holes are evident at all levels of the face. It is possible that the large quarry used by Kiln No.1 also contributed to the operation of Kiln No.2. Given the size of the larger quarry, it seems unlikely that it supplied only a single kiln.

SAMUEL STARKWEATHER'S LIME KILN AND QUARRY

All that survives of Starkweather's pot kiln is part of the lower portion of the structure, which includes the arched opening for the draw-off. The upper portion of the kiln, which would have extended for an unknown height above the arch, collapsed some time ago. The quarry for Starkweather's kiln was located just above the kiln. Using little more than gravity and some type of chute system, workers could have pried stone loose from the bluff and moved it downhill to the kiln.

PROTECTING ARCHAEOLOGICAL RESOURCES

Archaeological sites are protected through the Historic Preservation and Archeology Law (IC 14-21-1), other associated state laws, and the National Historic Preservation Act. Under IC 14-21-1, a person who disturbs the ground for the purpose of discovering, uncovering, or moving artifacts or features dating before December 31, 1870, must do so in accordance with a plan approved by the Indiana Department of Natural Resources.

Indiana's Division of Historic Preservation and Archaeology (DHPA), Department of Natural Resources, has the primary responsibility to review, evaluate, and comment on projects that may have an adverse affect on archaeological resources and historic properties. DHPA's Archaeology Section is responsible for prehistoric and historic archaeological sites and the valuable information that they contain. The DHPA is the central repository of archaeological records and reports for the state. For more information on IC-41-21-1 see the Question and Answer sheet at: http://www.in.gov/dnr/historic/files/hp-archaeolawqa_8-08.pdf.

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Vegetation encroaching on the archaeological remains of a local kiln.

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SOURCES FOR MORE INFORMATION ON UTICA LIME

Indiana Department of Natural Resources, Division of Historic Preservation & Archaeology: www.in.gov/dnr/historic
Louisville-Southern Indiana Ohio River Bridges Project: <http://kyinbridges.com>