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 considered. Lime operations with wood were able to use railroads, which Utica did not have, to attain 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. Company officials indicated 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 new-member companies by denying them access to transportation.

Competition was also a sign in the industry's evolution. The limestone 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.

Utica was the center of the lime extraction industry. Until the mid-1830s, there was a small kiln at Utica. This post was used to extract limestone. The kiln was later replaced by a larger kiln.

During much of the nineteenth century, quarry work was performed by hand using basic tools, such as hand drills, hammers, picks, shovels, 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 for 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 sledges. By manually moving the bit while striking the head of the bit with a hammer, workers drilled holes into the rock face. Workers packed the holes with gunpowder, the lime created two-moldable tubes of powder that were further reduced in size by additional charges, or with sludge hammers and steel wedges.

By the late nineteenth century, the most modern, large-scale systems typically employed steam or compressed air drills. The quarries of Utica remained largely consistent with the size and configuration that they assumed during their last operations. Significantly limonite quarries were necessary for the purpose of insuring that the lime production was consistent. Some of these sites from 1825, when Stecklewater's early pot kiln was constructed, to 1890, when Speed closed the company's operation.

Utica During the Civil War: A History of the Utica Lime Industry, Utica Township, Clark County, Indiana

ACKNOWLEDGMENTS
This pamphlet is compiled by the Ohio River Valley Field Office of Archaeology and Historic Preservation (ORVFAHP), Indiana Department of Natural Resources (INDNR) to assist with Section 106 of the National Historic Preservation Act through a First Amendment to Memorandum of Agreement. The agreement is between the Indiana Division of Historic Preservation & Archaeology, the ORVFAHP, and INDNR and the Lewis-Ellis-DeSoto Orleans River Bridges Project (Bridge Project). Through extensive literature review, on-site field investigations, and professional identification and evaluation, the author gathered knowledge and awareness of the Utica lime industry, lime kilns, quarries, and Utica's local history that made it possible. The purpose of this pamphlet is to share what was learned during the Bridge Project. Community Transportation Solutions (Gray & Pope) conducted the research, prepared the content, and designed the pamphlet layout.

SOURCES FOR MORE INFORMATION ON UTICA LIME
Indiana Department of Natural Resources, Division of Historic Preservation & Archaeology: www.in.gov/history/indiana-statewide-indiana-ohio-river-bridges-project.html

REFERENCES
Lime is commonly produced by the heating of natural limestone in a process known as “quickening.” The term “limestone” is derived from the Latin word “lithos,” meaning “stone.” Lime is often referred to as “quicklime” or “lime.”

**CLARK COUNTY COALITION PRODUCTION LIFE PERIOD**

In Clark County, Devonian- and Silurian-age limestone beds are located throughout the state, from the northwest corner of the state toward the Ohio border and south to the Ohio River. An abundance of quality limestone deposits was mined in Clark County by 1818 (Ault et al. 1974:29). The producers included E.J. Higrat, Allen Sumers, James Morrow, and Richard H. Ewing. Their lime was used for a variety of purposes, including the production of building materials, agricultural fertilizers, and various other industrial uses.

**THE LIME INDUSTRY IN INDIANA**

Indiana has a long history of lime production, dating back to the early 1800s. The state's rich limestone deposits have made it a key player in the lime industry for over 200 years. Today, Indiana is one of the leading producers of lime in the United States, with a diverse range of applications.

**LIME IN INDUSTRY**

Lime is used in a variety of industries, including construction, agriculture, and manufacturing. It is an important building material and is used in the production of concrete, mortar, and plaster. In agriculture, lime is used to neutralize soil acidity, improving soil structure and fertility. In manufacturing, lime is used to produce a variety of products, including paper, glass, and rubber.

**HISTORY AND IMPORTANCE OF LIME**

Lime is a crucial component of the building industry, playing a vital role in the construction of roads, bridges, and buildings. It is also used in the manufacture of plaster, cement, and glass. In addition, lime is a key ingredient in the production of fertilizers, which are essential for agriculture.

**LIME PRODUCTION IN THE NORTHWESTERN UNITED STATES**

Lime production in the northwestern United States is a significant industry, with production centered in states such as Indiana and Ohio. In Indiana, the state's rich limestone deposits have made it a key player in the lime industry for over 200 years. Today, Indiana is one of the leading producers of lime in the United States, with a diverse range of applications.

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Chamber opening and limestone wall of a candle, and many other products. Polishes, ceramics, bleaching powder, ammonia, insecticides, paper, paints, lubricants, it an important building material. You may be surprised to learn that lime was used ranging from 1,350° F to 1,650º F, a temperature hot enough to melt a silver coin. During the first half of the nineteenth century, lime

**"LOG HEAP" METHOD**

Lime is commonly produced by the heating of natural limestone in a process known as “quenching.” The most common technique for calcining lime is the “log heap” method. Limestone is added to the top of the log heap, which is left to dry for as long as six months. Once the pile was dry, lime-sticks 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 1850s, most lime producers used a “pot kiln” also called “ground hog” kiln. Continuous-burning kilns were common in 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 fuel is removed from the bottom, and new stone and fuel are loaded from the top. Because the limestone and fuel are alternating layers, the quicklime is contaminated by fuel ash, which must be separated from the lime. Yet, by eliminating the need to reload the kiln, continuous kilns allowed lime manufacturers to greatly increase their production. During the early 1860s, 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 manufacture of Quicklime, and brick, and of supplying Steam Boats with wood” (Thomas and Conner 1973:52–53). Perhaps as a result of these efforts, the first large lime shipment was made from Utica. Emerke agreed to pay Lentz one-half cent per bushel for all lime burned. He also stipulated that the Howes were entitled to 1 cent per bushel for all lime burned. The lease also stipulated that the霍斯 were entitled to 1 cent per bushel for all lime burned. The lease also stipulated that the霍斯 were entitled to 1 cent per bushel for all lime burned.

**"PERPETUAL" OR "CONTINUOUS" KILN**

Continuous-burning kilns are 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 fuel is removed from the bottom, and new stone and fuel are loaded from the top. Because the limestone and fuel are alternating layers, the quicklime is contaminated by fuel ash, which must be separated from the lime. 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.

**FIRST PERIOD OF 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 manufacture of Quicklime, and brick, and of supplying Steam Boats with wood” (Thomas and Conner 1973:52–53).

Annual Census data from the 1840s is available for five lime producers in Utica Township. Census (US Census 1830). The producers included E.J. Higrat, Allen Sumers, James Morrow, Napoleon Wood, and Robinson & Ping. If data for one year is aggregated for the five producers, employment levels varied from 10 to 12 workers, which included 1,100 to 1,200 cords of limestone, 1,000 to 1,200 cords of wood, and labor valued at $9,571.50, and five owners and nine workers worked the five lime operations.

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

1850

Utica native Napoleon Boroughs 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 kiln surface. Wood replaced the ground hog kiln improved fuel efficiency and made his operation more profitable.
The lime industry in Indiana

Lime was 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 1,650º F, a temperature hot enough to melt a silver coin. During this period, the process was known as "log heap" method. Log heaps consisted of nothing more than a large amount of wood piled into a large heap, which was left to dry for as long as six months. Once the heap was dry, it was ignited, and the resulting quicklime was recovered after the heap cooled. 

**LOG HEAP METHOD**

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 primarily by farmers to condition their soil for better crop yield. In Clark County, Devonian- and Silurian-age limestone formed 359 to 444 million years ago served as an important resource for the lime industry. 

**Example of log heap. Courtesy of Colonial Williamsburg.**

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 million dollars in lime were produced in Indiana. By 1850, 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 estimated to be approximately $5 million in 2010. 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 estimated to be approximately $5 million in 2010. The producers included E.J. Higrat, Allen Sumers, James Morrow, Henry C. Emerke, and Samuel Starkweather. Each of these operations was a profitable business. 

**PETROLITE OR “CONTINUOUS KILN”**

Continuous-burning kilns are common in the valley. They contain a vertical cylindrical shell, typically 6 to 10 feet in diameter, and between 40 and 50 feet in height. Lime stones and fuel, such as wood or coal, are loaded into the cylinder in layers. The fuel 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 kiln is rapidly heated by fuel ash, which must be separated from the lime. Yet, by eliminating the need to reload and the kiln, continuous kiln allowed lime manufacturers to greatly increase production. 

**PETROLITE OR “CONTINUOUS KILN”**

Perhaps as a result of these efforts, the first large shipment of Indiana lime left New Orleans at the time. Consisting of 5,000 barrels, the shipment marked the beginning of the process of shipping Indiana limestone and an important transportation network made lime handling a popular and profitable business. The goods were loaded onto the Blake and Jesup Steamboat Co., and shipped to New Orleans. 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 manufacture of lime, brick, and sand, and of steam boats with wood." (Thomas and Cleveland 1977:32-33).

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**1840S**

Annual Census data from the 1840s is available for five lime producers in Utica Township (Census 1840). The producers included E.J. Higrat, Allen Sumers, James Morrow, Napoleon Wood, and Robinson & Ping. If we take one year representative for the five producers, the results are as follows: 

<table>
<thead>
<tr>
<th>Producer</th>
<th>Lime (bbl)</th>
<th>Wood (bbl)</th>
<th>Fuel (bbl)</th>
<th>Employment</th>
<th>Value (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higrat</td>
<td>1,230</td>
<td>1,230</td>
<td>1,230</td>
<td>150</td>
<td>100,000</td>
</tr>
<tr>
<td>Sumers</td>
<td>1,230</td>
<td>1,230</td>
<td>1,230</td>
<td>150</td>
<td>100,000</td>
</tr>
<tr>
<td>Morrow</td>
<td>1,230</td>
<td>1,230</td>
<td>1,230</td>
<td>150</td>
<td>100,000</td>
</tr>
<tr>
<td>Wood</td>
<td>1,230</td>
<td>1,230</td>
<td>1,230</td>
<td>150</td>
<td>100,000</td>
</tr>
<tr>
<td>Robinson &amp; Ping</td>
<td>1,230</td>
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<td>150</td>
<td>100,000</td>
</tr>
</tbody>
</table>

By 1830, Napoleon Bonaparte Wood made significant strides in lime manufacturing around 1830 when he improved the ground hog kiln by building a temporarily wall in front of the furnace. While the ground hog kiln improved fuel efficiency and made his operation more profitable.

**PETROLITE OR “GROUND HOG KEN”**

By the 1850s, most lime producers were using "petrolite" kilns, also called "ground hog" kilns, which were widely used throughout the state toward the Ohio border and south to the Ohio River. An abundance of quality limestone deposits began in 1838 (Axt et al. 1974:29-39).

**PETROLITE OR “GROUND HOG KEN”**

Perhaps as a result of these efforts, the first large shipment of Indiana lime left New Orleans at the time. Consisting of 5,000 barrels, the shipment marked the beginning of the process of shipping Indiana limestone and an important transportation network made lime handling a popular and profitable business. The goods were loaded onto the Blake and Jesup Steamboat Co., and shipped to New Orleans. 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 manufacture of lime, brick, and sand, and of steam boats with wood." (Thomas and Cleveland 1977:32-33).

**PETROLITE OR “GROUND HOG KEN”**

By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed. By 1840, Utica lime industry had boomed.
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 bricks, masonry, metalwork, paper, and a variety of other products. As early as 1836, historians noted that the use of lime in Indiana was extensive, with the production of a considerable amount of lime taking place in the state. These lime operations were likely involved in the production of important building materials, and the use of lime in Indiana was likely a significant contributor to the state's economic growth during this period.

**METHODOLOGY OF LIME PRODUCTION**

Lime is produced commonly by the heating of natural limestone in a kiln, which is a process known as “calcination.” In industrial lime kilns, the typical process involves the heating of limestone in a kiln at temperatures ranging from 1,500°F to 1,800°F, with no temperature control, or even a stream of cold air. During this process, the heat draws off carbon dioxide (CO₂), leaving calcium oxide (CaO) and a variety of impurities.

**LOCATIONS OF LIME PRODUCTION IN INDIANA**

Lime production in Indiana was extensive, with numerous lime kilns operating throughout the state. As early as 1836, historians noted that the use of lime in Indiana was extensive, with the production of a considerable amount of lime taking place in the state. These lime operations were likely involved in the production of important building materials, and the use of lime in Indiana was likely a significant contributor to the state's economic growth during this period.

**The Importance of Lime in Indiana**

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**The Peak and Decline of the Utica Lime Industry**

The Utica Lime Company was one of the largest lime producers in the state of Indiana during the late 19th century. The company was founded in 1857 by Prussian-born Henry C. Emerke, who purchased a lease on the Utica Lime Kilns, a large deposit of limestone located near Utica. The company quickly grew in size and became one of the major lime producers in the state.

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**The Turnaround of the Utica Lime Industry**

By the mid-1870s, James Breckenridge Speed, president of the Utica Lime Company, was able to finance the necessary expansions of the company's operations, and the company grew rapidly. By 1878, the company had acquired additional leases on limestone deposits, and the company was able to increase its production capacity significantly. The company's success relied on its ability to efficiently produce and market lime, and it was able to do so by developing a new production technology that allowed the company to produce lime more cheaply and at a higher rate of output.

The company's success also depended on its ability to efficiently produce and market lime, and it was able to do so by developing a new production technology that allowed the company to produce lime more cheaply and at a higher rate of output. This new technology, which involved the use of continuous lime kilns, allowed the company to produce lime more efficiently and at a lower cost than traditional kilns. The company was able to take advantage of this technology and increase its production capacity, which allowed it to capture a larger share of the lime market.

**The Fall of the Utica Lime Industry**

As the Utica Lime Company grew in size and increased its production capacity, it faced increased competition from other lime producers in the state. This competition forced the company to lower its prices in order to remain competitive, which ultimately led to the company's decline.

The company's decline was due in part to the development of more efficient lime production technologies by other companies. By the late 1890s, many of the other lime producers in the state had adopted new technologies that allowed them to produce lime more efficiently and at a lower cost than the Utica Lime Company. This put pressure on the company to lower its prices in order to remain competitive, which ultimately led to the company's decline.

**The Impact of the Utica Lime Industry on Indiana**

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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-inefficient. Lime operations with ready access to a railroad, which Utica did not have, retained 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. Companies within the industry indicate that there was a desire to control production and discourage additional lime furnaces from entering the market. One of the articles aimed to hinder the operations of non-member companies by denying them access to transportation.

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

In the Utica area, quarries were actually exposed limestone bluffs. Due to the impermeable nature of limestone bluffs, the weight and bulk of the mixed limestone, Utica's limestone was 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 stones.

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 for the rock face with one hand while striking the head of the bit with a hammer. By methodically turning the bit while striking the head of the bit with a hammer, workers drilled a hole into the rock face. 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, workers could have pried stone loose from 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.

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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 unit, wagon shipments were considered. Lime operations were equipped with many access roads to a railway, which Utica did not have, to maintain a significant economic advantage.

Competition was significant in the lime industry. The Louisville Cement Company was the only business with enough capital to reduce or eliminate competition. Any remaining independent companies were left to compete with a well-financed company 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 impermeable nature of limestone bluffs, the weight and bulk of the mined limestone, Utica's 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.

Dropping vertically was accomplished by either the "single jack" or "double jack" method. Single jack drilling involved a single worker who held a steel drill bit for the rock face with one hand while drilling with the other hand.

Double jack drilling required one worker to hold the bit and one or two additional workers to strike the bit with long-handled sledges. By methodically moving the bit while striking the head of the bit, workers drilled a hole into the rock face. Workers pounded the holes with explosives, the mined-created manageable piles were naturally located near the quarries. The quarry for Starkweather's kiln was located just above the kiln. Using little more than a hand drill and long-handled sledges, all that survives of Starkweather's pot kiln is part of the lower portion of the structure, including 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. All that remains of the Utica Lime Manufacturing Company kilns No.1 and No.2 are large, double-chambered vertical kilns built from quarried blocks of limestone constructed around 1850 to 1860. Kilns No.1 and No.2 are 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 36 feet. Each wall, which extends into the steep slope of the bluff, measures roughly 62 feet from the top of the façade to the rear of the kiln, as shown in Figure 2. The kiln is similar to an earlier kiln located near the Ohio River.

The kiln, was built ca. 1850. The kiln opens onto a plot of level ground that has been cleared for construction. The deep lime face would have extended for an unknown height above the arch, collapsed some time ago. All that remains of the Utica Lime Manufacturing Company kilns No.1 and No.2 are large, double-chambered vertical kilns built from quarried blocks of limestone constructed around 1850 to 1860. Kilns No.1 and No.2 are 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 36 feet. Each wall, which extends into the steep slope of the bluff, measures roughly 62 feet from the top of the façade to the rear of the kiln. The kiln is similar to an earlier kiln located near the Ohio River.

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## ACKNOWLEDGEMENTS

This paper is sponsored by the Indiana Division of Historic Preservation and Archaeology (IDHPA) and the Indiana Department of Transportation (INDOT) to comply with Section 106 of the National Historic Preservation Act through a First Amendment to a Memorandum of Agreement. The appointment is to the Southern Indiana District of Historic Preservation & Archaeology, the IDHPA, and INDOT through the Louis-Ellis-Youd Indiana Osceola Bridge Project (Bridge Project). Through extensive literature research, on-site field investigations, and professional identification and evaluations, the significant knowledge and awareness of the Utica lime industry, lime kilns, and Utica's local history, were made possible. The purpose of the project is to provide a well-documented record of the sites, which were learned during the Bridge Project. Community Transportation Solutions (Gray & Pope) conducted the research, proposed the contract, and designed the project. The project was funded and managed through the Bridge Project.

**SOURCES FOR MORE INFORMATION ON UTLICA LIME**

***Indiana Department of Natural Resources, Division of History & Preserves & Archaeology:***

www.in.gov/dnr/historic/southern-southern-illinois-osceola-bridge-project.html

[MISCELLANEOUS SOURCES](#)
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 commonplace. Lime operations were further aided by easy 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. Companies within the industry indicate that there was a desire to control production and discourage additional lime burners from entering the market. One of the articles aimed at limiting the operations of non-member companies by denying them access to transportation.

Consolidation was also a sign 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.

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

DOUBLE JACK DRILLING

Double jack drilling required one worker to hold the bit and one or two additional workers to strike the bit with long-handled sledges. By methodically turning the bit while striking the head of the bit with a hammer, workers drilled a hole into the rock face. Workers pulsed the hammers with the blast, causing the massive 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 modern, larger, more automatic type of equipment was employed on either trains or with compressed air drills. The quarries of Utica remained largely consistent with the size and configuration that they assumed during their last days. Operations ceased in 1907. The last of the Utica lime was located just above the kilns. Uncovering pieces of a stone hammer in a cave, a souvenir for development. A quarry that was most likely associated with the Utica Lime Kilns. All that survives of Starkweather's pot kiln is part of the lower portion of the structure, which includes the arched opening for the door-oven. The upper portion of the kilns, which would have adorned for an unknown height above the arch, collapsed some time ago. The quarry for Starkweather's kiln was located just above the kilns. Using small stones, hammer and some type of stone hammer, workers could have pitted stone loose from the bluff and moved it downhill to the kilns.


REFERENCES

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This pamphlet is provided by funding from the Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) to conduct research, prepare the content, and design the pamphlet.


The quarry that supplied stone to Kiln No.1 varies in height from as low 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.

Conservation

All that survives of Starkweather’s pot kiln is part of the lower portion of the structure, which includes the arched opening for the dooroven. The upper portion of the kilns, which would have adorned for an unknown height above the arch, collapsed some time ago. The quarry for Starkweather’s kiln was located just above the kilns. Using small stones, hammer and some type of stone hammer, workers could have pitted stone loose from the bluff and moved it downhill to the kilns.

PROTECTING ARCHAEOLOGICAL RESOURCES

Archaeological sites are protected through the Historic Preservation and Archaeology Law (IC 14-21-1-5), other associated state laws, and the National Historic Preservation Act. Under IC 14-21-1-5, a person who destroys the ground for the purpose of discovering archaeological, or moving artifacts or features during before December 31, 1980, must do so in accordance with a plan approved by the Indiana Department of Natural Resources.


The Archaeology of Historic Preservation and Archaeology (DHPRA), Department of Natural Resources, Indiana. DHPRA, Indiana. DHPRA, Indiana Department of Natural Resources, Bloomington, Indiana.

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The limestone 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. Operations ceased in 1907. The last of the Utica lime was located just above the kilns. Uncovering pieces of a stone hammer in a cave, a souvenir for development. A quarry that was most likely associated with the Utica Lime Kilns. All that survives of Starkweather’s pot kiln is part of the lower portion of the structure, which includes the arched opening for the door-oven. The upper portion of the kilns, which would have adorned for an unknown height above the arch, collapsed some time ago. The quarry for Starkweather’s kiln was located just above the kilns. Using small stones, hammer and some type of stone hammer, workers could have pitted stone loose from the bluff and moved it downhill to the kilns.

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