

**HISTORIC DOCUMENTATION RECORD
WESTERN STONE COMPANY
(Keepataw Site)**

Location: The Keepataw site is located in Township 37N, Range 10E in Section 24 of DuPage Township in Will County, Illinois.

Present Owner: Forest Preserve District of Will County.

Present Use: Biological preserve and planned recreational usage.

Significance The Keepataw site is significant both for its association with the giant Western Stone Company and its long-time president, Martin B. Madden, and for what it can reveal about large-scale turn-of-the-century limestone quarrying and processing operations. Between 1889 and 1918, the Keepataw site was part of the vast holdings of Western Stone, "the largest company of its kind in America."¹ This giant combine of six important Des Plaines Valley quarrying companies was formed in 1889, just as local limestone was being supplanted as a building material by Indiana Bedford limestone and various stone substitutes.

The fates of Western Stone were tied for many years to the career of one-time quarry water boy and Chicago City Councilman, Martin Madden. When Madden joined the firm in 1891, he immediately set about to increase mechanization at the company's quarry sites in order to improve efficiency. He also sought to use his political contacts to obtain business for the company. Madden succeeded on both counts, but the general economic upheaval of the 1890s undercut the financial viability of Western Stone and the company never truly recovered. Moreover, as Madden's political career took off, eventually leading him to Washington, D.C. as a U.S. Congressman, Western Stone suffered further from his increasing inattention. By 1920, the company had long since ceased active operation.

¹Unrivaled Chicago (Chicago: Rand, McNally & Co., 1896), p. 64.

Although the giant Western Stone Company was not particularly economically successful, its former Keepataw site is significant for what it can reveal about the limestone quarrying technologies used by large-scale operations in the decades surrounding the turn of the century. Investigation of the Keepataw site has identified several quarry pits and related tailing piles. The site also contains the remains of two lime kilns that represent progressive stages of technological development, as well as evidence of two railroad lines, one of which leads to the larger of the kilns.

Of equal significance is the site's potential for revealing further information about late nineteenth- and early twentieth-century quarrying technologies. Underwater research could further illuminate the nature of the work done on the Keepataw site and clarify the role of the site in the business scheme of the Western Stone Company.

PART 1. HISTORICAL INFORMATION

A. Physical History

1. Period of Significance: 1889-1918
2. Architect: Unknown
3. Original and Subsequent Owners:
J. L. Norton
Western Stone Company
Forest Preserve District of Will County

In October 1889, the Western Stone Company purchased the Keepataw site from J. L. Norton, the Western Stone Company's first president, as part of a larger transfer of land in Sections 24 and 25 of Will County's DuPage Township. The deed conveyed property extending from north of Bluff Road south to the Des Plaines River.² Norton had held this property for less than twenty years when he sold it to Western Stone. An 1873 Thompson Brothers and Burr's atlas reveals that the majority of the property (the portion in section 24 and including the Keepataw site) had been owned by J. Murphy. The owner of the remaining property (that in section 25, immediately

²Deed dated October 12, 1889, in the records of the Will County Recorder of Deeds.

north of the Des Plaines River) was local quarryman N.J. Brown.³ Brown had owned the property along the river since at least 1862.⁴

Whether quarrying began on this land, now known as the Keepataw site, before it was purchased by the Western Stone Company is unclear. A map prepared by the U.S. Army Corps of Engineers in 1888 and 1889, in anticipation of the digging of the Sanitary and Ship Canal, provides contradictory clues. The map labels various portions of the site as "marsh," "meadow," and "cultivated." No quarry is labeled, although quarries located elsewhere along the proposed canal route are designated as such. The Army Corps map also indicates a side track running north from the C. S. F. & C. tracks and the Illinois & Michigan Canal, across a bridge over the Des Plaines River and up into section 24. This would indicate that something - quite possibly limestone or a limestone by-product - was being taken from the property for further transport by rail or water.⁵ The track does not appear to have extended onto the Keepataw site, however, and the property seems to have been cut off from the track by the new river diversion.⁶

In July of 1892, the Western Stone Company relinquished control of that portion of the property on which the track was located. At that time, the Sanitary District of Chicago took control of the land immediately north of the Des Plaines River in Section 25, as well as the property in the southeast corner of Section 24. The huge Sanitary and Ship Canal, and the related Des Plaines River diversion channel, were soon cut through these

³Combination Atlas Map of Will County, Illinois (Elgin, Illinois: Thompson Bros. & Burr, 1873).

⁴Map of Will County, Illinois (Chicago: S.H. Burhans & J. Van Vechten, 1862).

⁵Map and Profile of the Proposed Routes for a Waterway Between Lake Michigan and the Mississippi River, surveyed by the U.S. Army Corps of Engineers, L.L. Wheeler, U.S. Assistant Engineer, Sheet No. 4, 1888-1889.

⁶Sanitary District of Chicago Right of Way in Will County (Chicago: Sanitary District of Chicago, 1899).

lands.⁷

The Western Stone Company retained control of the remainder of the property for nearly thirty years. During this period, Western Stone quarried limestone and produced lime on the portion of the property south of Bluff Road, i.e., the Keepataw site. Quarry workers apparently lived on the portion of the property north of Bluff Road.⁸ Western Stone sold the land to Karoline Blasing in 1918.⁹ A 1925 State Geological Survey map indicates that the quarry was by that time "abandoned."¹⁰ The property passed through a number of subsequent owners, including the Vulcan Materials Corporation, which sought to reopen the quarry in the 1960s and 1970s.¹¹ The Keepataw site is now part of the Forest Preserve District of Will County.

4. Builder, contractor, suppliers: Unknown.
5. Original plans and construction: Unknown. Original plans and construction drawings were not identified during the document search. Some Western Stone Company papers were examined in the archives of the Illinois Secretary of State. It should be noted that no plans or construction drawings were included within the archives.
6. Alterations and additions: See above. Numerous land ownership acquisitions transpired during

⁷Ibid. Plat Book of Will County, Illinois (Chicago: Geo. A. Ogle & Company, 1893).

⁸Letter from John J. Schauer, Will County Historical Society, to Wilma Stromsky, Save the Valley Association, dated December 5, 1972. October 17, 1995 telephone conversation with Dorothy Hassert, resident of Romeoville, Illinois.

⁹Deed dated April 1, 1918, in the records of the Will County Recorder of Deeds.

¹⁰"Economic and Surficial Geology of the Joliet Quadrangle," Plate Number 1, from D.J. Fisher, Geology and Mineral Resources of the Joliet Quadrangle, Bull. No. 51, State of Illinois Department of Registration and Education, Division of the State Geological Survey, 1925.

¹¹Atlas & Plat Book, Will County, Illinois (Joliet: Will County Farm Bureau, 1976).

and prior to the tenure of the Western Stone Company.

B. Historical Context

Illinois Limestone and Dolomite

The term limestone is often used broadly to describe the carbonate rocks and fossils.¹² In the more specific sense of the term, however, limestone is distinguished from a second substance, dolomite, by its smaller content of magnesium carbonate. By strict definition, dolomite contains about 54% calcium carbonate and 46% magnesium carbonate, as well as traces of impurities such as silica, alumina, and iron oxide.¹³ Both limestone and dolomite are found in Illinois, but it is dolomite that was the important quarry stone of the Des Plaines River Valley.¹⁴

The commercially important limestones and dolomites of Illinois were formed from the shells and skeletons of sea creatures that lived in the oceans once covering the state. As these creatures died, their remains became compacted on the ocean floor and were mixed with sand or clay from adjacent land areas. Over many years, the shell fragments and mud combined to form limestone.¹⁵ Calcium carbonate in limestone is thought to have reacted with magnesium in sea water, or later, in ground water, converting the calcite into the

¹²Robert S. Boynton, Chemistry and Technology of Lime and Limestone (New York: John Wiley & Sons, Inc., 1980), p. 2.

¹³H.B. Willman, High-Purity Dolomite in Illinois, State of Illinois Department of Registration and Education, Division of the State Geological Survey, Report of Investigations, No. 90, 1943, p. 13.

¹⁴Frank Krey and J.E. Lamar, Limestone Resources of Illinois, State of Illinois Department of Registration and Education, Division of the State Geological Survey, Bull. No. 46, 1925, pp. 21-22.

¹⁵Ibid., pp. 21-22. 185. J.E. Lamar, Handbook on Limestone and Dolomite for Illinois Quarry Operators, Bull. No. 91, Illinois State Geological Survey, Illinois Department of Registration and Education, 1967, pp. 35-36.

mineral dolomite. The Silurian period ocean reefs of the Chicago region formed a particularly porous and pure dolomite.¹⁶ Along the Des Plaines Valley, especially between Lemont and Joliet, this Silurian dolomite lies beneath only a shallow layer of topsoil. Thus, it can be quarried with relative ease.¹⁷

History of Des Plaines Valley Limestone Quarrying

European settlers began to exploit the stone resources of the Des Plaines Valley as early as the 1830s. M.H. Demmond is said to have built a stone house in Joliet in 1835.¹⁸ The Illinois and Michigan Canal Commission built a warehouse of local dolomite in Lockport several years later.¹⁹

The excavation of the I & M Canal between Chicago and LaSalle-Peru in the 1830s and 1840s revealed the extent of the dolomite outcroppings in the Valley. In 1845, William Davidson and his brother opened a quarry one mile south of Joliet, where the canal (and the river) swings west-southwest. When the canal was completed in 1848, canal contractor Nathaniel J. Brown bought land along the margins of the canal in Lemont and opened a quarry there.²⁰ Slightly later, Dr. J.F. Daggett bought land south of Lockport and began to

¹⁶Lamar, pp. 36-37. Willman, p. 13.

¹⁷James C. Bradbury, Deborah J. Slaton, Joseph LaRue, Donald G. Mikulic, and Vincent L. Michael, Preservation of an Historic Building Material: Joliet-Lemont Limestone (Chicago: Landmarks Preservation Council of Illinois, 1988), p. 2.

¹⁸Linda T. Pote, "The Celebrated Joliet Marble Fields: An Historical Geography of the Lower Des Plaines Valley Limestone Industry," in Time and Place in Joliet: Essays on the Geographical Evolution of the City, edited by Michael P. Conzen (Chicago: University of Chicago Committee on Geographical Studies, 1988), p. 17, citing August Maue, History of Will County, Illinois (Topeka: Historical Publishing Co., 1928), p. 262. William Le Baron, The History of Will County, Illinois (Chicago: Wm. Le Baron, Jr., & Co., 1878), p. 388.

¹⁹Bradbury, et al., p. 2.

²⁰A.T. Andreas, History of Cook County, Illinois. From the Earliest Period to the Present Time (Chicago: A.T. Andreas, 1884), p. 847. Pote, p. 17.

operate a quarry along the west side of the canal. In 1851, G.A. Coussens & Co. opened the Oak Hill Quarry just opposite Daggett's quarry.²¹

The Des Plaines Valley quarry industry continued to grow steadily in the 1850s, as "Joliet limestone" or "Athens marble," as the local dolomite was variously labelled, became more widely known as a building stone. Increasingly, easy access to transportation on the I & M Canal, and the railroads that quickly followed its route made Joliet and Lemont, and to a lesser extent, Lockport, prime suppliers of limestone to Chicago.²² As local historian Fayette B. Shaw has written, "by the beginning of...1856, there were 8 quarries being worked in and around Joliet, the smallest of which employed 5 men, the largest 48."²³

The pattern was similar in Lemont. In 1852, A. S. Sherman, John Kittering, and William Giles organized the Illinois Stone and Lime Company. In 1854, Horace M. Singer and Mancel Talcott established the quarry of Singer and Talcott, which was to become the largest of the Lemont area quarries in the 1860s and 1870s.²⁴ According to Industrial Chicago, "down to the time of the great fire no less than seventy-five percent of the stone sidewalk flagging put down in Chicago was supplied by [t]his company."²⁵

The Great Chicago Fire of 1871 provided a strong stimulus to the local quarrying industry, as limestone (and other stones) came into high demand for rebuilding the city in a "fireproof" manner. Many Des Plaines Valley quarries were able to expand or reorganize to take advantage of the increased demand. In

²¹Pote, p. 19. Le Baron, p. 436.

²²The limestone quarried at Lockport was considered to be inferior. To quote Le Baron, "in the immediate vicinity of the village the stone does not compare in quality with the quarries of Joliet and Lemont." Le Baron, p. 436.

²³Pote, p. 19, quoting Fayette Baldwin Shaw, The Economic Development of Joliet, Illinois, 1830-1870 (Unpublished doctoral thesis, Harvard University, 1934), p. 192.

²⁴Andreas, History of Cook County, pp. 850-851. Bradbury, et al., p. 5.

²⁵Industrial Chicago, Vol. I, "The Building Interests" (Chicago: Goodspeed Publishing Co., 1891), p. 759.

Lemont, Boyer & Corneau, which had opened two new quarries just before the fire, benefitted from the bull market. In 1872, Singer and Talcott reorganized under the name of Singer & Talcott Stone Company. Bodenschatz & Earnshaw was established in 1872, and the Chicago & Lemont Stone Company in 1879. The Excelsior and Riordan Stone Company, with its three quarries extending west of Lemont into Will County, also had a share in the expanded market.²⁶ In Joliet, the Joliet Stone Company opened in 1872, and soon "developed not only a Chicago, but a Midwestern market."²⁷ Thompson's 1873 atlas of Will County took special note of the Joliet area quarries of Steel, Davidson, Werner, Kronmeyer, Nobes, and others.²⁸

The strong market for Des Plaines Valley dimension stone was not to last. By the 1890s, other building materials had largely supplanted Joliet/Lemont limestone in construction. Beginning in the early 1870s, an increasing number of building stones were available in the Chicago market.²⁹ Among these was the more durable limestone of Bedford, Indiana, the superiority of which was openly acknowledged in 1891 by the authors of Industrial Chicago:

Our Lemont and Joliet dolomites were much used for both building and flagging. Because of their generally poor weathering qualities, the oolitic limestones (from Indiana) are fast superseding them for building fronts, and the oolitic stone ought to come in good demand for flagging, as it is a superior stone for that purpose. At one period much of this Joliet and Lemont stone was used for fronts, but experience has demonstrated that more suitable building material can be procured for the purpose. The same defect in the stone, that is, a yellow stain and shaling, shows in the quarry as it does in the building, and a knowledge of it should have been taken advantage of before using the stone. In a very short time this stone requires a

²⁶Ibid. Andreas, History of Cook County, p. 851.

²⁷Pote, pp. 22-23, citing Half Century's Progress of the City of Chicago (Chicago & New York: International Publishing Co., 1887), p. 164.

²⁸Combination Atlas Map of Will County, Illinois, 1873.

²⁹Bradbury, et al., pp. 9-10.

coating of paint.³⁰

Other alternatives to the dimension stone from Joliet and Lemont were also coming into favor. These relatively inexpensive building materials included terra cotta, artificial stone, and Portland cement.³¹

The ability of the Des Plaines Valley quarries to compete in the changing market was impaired by labor troubles in the 1880s. After quarry owners lowered wages from \$1.75 to \$1.50 per day in the spring of 1885, quarry workers went out on strike. In April, the owners issued a statement saying that no concession would be made.³² The strike was eventually put down, but only after a violent confrontation in which two workers died and a number of workers and militia were injured.³³ Labor troubles would continue to recur throughout the 1890s.

Putting down the strike (and coping with the general upheaval in the markets) was facilitated by the organization of the Joliet and Lemont quarries in 1881 into the Chicago Building Stone Company. This combine was charged with doing the "marketing and collecting for all the companies producing the stone."³⁴ In addition to quelling the labor disturbance, the Chicago Building Stone Company succeeded in raising the price of rubble stone from between \$7 and \$7.50 a cord to between \$8 and \$8.50 a cord. Despite its apparent success, the association was fairly short-lived. Although builders were unwilling to pay the single price set by the combine for the varying grades of limestone quarried at Lemont and Joliet, none of the quarry owners would agree to a quality-based

³⁰Industrial Chicago, Vol. I, p. 454.

³¹Bradbury, et al., pp. 9-10. See generally, Industrial Chicago, Vol. 1, Chapter XIV.

³²Sonia Kallick and Thomas Ludwig, Lemont History and Anecdotes, "Which Side Are You On?" (Lemont: School District 113, 1978), p. 2.

³³Chicago Tribune, May 5-14, 1885.

³⁴Edgar Weston Brent, Martin B. Madden, Public Servant (Chicago: Edgar Weston Brent, 1901), p. 27.

graded price scale. At an impasse, the company disbanded.³⁵

Formation of the Western Stone Company

The Western Stone Company arose out of this period of market flux. Western Stone was incorporated on September 17, 1889, "to quarry, manufacture, transport, buy, sell and deal in stone of all kinds whatsoever and to buy, sell, own, manage, control and deal in personal property of all classes."³⁶ Although The Economist noted that "the only classes of stone that will be included in this arrangement are flagging and rubble,...used in [Chicago] for sidewalks and macadam and the rough stone," the company apparently did produce some dimension stone, at least during the early years of its existence.³⁷

The Western Stone Company was "formed by buying out six of the principal stone firms of the city, with quarries at Lemont and Lockport, Ill." These six firms were the Singer and Talcott Company, the Excelsior Stone Company, the Chicago & Lemont Stone Company, the Corneau Stone Company, the Bodenschatz & Earnshaw Stone Company, and the Lockport Stone Company. J.L. Norton, at that time the owner of record of the Keepataw site, was named president of the new conglomerate.³⁸

The Western Stone Company inherited substantial resources from its predecessor firms. For example, according to Industrial Chicago, the Excelsior Stone Company brought with it "extensive quarries...at Lemont, Ill., cover[ing] an area of seventy-five acres."³⁹ Similarly, the Singer and Talcott Stone Company's Lemont quarries,

which covered thirty odd acres of ground, possessed excellent transportation facilities, being located on the Chicago & Alton railroad and the Illinois and Michigan canal, and were supplied with ample steam power and

³⁵Industrial Chicago, Vol. 1, p. 760.

³⁶Western Stone Company incorporation papers, dated September 17, 1889, in the archives of the Illinois Secretary of State.

³⁷The Economist, September 7, 1889, p. 793. Industrial Chicago, Vol. 1, p. 781.

³⁸Industrial Chicago, Vol. 1, pp. 459, 772.

³⁹Ibid., p. 771.

completely equipped in every respect with the most improved appliances and general appurtenances, including three planers, three gang saws, one header, one rubbing bed, two overhead travelers, etc., while employment was afforded to from two hundred to three hundred workmen.⁴⁰

From its quarries at Lemont and Lockport, Western Stone shipped stone by railway and ship to its numerous Chicago yards at the corner of Twenty-third Street and Archer Avenue, 1 to 17 West Polk Street, 264 South Market Street, 325 to 349 Hawthorne Avenue, the corner of Lake Avenue and 40th Street, and the corner of 63rd and Wallace Streets. In 1891, the company had "about thirty-five boats, tugs and barges in constant use" and employed "about fifteen hundred men the year round." The company still did some trade in building stone, and acted as "extensive dealers in sidewalk stone."⁴¹

The Western Stone Company Under Martin B. Madden

The impressive resources of the Western Stone Company did not immediately translate to a positive financial picture for the company. Therefore, in 1891, in hopes of improving management and strengthening its market position, the company's directors approached well-respected quarryman and Chicago City Councilman Martin B. Madden about bringing his Joliet Stone Company into the combine. After some negotiation, he agreed.⁴² The financial fate of the Western Stone Company was to be linked to Madden's political fate well past the turn of the century.

Madden was a product of the Des Plaines Valley quarries. He had begun his career at ten as a water boy in the quarry of Edwin Walker. Over the following eleven years, he rose from that position to general manager and chief draftsman.⁴³ Thereafter, he joined the Enterprise Stone Company, where he became quarry superintendent in 1881, and then the Joliet Stone Company, in which he soon was able to purchase an interest. In 1882, when the Joliet Stone Company became a

⁴⁰Ibid., p. 762.

⁴¹Ibid., p.781

⁴²Thomas Robert Bullard, From Businessman to Congressman: The Careers of Martin B. Madden, Ph.D. Dissertation in History, the University of Chicago, 1973, p. 10. Industrial Chicago, Vol. 1, p. 770.

⁴³Unrivaled Chicago, p. 64.

part of the Chicago Building Stone Company trust, Madden became financial manager of the latter. In 1886, Madden engineered the merger of the Joliet Stone Company and the Crescent Stone Company of Joliet and was made vice-president and general manager of the expanded Joliet Stone Company.⁴⁴ He was named president of the Quarry Owners' Association in 1887 and vice president of the Builders & Traders' exchange in 1888.⁴⁵

In 1889, Madden became alderman for the 4th Ward of the City of Chicago. He was assigned to the supposedly unimportant Wharves and Public Grounds Committees of the City Council. According to his contemporary biographer, Edgar Weston Brent, Madden made the most of his committee assignments by insisting that the committees exercise their authority to regain control of projects within their nominal authority that had been inappropriately taken up by other committees. The Public Grounds Committee, especially, was to become very influential with the annexation of approximately 150 square miles into the city in 1889.⁴⁶

Madden was re-elected to the City Council in 1891, 1893, and 1895. By 1891, he had become a member of the influential Finance Committee. In 1893, he was named its chairman. The committee chairmanship afforded him a controlling hand in promulgating rules regulating city contracting, railroad grade crossings, and street paving, all of which impacted the business interests of the Western Stone Company.⁴⁷

It was undoubtedly Madden's political influence, as much as his business experience, that prompted the Western Stone Company directors to seek his entry into their combine. Once the negotiations had been concluded, he became the company's vice president and manager and began to mechanize the firm's operations in order to reduce the costs of cutting stone. This he had done by 1892, but his actions were soon overshadowed by the effects of the tremendous depression of 1893. By April 1893, the company's stock was selling at 50,

⁴⁴Ibid. Brent, pp. 24-27. Bullard, p. 8. The various sources are inconsistent with respect to the specific dates and even the names of the companies in Madden's history.

⁴⁵Industrial Chicago, Vol. 1, pp. 770-771.

⁴⁶Brent, pp. 60-65.

⁴⁷Ibid., pp. 70-74, 115, 148-50, 165-166.

after a January high of 95.⁴⁸ The poor economy led Western Stone and the other Des Plaines Valley quarry operators to again lower a recently-obtained wage of \$1.75 per day to \$1.50 per day. This led to another violent strike, which again had to be put down by the militia.⁴⁹ The economic damage done by the strike and the depression led to another poor year for Western Stone Company in 1894.⁵⁰

In the hopes of improving the company's financial position, the Western Stone stockholders elected Madden as president at the January 16, 1895 annual meeting.⁵¹ Madden took the helm of a company employing 2,700 men. Fifty boats and 500 teams of horses serviced its many yards. Madden inherited a debt of \$158,000 and discovered a deficit in the previous year's accounts of \$90,000. Madden took immediate remedial action: "He reduced the cost of quarrying, cutting and transporting the output 33 1/3 percent" by spending \$108,000 to improve equipment and by cutting 400 "useless" jobs.⁵² To allow the company's remaining laborers to operate the new stone processing machines without tiring, Madden instituted a 7 1/2 hour day, adding two fifteen-minute breaks, one in the morning, and one in the afternoon.⁵³ By the end of 1895, Madden could report decreases in the cost of cutting stone from \$1.50 to 50 cents for large stones and from 52 to 16 cents for small stones. In the way of new business, Madden had secured a contract for the lake front retaining wall that the Illinois Central Railway was required to build under Chicago's railroad grade crossing law (which Madden had been instrumental in promulgating). At the January 1896 annual meeting, Madden was offered resolutions of praise, and was unanimously re-elected as president.⁵⁴

⁴⁸Bullard, pp. 10-11.

⁴⁹Lemont History and Anecdotes, "The Strike of 1893," pp. 1-2.

⁵⁰Bullard, p. 11.

⁵¹The Economist, January 19, 1895, pp. 64-65.

⁵²Brent, pp. 33-34.

⁵³Bullard, p. 12.

⁵⁴Ibid. The Economist, November 2, 1895, p. 540. The Economist, January 18, 1896.

The promise of 1895 was not to last. The general economy continued to be poor. Although Madden obtained "a [\$125,000] contract with the Pennsylvania Railroad Company to furnish the stone required for the elevation of its tracks between Thirty-first and Sixty-third streets" in mid-1897, and in early 1898 the outlook was said to be "brighter than it has been for four years," labor troubles recurred and Western Stone continued to suffer.⁵⁵ In December, The Economist reported that the company had "little to show for the year 1898."⁵⁶

Madden and Western Stone attempted to further accommodate to changing market conditions "by going extensively into the furnishing of crushed stone" in 1899. The new branch of the business was said to be "in full operation" in June of 1900 and "giving satisfactory results."⁵⁷ Unfortunately the new business line did not help the firm appreciably due to a general building trades strike that "crippled" Chicago in 1899-1900.⁵⁸

The decline of the Western Stone Company continued after 1905. By this time, Madden had left the Chicago City Council and was increasingly distracted by his duties in the United States Congress, to which he had been elected in March of 1905. Debt reductions in 1906 and 1907 did not buoy the company.⁵⁹ Nor did a 1908 contract with the Sanitary District to haul stone for riprap from the Sanitary and Ship Canal spoil banks to Chicago's Lincoln Park.⁶⁰ By 1910, it was rumored that Western Stone soon would be forced to sell some of its land holdings.⁶¹ In that year, in hopes of staving off total collapse, Western Stone joined other firms in forming a crushed stone combine.

⁵⁵The Economist, July 17, 1897, p. 67. The Economist, January 22, 1898, p. 98. Lemont History and Anecdotes, "Labor and the Quarries - 1897," pp.1-2.

⁵⁶The Economist, December 31, 1898, p. 759.

⁵⁷The Economist, November 18, 1899, p. 593. The Economist, June 16, 1900, p. 716.

⁵⁸Bullard, pp. 13-14. The Economist, January 19, 1901, pp. 71-72.

⁵⁹Bullard, p. 14.

⁶⁰Burchard, p. 397.

⁶¹The Economist, January 22, 1910, p. 221.

The combine was broken in a 1911 anti-trust suit.⁶²

Western Stone held no annual meeting in 1912 or 1913. An annual meeting finally was held in 1914, but Madden made no statement. He retired from the company in the following year, leaving the presidency in the hands of his son-in-law, Paul Henderson. Henderson, too, left the company in 1917.⁶³ The Keepataw site, along with other properties, was sold off in 1918.⁶⁴

In its 1920 annual report to the Illinois Secretary of State, the company stated that it had "not actively engaged in operation of its plants for some time."⁶⁵ The Western Stone Company was involuntarily dissolved by Superior court decree on February 16, 1925.⁶⁶

Technological Context

Industry Overview

Throughout much of the nineteenth century, limestone quarrying in the Des Plaines Valley was largely hand work.⁶⁷ Naturally, only stone lying close to the surface was quarried. Once the overburden had been shoveled away, laborers inserted wedges into open joints in the stone and then used pry bars as levers to peel back the layers. Quarrymen could control the size and shape of these slabs by scoring the upper surface of the bed with a hammer and chisel. The levered piece would then snap off where it had been scored.⁶⁸

To produce building or dimension stone, the large pieces would have been further subdivided and dressed by hand. A series of

⁶²Bullard, p. 14.

⁶³Ibid.

⁶⁴Deed dated April 1, 1918, in records of the Will County Recorder of Deeds.

⁶⁵Western Stone Company Annual Report, dated February, 13, 1920, in the archives of the Illinois Secretary of State.

⁶⁶Superior court decree dated February 16, 1925, in the archives of the Illinois Secretary of State.

⁶⁷Bradbury, et al., p. 5.

⁶⁸Ibid., pp. 4-5.

holes three-quarters of an inch in diameter and several inches deep would have been drilled along the desired split line. Into each of these holes would have been inserted two half-round pieces of soft iron with a small steel wedge between them. The quarryman would then have moved from wedge to wedge, hammering as he went, until the stone broke cleanly along the line. This process required a considerable amount of skill, as did the actual dressing of the blocks.⁶⁹

Once the limestone had been dressed or broken down into pieces of the appropriate size, it was dragged from the quarry by mule or man for transport to its ultimate destination. In the Des Plaines Valley, limestone was generally shipped by rail or by barge on the I & M Canal.⁷⁰

By the last decade of the century, mechanization in quarry practice was taking hold. This was due in part to the explosion of excavating and rock moving machines developed for digging canals such as the Sanitary and Ship Canal.⁷¹ Nevertheless, given the extremely individualized conditions of quarry sites, it is difficult to generalize about the extent of mechanization in any particular location. As late as 1925, Krey and Lamar recorded a wide range of hand and mechanized quarrying methods employed in Illinois.⁷²

In the late nineteenth century and thereafter, the basic quarrying process was the same as in the entirely pre-mechanized days: the overburden needed to be stripped, and the stone removed from the ground and transported out of the quarry and on to its final destination. The methods for removing overburden varied widely with its depth. In certain situations, the composition of the overburden mattered as well, as where the limestone was being quarried for cement-making and the overburden contained clay or shale which was a

⁶⁹Ibid. George P. Merrill, Stones for Building and Decoration, 2nd Edition (New York: John Wiley & Sons, 1897), pp. 375-382.

⁷⁰Industrial Chicago, Vol. I, pp. 456, 772.

⁷¹Charles Shattuck Hill, The Chicago Main Drainage Channel (New York: The Engineering News Publishing Co., 1896), pp. 39-41, 45, 60, and 72.

⁷²See generally, Krey and Lamar, pp. 66-72.

necessary part of the cement mix.⁷³ Where the amount of overburden to be removed was limited, or where the rock surface was irregular, thereby making mechanized removal impractical, quarries employed men to shovel overburden into dump carts by hand. Where a thin overburden was to be removed from a wide surface and the dumping place was convenient, horse teams dragging scrapers could be used. Drag-line scrapers (basically large shovels moved along the earth by horizontal drag lines, often attached to the arms of boom derricks) were sometimes employed where the overburden was less than eight feet thick. Hydraulic stripping was an inexpensive means of stripping, but could only be used where water was plentiful and drainage was good. Finally, the most practical and efficient means for large-scale stripping of overburden was the steam shovel, heavily used in excavating the Sanitary and Ship Canal.⁷⁴

Once the overburden had been removed, quarrymen were faced with the task of taking the limestone from the ground in useable form. This process generally involved blasting with dynamite, although for dimension stone, channelling and gadding machines - locomotive power drills mounted on rails - were sometimes used to cut out sections of limestone.⁷⁵ Where blasting was used, charges were set into holes drilled in the stone. Earlier in the nineteenth century, drilling was done by a team of men using a flat pointed drill called a "jumper." One man held this drill, while others alternately struck it into the ground with heavy hammers. By 1897, Merrill referred to drilling with jumpers as the "old time method of drilling," and stated that less labor-intensive tripod and other drills driven by steam or compressed air were generally favored.⁷⁶ By 1918, Bowles wrote that tripod drills "during recent years...have largely given place to churn drills," large,

⁷³Oliver Bowles, Rock Quarrying for Cement Manufacture, United States Department of the Interior, United States Bureau of Mines, Bull. No. 160 (Washington, D.C.: Government Printing Office, 1918), p. 35.

⁷⁴Ibid., pp. 35-42. Krey and Lamar, pp. 66-67. Hill, pp. 39-41.

⁷⁵Merrill, pp. 388-394.

⁷⁶Ibid., pp. 387-388.

efficient power drills designed for well drilling.⁷⁷ Churn drills were said to cut limestone at rates of 30 to 75 feet a day for 6-inch holes and 50 to 115 feet a day for 5-inch holes. Two other drill types sometimes used were (i) wagon drills, steam- or compressed air-driven reciprocating drills mounted one or more at a time on wagons, and (ii) hammer drills, one-man power drills with hollow steel bits through which air was forced to blow cuttings from the drill holes.⁷⁸

Drilling and blasting methods varied widely from quarry to quarry. Factors involved in determining the size and spacing of drill holes and the type and quantity of explosive used included (i) the height of the rock face; (ii) the hardness and uniformity of the rock; (iii) the attitude of the beds; (iv) the attitude of the quarry floor; and (v) the prevalence of open bedding seams and joints. Over time quarrymen moved from the "multiple bench quarrying" method, in which rock was shot down in successive benches or steps, to a single-bench method, in which all the rock was removed at a single level before a lower bench was cut. The latter method was considered more efficient, in that a larger mass of rock could be shot down with a single blast and the rock blasted did not need to be cleaned off the higher benches. Efficiency improved as the deep-drilling churn drills came into common use and as quarrymen became better able to control blasting.⁷⁹

After the initial blasting was completed, the large masses of rock usually needed to be further broken down according to their intended uses. The large pieces were shaped into dimension or building stone with power saws consisting of "smooth flat blade[s] of soft iron, set in...frame[s] and fed with sharp sand and water."⁸⁰ Power-driven planers, lathes, grinders, and polishers also were available. As previously noted, much final finishing continued to be done by hand.⁸¹

⁷⁷Bowles, p. 43. Krey and Lamar noted that, in 1925, tripod drills were still commonly used at Illinois quarries where the rock face was being worked in benches, or stepped surfaces. Krey and Lamar, p. 67.

⁷⁸Bowles, pp. 43-44.

⁷⁹Ibid., pp. 46-47.

⁸⁰Merrill, p. 397.

⁸¹Ibid., pp. 394-396, 399-401.

Limestone that was to be used in cement or lime production, or as ballast or riprap, did not need to be subdivided with such precision. Therefore, it was usually simply blasted a second time. This process was known as "secondary blasting."⁸²

Once the limestone had been broken up sufficiently, it could be removed from the quarry. The general method of removal was to load the pieces of stone into cars and haul it away. Here again, however, a number of different practices were followed. Two methods of loading were in use: hand loading and steam-shovel loading. As late as 1918, Bowles found that in about three-eighths of the limestone quarries he visited, rock was still being loaded by hand. Hand loading had the advantage of permitting easy sorting of limestone of varied composition within a given quarry. This in turn facilitated mixing of the various stones to obtain the desired combination for cement mixing and the like. Hand loading required a relatively small capital outlay for equipment, although it required a larger number of laborers than did steam shovel work. Expensive steam shovels afforded the ability to load large blocks of stone quickly. This kept blasting costs down, but undermined a quarry's ability to sort and mix stones efficiently.⁸³

Regardless of the loading method employed, limestone generally was placed into some form of rail car and transported to a processing or distribution point. There appear to have been almost as many types of cars and methods of hauling as there were quarries.⁸⁴ In general, cars loaded by hand were low and small, often with a capacity of two tons or less. Many were designed with side-dump features, but many local variations existed. Cars used to transport steam shovel loads were usually much larger than those which were hand loaded. The capacities of these cars were often five tons or more. In some places, standard hopper-bottom rail cars even were employed.⁸⁵

Both types of cars were hauled by a variety of means. Where practical, simple gravity was used to move the cars. Horses and mules were commonly used where tracks were level, and

⁸²Bowles, p. 46. Krey and Lamar, p. 69.

⁸³Bowles, pp. 118-121.

⁸⁴Krey and Lamar, p. 70.

⁸⁵Bowles, pp. 124-125.

where loading was done by hand.⁸⁶ Krey and Lamar noted that as late as 1925, small cars were even moved by laborers in some Illinois quarries.⁸⁷ Where steam-shoveled loads were too heavy to be moved by animals or men, locomotives generally were used. Locomotives could be of standard size or of the miniaturized version known as "dinkeys."⁸⁸ In many locations, quarries were situated such that the limestone-filled cars had to be pulled out of the quarry by means of a power hoist on an inclined railway. In certain places, pans or buckets of stone were carried on overhead cableways or aerial tramways, to avoid hilly terrain.⁸⁹

The quarried limestone then would have been ready for shipping by water or rail or for any final processing. To be used as railroad ballast or road material, or in cement, the limestone would have needed to be broken down further.⁹⁰ The large crushers used for this purpose were almost always located at the surface, above the quarry. Crushers varied in size, depending on the nature of the quarry and whether the limestone was loaded by hand or by steam shovel.⁹¹

After the crushers had done their work, the limestone pieces were screened, generally in rotary cylindrical steel screens. These screens sorted the limestone into appropriate sizes for various uses, such as one-half to one inch pieces for aggregate for concrete, or two and one-half to five inch pieces for use in macadam.⁹²

Quarrying companies also often maintained on-site facilities for the production of lime, a limestone by-product used in making mortar and portland cement, among other things. Lime is derived from limestone by heating the stone to between 900 and 1,000 degrees, and thereby freeing carbonic acid gas

⁸⁶Ibid.

⁸⁷Krey and Lamar, p. 70.

⁸⁸Bowles, p. 125.

⁸⁹Ibid., pp. 125-127.

⁹⁰G.P. Grimsley, Clays, Limestones, and Cements, West Virginia Geological Survey, Vol. III, 1905, pp. 386-387.

⁹¹Bowles, p. 135. Burchard, p. 395.

⁹²Burchard, p. 395.

(carbon dioxide).⁹³

Commercial lime burning has long been done in permanent structures known as lime kilns. In the late nineteenth and early twentieth centuries, lime kilns were of two general types: intermittent kilns and continuous kilns. Intermittent kilns needed to be cooled and reloaded between each burning. Continuous kilns, as their name implies, could be fueled and loaded without interruption.

During the nineteenth century, primitive intermittent kilns were frequently found in agricultural areas. These kilns were "rudely constructed of stone, and were located on the side of a hill, so that the top was easily accessible for charging the kiln with stone and the bottom for supplying fuel and drawing out the lime."⁹⁴ Large pieces of limestone were used to form an arch within the kiln. Above the arch, the kiln was filled by throwing the smaller pieces of stone in from the top. A slow-burning wood fire was started below to gradually heat the lower stone without cracking the arch. The fire was then increased until the stone reached white heat.⁹⁵

In the last quarter of the nineteenth century, people began to erect permanent intermittent kilns lined with fire brick. These "pot kilns" usually had an egg-shaped interior shaft, with the largest diameter being 4 to 6 feet above the ground. A kiln 10 to 11 feet in greatest diameter might be 25 to 28 feet high, 5 to 6 feet across at the top, and 7 to 8 feet across at the bottom. The wood was introduced and the lime removed through a 5 to 6 foot high arched opening at the bottom. A horizontal grating upon which to build a fire was usually placed 1 or 2 feet above the bottom.⁹⁶

⁹³Victor R. Rolando, 200 Years of Soot and Sweat: The History and Archeology of Vermont's Iron, Charcoal, and Lime Industries (Dover, Delaware: Dover Litho Printing Co., 1992), p. 206. Edwin C. Eckel, Cements, Limes, and Plasters: Their Materials, Manufacture, and Properties (New York: John Wiley & Sons, 1905), pp. 96-97. S.W. Parr and T.R. Ernest, A Study of Sand-Lime Brick, Illinois State Geological Survey, Bulletin No. 18 (Urbana: University of Illinois, 1912), p. 27.

⁹⁴Eckel, p. 99, quoting S.W. Blatchley, 29th Annual Report of the Indiana Department of Geology, 1904, pp. 225-227.

⁹⁵Grimsley, p. 368.

⁹⁶Grimsley, p. 100.

Intermittent kilns had several disadvantages. Most obviously, they were inefficient in that a large quantity of fuel was needed to bring the contents of the kiln to the proper temperature and this process had to be repeated each time the kiln was charged. In addition, the kilns often burned unevenly, so that the stone directly on top of the arch became overburned before the uppermost stones were thoroughly calcined. Due to these disadvantages, intermittent kilns were generally used by the turn of the century only where there was "a slight or very irregular demand for the product."⁹⁷

A more efficient and advanced alternative to the intermittent kiln was the continuous, or perpetual kiln, introduced in the 1860s.⁹⁸ In continuous kilns, the limestone was added at the top, the lime was withdrawn below, and the fires were kept constantly burning.⁹⁹

Continuous kilns fell into three sub-categories: mixed feed, separate feed, and rotary kilns. Mixed feed kilns were so named because limestone and fuel were charged into the kiln in alternate layers. One type of mixed feed kiln, dubbed by Grimsley in 1906 as the "old type," were square stone "pot" kilns. Grimsley described these as 18 to 20 feet high and 10 to 12 feet square. These kilns were fired with coal, although a wood fire was built at the bottom to start the lowest layer of coal burning. As the fire gradually worked its way up the kiln, the burned lime was removed and new layers of coal and limestone were fed from the top. According to Grimsley, "the kilns [were] cheap in construction, the process of burning [was] simple, and the lime [was] usually of good degree of strength, but [was] apt to be dark in color."¹⁰⁰

A more advanced form of the mixed feed kiln was the Aalborg or Schofer kiln, which, in vertical section, appears as two egg-shaped sections stacked upon each other. The upper chamber was a preheating space, in which the limestone was heated, dried, and partially calcined. At the juncture of the two chambers, the fuel was fed into the kiln through a number of diagonal chutes. Here, where the kiln was at its hottest, the actual burning took place. In the lower chamber, the burned

⁹⁷Eckel, pp. 99-101.

⁹⁸Rolando, p. 208.

⁹⁹Grimsley, p. 369.

¹⁰⁰Grimsley, p. 369.

lime cooled and air was heated and passed through to the juncture point to fuel combustion. Eckel stated that this made for great efficiency and economy in fuel consumption.¹⁰¹

The second type of continuous kiln was the separate feed variety. In such kilns, the fuel and the limestone were fed into different chambers, and thus never came into direct contact. Although this design was somewhat less fuel efficient than the mixed feed type, the separate feed kiln had the advantage of producing a higher grade of lime that was not discolored by contact with the fuel or mixed with unburned remnants of it.¹⁰²

The separate feed kiln type, which by 1905 was said to be "used at most of the larger lime-burning plants," comprised a wide variety of patent kilns.¹⁰³ In general, these kilns, rising 25 to 35 feet, were taller than the mixed feed kilns. Most were sheathed in steel or iron and lined with fire brick, although some were constructed of stone. The limestone was charged from the top, as in mixed feed kilns. The fuel, however, was burned in separate furnaces located either inside or outside the wall of the kiln. Thus, the limestone was burned by the hot furnace gases, rather than by the fuel itself. As in the mixed feed kilns, the burned lime was removed from the bottom of the kiln. One typical separate feed kiln, the Keystone kiln, was raised above the ground so that the burned lime could be discharged from the bottom of the kiln directly into small rail cars running beneath it.¹⁰⁴

A third type of continuous kiln was the rotary kiln. A relatively late innovation, the rotary kiln was developed for use in the portland cement industry. These kilns were essentially horizontal kilns that rotated slowly on driven rollers. The end of the kiln into which the limestone was fed was slightly raised, so that the charge moved slowly to the

¹⁰¹Eckel, pp. 101-102. Rolando describes the operation of the Aalborg kiln somewhat differently. He states that the diagonal chutes were passages through which air would have been drawn to the juncture to cause combustion of the fuel. According to Rolando, the fuel was mixed with limestone at the top of the kiln. Rolando, p. 209.

¹⁰²Eckel, p. 103.

¹⁰³Ibid.

¹⁰⁴Ibid., pp. 103-106. Grimsley, p. 370. Rolando, p. 209.

lower, discharge end. The kilns operated most efficiently when the limestone was finely ground before charging. Rotary kilns were not widely used in the United States; as late as the 1920s, only thirty were in use.¹⁰⁵

Western Stone Company Technologies

Although Brent, Madden's biographer, made much of Madden's introduction of "labor-saving machines" into the Western Stone quarries, it is difficult to know the true extent of mechanization there, given that no relevant business records apparently survive. There is some documentary evidence of quarry technologies used at various Western Stone Company sites, however. (None, unfortunately, concerns the Keepataw site.) As already noted, in 1891 Industrial Chicago took note of the Western Stone Company's former Singer & Talcott yards in Lemont, which were said to be "supplied with ample steam power and completely equipped in every respect with the most improved appliances and general appurtenances." In addition to mechanized stone dressing machines (planers, gang saws, etc.), the yard possessed "two overhead travelers" for moving stone to the I & M Canal.¹⁰⁶ An 1897 Sanborn map confirms the existence of this and other stone handling equipment at various Western Stone quarries in and near Lemont and reveals the presence of railroad tracks at each site.¹⁰⁷ The former Singer & Talcott yard in Chicago was similarly equipped.¹⁰⁸

In 1908, Burchard noted that "the Western Stone Company is operating two crushers near the county line west of Lemont." These were "converting the rock of the [Sanitary and Ship Canal] spoil bank into concrete material."¹⁰⁹ Burchard's reference may be to the two Western Stone crushing sites, one on either side of the canal, recorded by Krey and Lamar as "abandoned" in 1925. At the more northerly of the two, Krey and Lamar recorded "one Allis-Chalmers crusher No. 3, two No. 4, and one each of Nos. 5, 6, and 7," as well as "23 sections of screen." The crushed stone from the spoil banks "was put into skips and these were loaded, two high, on the barges

¹⁰⁵Rolando, p. 210.

¹⁰⁶Industrial Chicago, Vol. I, p. 762.

¹⁰⁷Sanborn Map of Chicago, Vol. D (Chicago: Sanborn - Perris Map Co., 1897).

¹⁰⁸Industrial Chicago, Vol. I, p. 762.

¹⁰⁹Burchard, pp. 389, 397.

which were pulled to Chicago by steam tug."¹¹⁰

Finally, Krey and Lamar also recorded a Western Stone Company quarry site at the southeast corner of Joliet that had not been in operation since 1913:

The quarry which was worked as a pit, is roughly rectangular in outline, about 2,500 feet long and 800 feet wide, and has a face about 25 feet high....The face was worked in benches 20 feet high. Both well and tripod drills were used to drill the blast holes and 40 and 60 per cent dynamite was used in blasting....The broken rock was loaded by steam shovels into 4-yard cars, which were hauled to the tippie by a locomotive. Three Gates gyratory crushers, Nos. 5, 7 1/2, and 12, were used for crushing and a set of rolls for pulverizing. Two sets of screens separated the crushed rock into sizes up to three inches.¹¹¹

Interestingly, despite all this mechanization, a 1907 U.S. Geological Survey photograph of a Western Stone Company quarry at Joliet shows stone being loaded by hand into small dump carts at the quarry walls. These carts are being hauled by mule along rough rails laid on randomly-spaced logs.¹¹²

PART II. ARCHITECTURAL INFORMATION

A. General Information

1. Engineering Character: The Keepataw site is of engineering merit based on four criteria. First, the system is of merit in the history of American industrial archaeology. Second, it is of merit for its association with Chicago City Councilman Martin Madden. Third, the site is of merit as an extant large-scale turn-of-the-century limestone quarrying and processing operations. Finally, the site is of merit for its association with the Western Stone Company.

2. Condition of Fabric: Fair to poor

¹¹⁰Krey and Lamar, p. 111.

¹¹¹Ibid., p. 189.

¹¹²Photograph by E.F. Burchard, in Bradbury, et al., p. 4.

3. Summary Description: As already noted, neither the place of the Keepataw site in the Western Stone Company's overall business plan, nor the nature of the technologies used there are documented in writing. Archaeological investigation of the Keepataw site, however, has revealed evidence that both stone quarrying and lime burning took place there. The site contains a number of quarried areas. The locations of these quarry pits are confirmed by a State Geological Survey map, as are the locations of related quarry dumps or tailing piles.¹¹³ Because the quarry pits have long since filled with water, it has not been possible to study the quarry walls to determine the precise methods used in quarrying. A certain amount of evidence is available in the tailing piles, where some pieces of waste stone are marked with half-cylindrical holes. These holes may indicate that wedges were driven into the stone by hand to split pieces in two. The holes may also have been drilled to make room for blasting charges in the stone.

The site also contains two structures that appear to have been lime kilns. The first structure is located at the base of a small hill near the center of the site. It consists of three walls of uncut limestone pieces. Nothing remains of any interior construction. Although rough limestone was used to construct many types of structures in the nineteenth century, this structure appears to be too small to be anything other than a kiln. It probably was a simple intermittent feed kiln of the type described by Eckel.¹¹⁴ Limestone likely was loaded from the hillside into the top of the kiln and lime removed from the bottom. The kiln may well have been fired with wood cut from the surrounding land.

This basic intermittent kiln may have been built by the Western Stone Company as a first foray into lime production. It is also possible, however, that the kiln was built before 1889, in the days when the land was cultivated. Lime may have been produced here on an as-needed basis for agricultural and building purposes.

The second structure on the site is more clearly

¹¹³"Economic and Surficial Geology of the Joliet Quadrangle," Plate Number 1, from Fisher.

¹¹⁴Eckel, p.99.

identifiable as a kiln, and in light of its size and complexity, almost certainly dates from the Western Stone Company's tenure on the land. This tapered, chimney-like structure is located on a slight rise in the middle of a marshy area near the west end of the site. Built atop a limestone foundation, the brick structure stands approximately 14 meters tall. At the base of the structure is a rectangular hole several feet wide. A second hole, located on the opposite side, is larger. The walls of the chimney are interrupted periodically by much smaller holes, several bricks in width.

This structure was probably a type of continuous feed kiln. It may have been a mixed feed continuous kiln, in which layers of limestone were loaded alternately with layers of fuel into the top of the structure, perhaps using a conveyor belt or dump cars on an inclined rail. In light of its substantial height, it may also have been a separate feed kiln, in which the fuel was burned in separate compartments inside the chimney (although separate furnace compartments were sometimes located outside the chimney). Archaeological investigations encountered evidence of a conveyor belt or an inclined rail as well as evidence of separate furnaces located outside the chimney. Therefore, the continuous feed kiln type is unclear. In either case, the small holes in the shaft would have provided air flow to aid in combustion. The burned lime would have been removed from the large rectangular hole at the base of the chimney on a continuous basis.

A more detailed investigation of the Keepataw site would be likely to reveal additional information about the limestone quarrying and processing technologies used by the Western Stone Company on the site. Further investigation into the quarry pits themselves might reveal, for example, information about the precise quarrying methods employed. For example, evidence would likely be found of the extent of drilling and blasting done. It should be noted that this type of detailed information was not available due to high water in all of the quarries on the Keepataw site. In fact, the site was investigated over the period of a year and at no time were such investigations possible. This type of information would be available only during underwater investigations.

Of equal significance, further investigations might yield clues to the relationship of the Keepataw site to other

Western Stone sites in the area. For example, it may be possible to determine whether limestone from the Keepataw site was hauled to nearby Western Stone quarries number 4 and 5 for crushing, or into Lemont for dressing. Such information would provide a clearer picture of how the giant company functioned, and, perhaps, about why it failed.

B. Description of Intermittent Feed Kiln:

1. Overall Dimensions: The intermittent feed kiln is 4.6 meters wide (east/west) and 4.9 meters long (north/south). The thickness of the limestone walls is approximately 40 centimeters. There is no roof and there appears to be no evidence of roof rubble to indicate construction material. Therefore, no accurate height measurement is available (SEE PHOTOGRAPHS 11-Wi-479-1 through 11-Wi-479-4).

2. Foundation: Foundation and wall rubble consists of irregularly cut limestone blocks.

3. Structural System: The limestone blocks are mortared with heavy grit tempered cement. There appears to be no consistency in thickness of the mortar. No mechanical system of loading limestone into the intermittent kiln was noted directly in the area, although, it should be noted that the natural berm area is directly behind the structure (SEE PHOTOGRAPH 11-Wi-479-6). It is possible that this natural berm was utilized as the high hill for loading the limestone into the intermittent feed kiln.

However, evidence exists surrounding the intermittent feed kiln for loading mechanisms. Remains of what appear to be mechanized shovels (Bishop-7-7530 and Chicago Board of Health Permit #5 were noted on one shovel) and loading metal superstructures exist. The Chicago Board of Health Permit may indicate that this intermittent feed kiln dates to the Western Stone Company's tenure on the land.

C. Description of Continuous Feed Kiln:

1. Overall Dimensions: Each side measures 2.35 meters long transitioning from the limestone block base to red fired brick. Each brick measures 17.78 centimeters long, 7.62 centimeters wide and 10.16 centimeters deep. Some bricks bore evidence of high temperatures indicated by

black soot. The walls are double insulated.

2. Foundation: Irregularly cut limestone foundation blocks. All four sides measure 2.35 meters and 22 centimeters long and 78.74 centimeters in height. Some blocks apparently were rejects from the production process as gadding holes were evident on the facade.

3. Structural System: The limestone blocks are mortared with heavy grit tempered cement. There appears to be no consistency in thickness of the mortar. Although the height of the kiln is relatively tall, no internal support structure was evident. In addition, the internal portion of the stack was clear to the top of the stack. No evidence of separate compartments or hour glass shaped flues were observed.

The bluff side of the continuous feed kiln contains a hole. The top of the hole was originally arched shaped as suggested by the remaining bricks. The height of the arch from top to bottom is 91.44 centimeters. The bottom of the arch is 63.50 centimeters in width. The top of the arch is 53.34 centimeters in width. The interior arch is 68.58 centimeters in height. The depth of the arch is 50.8 centimeters in depth.

Another larger hole is on the Des Plaines River facade of the continuous feed kiln. The width of this arch is 1.22 meters in width, 1.60 meters high, and 50.80 centimeters in depth. The walls of the kiln are double. The interior wall is 92.71 centimeters thick. The gap between interior and exterior wall comprises a single course of bricks approximately 10.16 centimeters. The exterior wall is 62.23 centimeters thick.

The function of the two holes is not entirely clear. One probably functioned as the off loading portal for the processed lime. The smaller hole may have served the function of off loading the lime onto a mechanism along the deep channels mentioned below. The larger hole on the side of the Des Plaines River does not have a discernable channel underneath it. The lack of evidence of off loading mechanisms to the larger hole and the height of the larger hole support the contention that the smaller hole served as the off loading mechanism. Rebar rods were noted to the west of the continuous feed kiln at the terminus of the rail line. It is unclear whether these were supports for a loading apparatus to the top of the kiln. Further evidence of the nature of the

apparatus used to load limestone into the top of the high brick kiln is unavailable.

It should be noted that foundations for four separate structures were noted to the east of the kiln. It is unclear whether these were separate furnaces located outside the kiln or were supporting foundations of overhead feeders to load lime into the top of the kiln. Therefore, the specific type of continuous feed kiln (mixed feed versus separate feed kiln) is unknown. A series of channels (approximately 88.90 centimeters deep and approximately 1.5 meters wide) are located to the east and north facades of the kiln. The channels do not appear to lead to the Des Plaines River, the Sanitary and Ship Canal or the I & M. It is unclear what the function of these channels were.

Leading to the kiln are the remains of railroad tracks on which limestone was likely hauled from the quarry pits to the kiln or elsewhere. Additionally, it appears that a separate set of tracks, shown on the Chicago Sanitary District maps, were extended across the river diversion and onto the Keepataw site. In fact, these two rail lines on the Keepataw site run parallel to each other. One runs to the continuous feed kiln and is the only semi-dry access route to the kiln itself. Surface inspection along this rail line noted one rough rail and one rail spike. The second rail line, running parallel to the first, runs directly to the river diversion (it is unclear whether the connection over was dismantled or whether the river diversion was ever bridged). The rail line was walked until surface conditions became too marshy. Surface inspection noted several rail spikes and screws. It should be noted that neither rail line is complete and each appears to have been dismantled. Additionally, it appears that the two individual rail lines were connected by a bridge system. Foundations for bridge pilings were noted on each rail line. However, again, surface inspection was hampered by marshy conditions.

D. Site and Surroundings:

1. General Setting and Orientation: The Keepataw site is located just south of Bluff Road and extends to the Des Plaines River. The majority of the site is located in a marshy area and is generally inaccessible for most of the year. Access to the outer quarries, continuous feed kiln and river diversion is limited to rail lines

(or mule roads) on banks of higher ground. A small portion of the site is located on higher and dryer terrain. This portion is likely the previously cultivated or meadow area indicated on the map prepared by the U.S. Army Corps of Engineers in 1888 and 1889. The remaining portions are quarry pits inundated with water and are surrounded by tailing piles.

PART III. SOURCES OF INFORMATION

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- C. Likely Sources Not Investigated
Joliet, Lemont or Chicago newspapers, regional periodicals and further interviews with residents. Conco-Western Stone Company in North Aurora, mentioned in "Rocky times for open quarries" in Chicago Tribune, Friday, March 15, 1996, investigate possible archives leads.

PART IV. PROJECT INFORMATION:

This project was undertaken by the Illinois Department of Transportation in response to public and private concerns regarding impact to the Keepataw site. Key project personnel included Karen Poulson, senior staff archaeologist/cultural resource manager and Elizabeth Patterson, historical researcher.

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