Society for Industrial Archeology · New England Chapters

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President's Report, SNEC

First of all a big welcome to the many new national SIA members and others who have recently joined the chapter! The chapter is really what you all as members make of it, and I encourage you all to participate actively. We are always looking for program possibilities; ideas are easy, what we need are contacts and help in making arrangements for the group to a visit site or area on a Saturday. The chapter represents ALL of southern New England, and we would like to run programs in YOUR particular area, but to do that we need you to take the lead in finding interesting and available programs for the group. Contact Matt Kierstead, Program Chair (508) 947-0766 or me (617) 628-2786, msteinitz@juno.com.

About a hundred enthusiastic Northern and Southern New England Chapter members and friends attended the Tenth Annual Conference on New England Industrial Archeology at the Boott Cotton Mills Museum in Lowell in February. Attendees were treated to a full morning of stimulating presentations: Nolan Jones, President of the Middlesex Canal Association, updated us on efforts to preserve, protect and restore the Canal corridor, and provided a series of aerial photo views of canal segments. Matt Kierstead and Mary Kate Harrington of the Public Archaeology Lab provided a preview of work that will come out of their current survey of historic Boston Industrial areas. Andy Vadnais and Don Woods reviewed the research and engineering that have gone into their re-creation of a turbine power system at Hancock Shaker Village. At the break Carl Walter had a steady throng gathered around his computer to view his interactive Atlas of the New Haven and Northampton Canal. Ed Kirby narrated the story of the recent major restoration of Connecticut's Lime Rock blast furnace. Suzanne Richardson updated us on the most recent progress in the ongoing work at the Oliver Evans Gristmill in Windsor, Vermont. Mary Boswell introduced a very nicely produced video on the Belknap Mill in Laconia, New Hampshire, which provided the morning finale. After lunch, conference attendees were treated to a special preview tour of the new American Textile History Museum, hosted by Director Paul Revard. The Museum, at 491 Dutton Street, is now open to the public after a multi-year relocation effort, and I'm sure all those who enjoyed the preview will agree that it is worth a special trip to Lowell! Thanks again to the National Park Service, Lowell National Historic Park, and the American Textile History Museum.

The National Board of the SIA has given preliminary approval to chapter member Bob Stewart to organize a national tour in the Hartford-Springfield area in the Fall of 1998. SNEC has offered Bob its support in this undertak-

ing, which will provide SIAers from around the country, as well as those of us in the region, opportunities to view many industries and sites to which we would normally not have access.

Dean Herrin of the Historic American Engineering Survey was recently in Lowell for a meeting with a group of IA representatives that included a number of SIA members. HAER is looking to develop a national initiative to examine broadly the history of the American textile industry, an initiative that would look at the industry in a series of regional and local settings, and that would document the settlement forms, manufacturing systems, power mechanisms, etc that characterized different periods and places. HAER is currently working in partnerships with groups in the southern states on projects that could lead into this national initiative. They are very interested in working with groups in New England to the same end. Feel free to contact me for more information on this developing initiative!

Michael Steinitz
Somerville, MA

President's Report, NNEC

The Northern New England Chapter is planning several events for 1997. The first is the spring meeting, planned for the Belknap Mill in Laconia, N.H., on May 17. The meeting will be there at the mill, and participants will be able to tour the mill, Star Specialty Knitting, the only remaining knitting mill in operation in Laconia, and Allen Rogers, a wood-turning mill. Mary Boswell, Executive Director of the Belknap Mill, and Dennis Howe have planned a fine spring meeting there. Rain or shine, it should be interesting. Further details are available elsewhere in this newsletter.

Duncan Wilkie, now of the Agency for Transportation for the State of Vermont, is making arrangements for the fall meeting. The plan is to meet in the Barre, Vermont, area, and we hope to be able to tour some of the historic granite sheds in the area. As you may know, Barre was a center for stone masonry, and the industry employed numerous stone cutters from Europe, including Italians. The meeting will, we hope, occur sometime in late September because October seems to have archeology meetings every weekend. Barre is on Rt. 89, close to Montpelier, and will be easily accessible to people coming from other areas of New England.

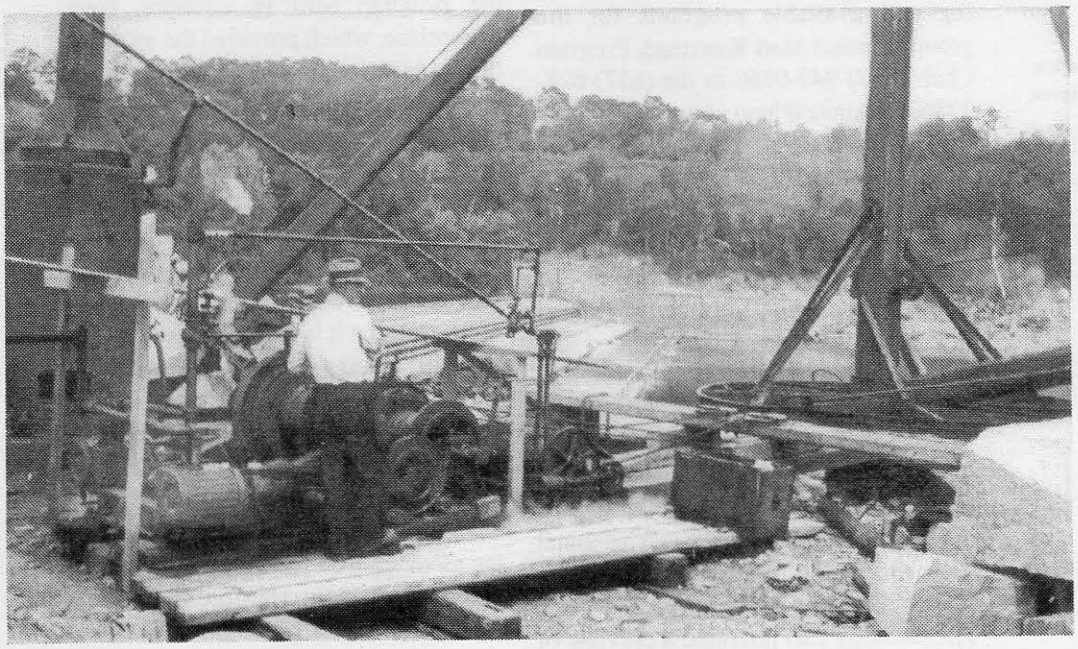
We would like to have a meeting in Maine and welcome suggestions from members with ideas about possible locations. The area around Augusta has numerous mill sites, and I am sure there may be some possible locations in the Berwick area.

Katherine Donahue
Hartland, VT

Historic Hydroelectric Photos to be Conserved

Recently the industrial archeology of the Sewall's Falls hydropower station in Concord, New Hampshire, continued with the analysis of a collection of over 400 historic photographs. The site was New Hampshire's first three-phase electrical generating plant, originally placed on-line in 1894, and has been the subject of several articles by David Starbuck and Dennis Howe in *IA* [1990:16(2);40-61 and 1994:20 (1&2); 119-138] and this newsletter.

The photographs, which are dated between 1893, when the construc-



A steam powered derrick and its operator at the Sewall's Falls Dam, c1936. Concord Electric Company Collection.

Workmen remove a thick layer of concrete from the planking of the spillway of the timber crib dam at Sewall's Falls, c1933. This and other photos revealed the results of experimental use of concrete which failed. Concord Electric Company Collection.

tion of the station began, and 1966, when the station was finally shut down, were made available to Starbuck and Howe during their survey for the Historic American Engineering Record (HAER) in 1992. The survey was carried out to mitigate the adverse effects of stabilizing the remains of the hydropower complex's unique timber crib dam as the site was being prepared for public access with water front development funded by a grant from the United States Fish and Wildlife Service's Dingell-Johnson Program administered though the New Hampshire Department of Fish and Game.

The renewed research was made possible because the collection is to be donated to the New Hampshire Historical Society archives by the Concord Electric Company to assure its preservation. The creation of a catalog, which identifies each image by date, direction of the camera, and a description of the subject, required careful inspection under magnification.

The inspection revealed much about processes, construction methods, and other details captured by the photographs as the station was enlarged and repaired over its 72 years of operation. For example, it was possible to trace the development of concrete technology at the site from its introduction early in the 20th century. It is conjectured that the construction of the second powerhouse, begun in 1905, was the first important industrial application of reinforced concrete in the State.

The original components of the station were constructed with 19th-century technology and materials: timber cribbing, packed with stone in the dam and power canal; granite masonry in the abutments, headgate structure and powerhouse foundation; and wood and brick in the powerhouse superstructure.

A third powerhouse, which applied steam technology to electric power generation, was constructed entirely of concrete in 1908. Reinforced concrete was used in the construction of its floors and machine mounts, and concrete blocks were used in its walls.

The photographs revealed that site engineers experimented with concrete. To protect the 3-tier, 470-foot-long spillway of the timber crib dam, and avoid the necessity to replace the fir plank sheathing every 7 years, a thick veneer of concrete was applied to the planking. Rather than making an improvement, the concrete failed to provided protection or improved stability so that costly removal and rebuilding was necessary.

Photographs taken in 1933 revealed a severely distorted, concrete-coated spillway which had suffered ice build-up in the stone-filled cells during the winter. Other photos showed the removal of the eight-to-twelve-inch-thick concrete veneer by laborers using hand tools and wheelbarrow. Evidence of the failed experiment was not recognized in extant remains which emphasizes the value of the photographic collection in understanding industrial history.

Once archived, the Concord Electric photographic collection can provide much information to researchers. Several structures which were captured by its images have since disappeared from the site. Tools and equipment, long abandoned to newer technology, can be seen in the collection.

More than three hundred of the images captured the processes of repair and reconstruction with sequences of photographs. Most of the sequence images are on cellulose nitrate substrate film which is inherently unstable and self destructive over time. Conservation will include duplicating the negative images onto modern, stable film for safe storage.

The collection will be helpful

when interpreting the site for the public as further access improvements are made by the State. The remains of the buildings can provide important examples of a rapidly-changing industrial architecture which occurred during a short 15-year period at the turn of the 20th century.

Dennis Howe
Concord, NH

Historic Bridge at Risk in NH

[Editor's note: the following article by New Hampshire's Architectural Historian, James L. Garvin, was published in the *Concord Monitor,* March 23, 1997. While it is about a New Hampshire bridge, Garvin's concerns are applicable to any of the New England states.]

If you want to see how fragile our New Hampshire heritage is, look at Henniker.

Henniker has been battling tooth and nail to keep a Rite-Aid store out of its village. The people of Henniker know that a generic pharmacy would kill locally owned businesses and draw traffic out of the town's historic center. weakening the vitality of the village.

Henniker voted down a cellular telephone tower on Craney Hill, preferring to save a 1939 fire tower that has been listed on the National Historic Lookout Register.

Yet Henniker also just voted to demolish one of the most historic and picturesque steel-truss bridges in New Hampshire.

At town meeting on March 12, Henniker voters decided to replace the Patterson Hill Road Bridge with a modern stringer span, even though the historic bridge could have been rehabilitated for $575,000. The new bridge will cost $815,000, of which the state will pay $652,000.

As everyone who travels the old Franklin Pierce Highway between Henniker and Hillsboro knows, the Patterson Hill Road Bridge is one of the most picturesque of New Hampshire's early steel spans. The sudden appearance of its delicate trusses above the Contoocook River as one rounds the curve by the paper mill dam has long assured travelers that New Hampshire's history is still safely with us.

The Patterson Hill Road Bridge was built in 1915. It was designed by engineer John W Storrs of Concord. Storrs was a New Hampshire pioneer in steel bridge design and the author of a 1918 book on bridges, a slim volume that exerted great influence over highway engineers and road agents in the early years of the century. Storrs was also a visionary highway planner who conceived the three great automobile routes from the Massachusetts border to the White Mountains – today Route 16 on the east, Route 3 in the middle of the state and Route 10 on the west.

Partly because of its authorship by Storrs and partly because of its age – it is the oldest active span of its design in the state – the Patterson Hill Road Bridge was declared eligible for the National Register of Historic Places in 1987, The bridge is a historic monument, but it's more than that. I have taken several bus tours along former state highways. I especially remember one tour sponsored by the National Trust for Historic Preservation.

Henniker folks would have been surprised at the admiring outcry with which Americans from younger or more urbanized states greeted their first sight of the old bridge as the bus rounded the curve in West Henniker.

Folks living anywhere along the Contoocook would have been equally surprised at the fascination with which the nation's most avid preservationists regarded the entire Contoocook River Valley from Hopkinton to Jaffrey. There is simply no comparable landscape anywhere else in the United States, rich with water vistas, beautiful villages, wood, stone and early steel bridges and the full range of New England's industrial history. If ever a route in New Hampshire deserved to be designated a Scenic Byway, that route is the old Pierce Highway, now mostly bypassed and peaceful, from Contoocook to Hillsboro.

Long dependent on tourism, New Hampshire is beginning to recognize that people don't come here for our scenic beauty alone. They come from younger states and from foreign countries to see in New Hampshire the preserved landscape of American history. They want to see and touch the things of America's youth, to speculate on what sort of people conquered the rugged landscape of the Northeast and harnessed its turbulent streams to turn the wheels of the American industrial revolution. They come to see our stone walls, our villages, our textile mills and our bridges as well as our lakes and mountains.

We take our heritage too much for granted. We cannot see ourselves as others see us.

Like strangers from a foreign' country, my bus passengers quizzed me about the firewood pile in the yards of Henniker houses or the stacks of pine boards at a roadside lumber yard. They wanted to know the geological origins of the sand and gravel in borrow pits, and how cold it gets in the winter, Some, from flat and treeless places, were astonished (and even a little apprehensive) at our curving roads, our thick forests, our steep hillsides.

These are the new tourists on whom New Hampshire must depend. Some are Americans from places that have little history in their landscapes and for whom everything in the New Hampshire countryside is ancient and wonderful. Some are Europeans who have learned to preserve their history for tourists from around the world, and who now come here to see our history.

Our economic future depends on the kind of people who crowded to the side of the bus to snap pictures of the Patterson Hill Road Bridge. We must learn to see our state through eyes as fresh as theirs.

There won't be as much to photo-

graph the next time a tour bus follows the Contoocook to West Henniker. The scenic beauty of the turbulent stream will remain, as will the quiet impoundment above the paper mill dam. But one of the most dramatic images along the route, a sight that today quickens the pulse of anyone who loves the old New Hampshire, will be missing. In its place will be a bland bridge of steel beams.

There is only one Patterson Hill Road Bridge in the world, and soon it will be gone.

James L. Garvin
Pembroke, NH

Stone Arch Bridges Make News in MA

Stone arch bridges in Western Massachusetts were recently written up in two newspaper articles. The first (*Bennington Banner*, March 8, 1997, p. 2C) described the stone arch railroad bridges built up the Westfield River, while the other (*Berkshire Eagle*, March 17, 1997, p. B3) described planned improvements to the Old Curtisville Bridge in Stockbridge.

The Westfield River bridges, built by George Washington Whistler in the 1830s, allowed steam locomotives to negotiate the steep, eight-mile-long, narrow gorge. At the time it "was the steepest railroad in the world – so steep that when they started building they didn't have any engines that could climb that grade." It was the final section of track to link Boston wharves with the Erie Canal at Albany, NY.

The ten bridges were built of stone to gain strength needed to carry the heavy trains. The arches were pieced together without mortar by Irish and Scottish craftsmen, from square blocks of granite quarried from the surrounding cliffs. Each 50-foot-wide bridge rose higher than the last until the highest surviving arch soars more than 70 feet above the stream below,

Amtrak trains still rumble over three of the bridges, including a graceful double arch in Middlefield, the only one of the five surviving bridges that can be seen from a road. Two more arch bridges were abandoned after the turn of the century. Although vandals and nature have taken their toll on the abandoned bridges, they have survived well. The Old Curtisville Bridge, built in 1842, spans Larrywaug Brook near the intersection of Route 183 and the Interlaken Crossroad, about a mile northwest of Stockbridge village. The bridge is distinguished by its large stone arch that was built without mortar. Drainage from the road above is causing fill behind the wall to wash away, and the iron railing is also in need of repair.

Canterbury Farm Landscaping, Inc. of Becket, Mass, was awarded the $38,368 contract to repair the bridge, which will begin in April and be completed by Memorial Day.

Vic Rolando
Bennington, Vt.

Dublin Seminar

This year's Dublin Seminar for New England Folklife, June 27 - 29 at Deerfield MA, is on "Textiles in Early New England: Design, Production, and Consumption.' The Saturday session will include papers on industrial production and outwork production in the lace industry, including a paper by chapter member Richard Candee. For more information contact Peter Benes, Director of the Dublin Seminar, Boston University Scholarly Publications, 508 369-7382.

Vermont Archeology Week to Feature IA Tours

This year's Vermont Archeology Week will be held September 21-27, 1997. Among the dozens of programs and events will be IA tours by Victor Rolando. The always-popular tour of the Forestdale Ironworks State Historic Site in Brandon will be repeated this year; other IA tours will be scheduled for weekends and weekdays in southern Vermont.

For unfortunates who live outside Vermont, please contact Vic at 214 Jefferson Hgts, Bennington, Vt 05201; (802) 442-0105 to get on the mailing list of events.

IA on the Web

The following IA sites should be of interest to SIA members with web access, and should be inspiration for others to experiment with exploring!

http://www.ss.mtu.edu/IA/sia.html
The home page of national SIA!

http://www.iarecord.demon.co.uk/
This is the place to start browsing the web for IA. Many, many links to other interesting sites. I.A. Recording is dedicated to recording British IA on film and video. Their web site is a great service!

http://www.yale.edu/ewhitney/index.html
New England IA! The Eli Whitney Armory site with information on the ongoing field excavations at the Armory.

http://spirit.lib.uconn.edu/Archnet/topical/historic/SIA/sia.htm
Back issues (1991-4) of our own New England Chapters Newsletter.

http://Icweb2.loc.gov/ammem/paper/west/westhome.html
Library of Congress, "inside an American Factory: The Westinghouse Works, 1904" includes 21 early motion picture film clips.

Happy IA surfing!

Michael Steinitz
msteinitz@juno.com

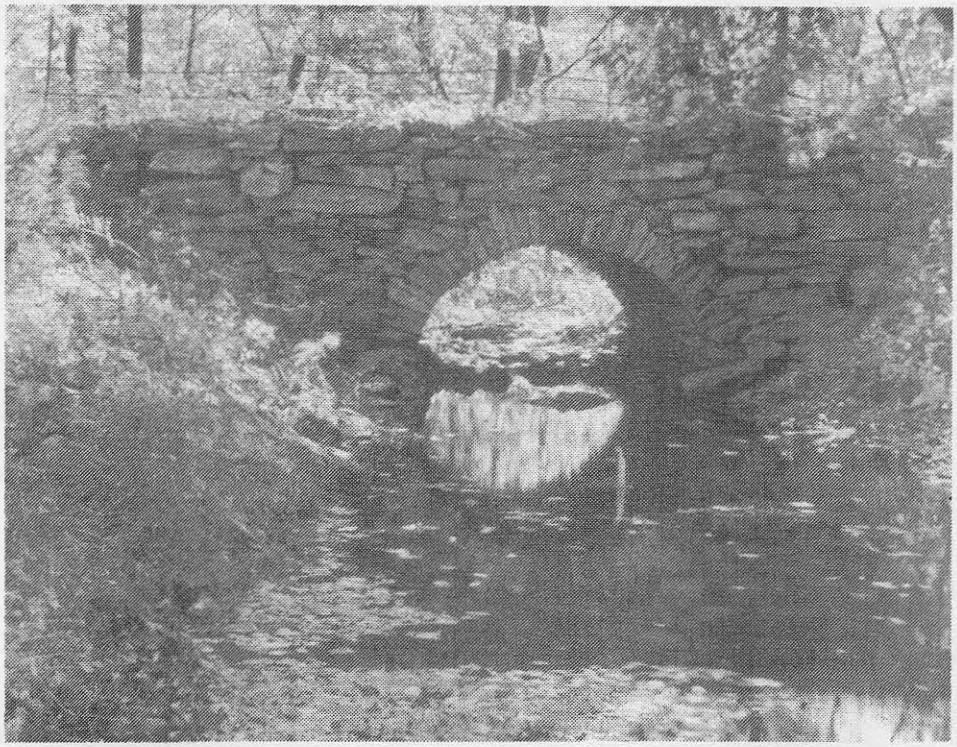


Figure 1. *Depot Road Bridge (K. Holm photo).*

Vernacular Bridge and Hydropower Engineering Documented in CT

Recent replacement of the Depot Road Bridge in Coventry, Connecticut included documentation by Raber Associates (South Glastonbury, CT) of two associated, well-preserved 19th-century rubble-masonry structures: an arched bridge crossing Mill Brook, and a nearby arched culvert running under the brook. The visible bridge structure was recorded to standards of the Historic American Engineering Record. During construction of a new bridge and demolition of the old one, investigations beneath the stream bed documented bridge footings and the culvert, which was built as part of a satinet mill tail-race. Both structures had similar materials and almost identical foundation systems. The culvert is an example of vernacular hydropower engineering which appears to have provided some short term advantages, but which also may have inhibited subsequent power arrangements.

Mill Brook falls about 250 feet in two miles from Lake Wangumbaug to the Willimantic River. By the early 19th century, the brook powered a number of industrial enterprises, and eventually supported fourteen small mills making a wide range of products including silk, woolens, satinet, and metallic cartridges. At the lowest privilege on the brook, immediately above the Depot Road crossing, a sawmill, dam, and pond appeared by c1806, with a fulling mill added c1812-18. Local entrepreneurs enlarged the site in the early 1830s to make satinet and cassimere. Coventry Satinet Manufactory's construction probably included raising the dam, building the culvert, and replacing a earlier timber crossing with a stone-arch bridge. The undocumented decision to build a stone bridge probably reflects the crossing's position on an important local road, and the location of the bridge just below the mill dam, failure of which would have seriously threatened a less durable structure.

The Depot Road Bridge was an excellent example of the most basic type of vernacular masonry arch construction. Bridge stones were locally-available gabbro. Carrying the roadway over Mill Brook for a distance of about 35 feet, the bridge had an 11-foot-wide semi-circular arch of unmortared, largely uncut flat stones, and mixed-size, flat rubble spandrels retaining rubble fill. Many of the arch ring stones were at least partly cut or finished. The 28-foot-long arch rose 6 feet above platforms of large, flat, 6-to-12-inch-thick rubble slabs, set 9.5 feet apart in the brook. The coarse-textured bed of Mill Brook in the bridge vicinity, consisting primarily of deep sand, gravel, and cobble deposits, provided a firm bed for flat-bottomed rubble slab footings. Although seated only about a foot

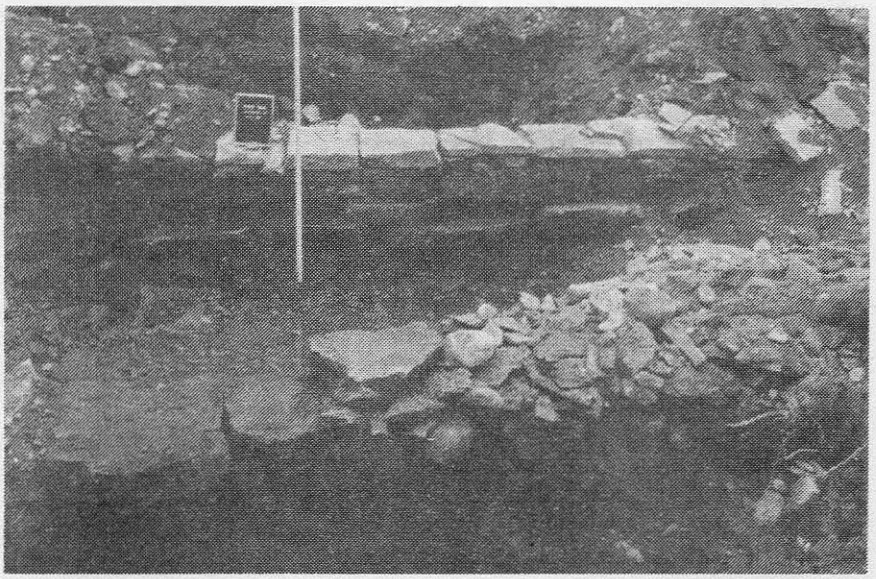


Figure 2. *Depot Road Bridge footings (K. Holm photo).*

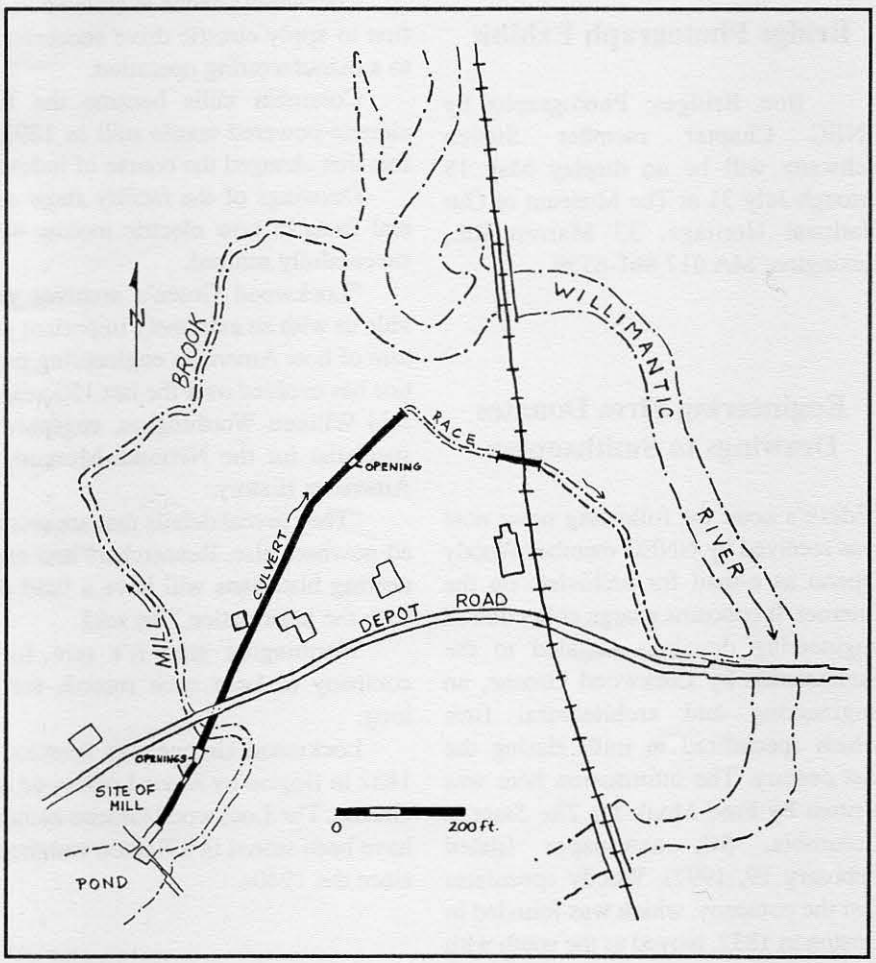


Figure 3. *Sketch Plan of Coventry Satinet Manufactory Tailrace System. Drawn by Michael Raber.*

below the stream channel, the bridge footings remained sound for the approximately 160-year history of the bridge (Figures 1 and 2).

The most unusual component of waterpower development at the satinet works was the tailrace system, which carried waste water from the wheel pit not into Mill Brook, but rather below the brook and into the Willimantic River. This arrangement, including a short open race below the wheelpit and the much longer stone culvert, increased the available head from perhaps 14 feet to the 18 feet documented from federal census reports and surviving dam and tailrace remains. A much larger dam would have otherwise been needed to obtain the same result. The culvert, a rubble-stone arched structure built of the same materials used in the bridge, ran about 760 feet underground to an open ditch which originally ran another 700 feet into the Willimantic. The 10-foot-wide, approximately 3-foot-high culvert had a gravel-bottomed channel 6.4 feet wide, 10-inch-high vertical sides of rubble blocks, and a low arch of split boulders rising to a point about 1.8 feet above the culvert bottom. The top of the arch was about 2 feet below the Mill Brook stream channel bottom, at a point very near a corner of the bridge (Figures 3 and 4). In addition to increasing head at the mill, the culvert may have been built to avoid backwater or erosion problems. Coventry Satinet used this area for other structures, and may have been uneasy about possible flooding or erosion. In particular, introducing a strong tailwater flow into the brook at this point could have contributed to erosion of the upstream bridge abutment edges.

The tailrace culvert was the most constricted component of the waste water system at this site. Several estimates of culvert capacity were made, based on observed dimensions of the documented culvert section and possible culvert slope as suggested by an elevation in a culvert opening about 460 feet from the stream. It appears that the culvert discharged about 12 cubic feet/sec-

Figure 4. *Coventry Satinet Manufactory tailrace culvert section under Mill Brook (K. Holm photo).*

ond, just enough to discharge the minimum flows needed to run the earliest waterwheel installed at this privilege, as calculated from known head and horsepower data. Variations in Mill Brook flow data are not yet calculated. By chance, calculation, or experience, the Coventry Satinet Manufactory built perhaps the smallest culvert possible to provide one or more of the advantages suggested above. The culvert probably had several disadvantages, however. Limited openings made maintenance difficult and the culvert prone to accumulation of silt, decreasing the flow capacity. Even when fully open, the culvert's small size made it prone to backwater if headrace intake controls failed to stop high water, and an abrupt rise in water surface occurred as flow was retarded. With enough velocity, water pressure could have also damaged the culvert. Culvert builders probably minimized the culvert slope to reduce velocity, carefully weighing waste water demands against potential high-water damage. The open tailrace channel just below the presumed wheelpit location may represent an attempt to release some of the pressure from such an event, as may two small culvert openings between the open channel and Mill Brook.

The satinet mill ran under various owners until an 1880 fire and was rebuilt c1908 as a fiberboard mill which operated on a somewhat occasional basis until 1940, when the site again burned. The earlier complex was powered by water and steam before 1870, and at some point a turbine replaced what was probably an overshot or high breast wooden wheel. Survival of the culvert for over 160 years in operable condition attests to the empirical wisdom of its builders or subsequent users. If water supply allowed for use of more than about 12 cubic feet/second during much of the year, however, culvert size may have inhibited waterpower development at this site. We do not know if the introduction of steam power here reflected a need to run more equipment than first installed in the 1830s, a desire to overcome seasonal under-supply of water seen in the original site design, or both.

Michael Raber
South Glastonbury, CT

Bridge Photograph Exhibit

Iron Bridges: Photographs by SNEC Chapter member Steven Schwartz will be on display May 15 through July 31 at The Museum of Our National Heritage, 33 Marrett Rd., Lexington, MA 617 861-6559.

Engineering Firm Donates Drawings to Smithsonian

[Editor's note: the following news note was received by NNEC member Woody Openo as e-mail for archivists on the Internet. It concerns a large collection of engineering drawings donated to the Smithsonian by Lockwood Greene, an engineering and architectural firm which specialized in mills during the last century. The information here was written by Fred Monk for *The State,* a Columbia, SC, newspaper (dated February 19, 1997). Woody speculates that the company, which was founded in Boston in 1832, moved to the south with the textile industry.]

Lockwood Greene helped create history with its designs of facilities during the rise of American industry.

The Spartanburg-based engineering and architectural firm is making history again with the donation today of more than 5,000 original engineering drawings to the Smithsonian's National Museum of American History.

This is the largest collection ever donated by private industry.

The drawings record on paper the rise of industry in America and date back to the mid-1800s.

Most of the drawings are in mint condition, and many are on linen using India ink – the tools of the trade for draftsmen in the 19th and early 20th centuries.

The engineering drawings include the historic Columbia Mills, now the State Museum on Gervais Street.

Lockwood Greene is credited as the first to apply electric drive successfully to a manufacturing operation.

Columbia mills became the first electric-powered textile mill in 1893, a feat that changed the course of industry.

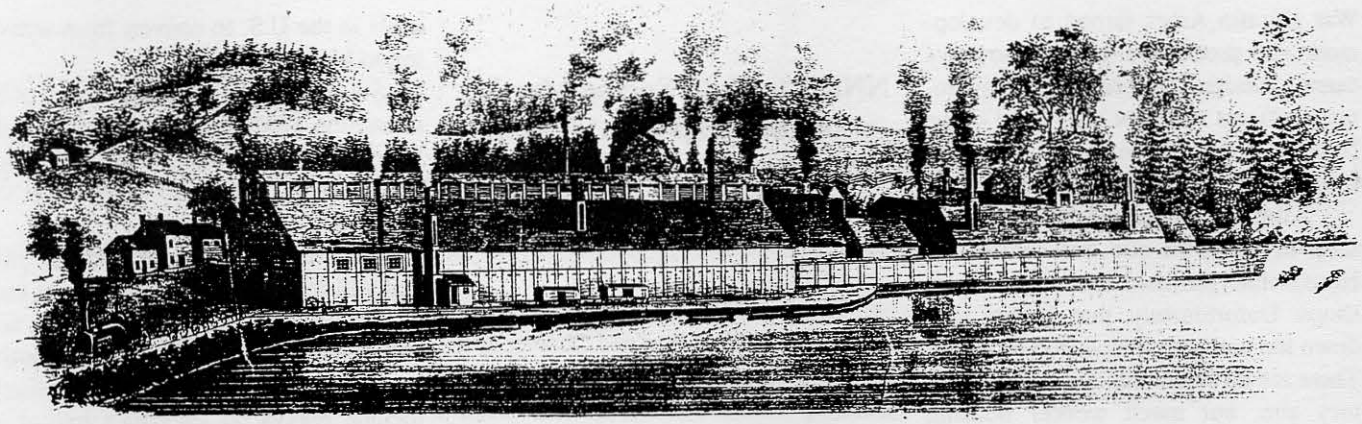
Drawings of the facility show several firsts in how electric motors were successfully utilized.

"Lockwood Green's archives provide us with an extremely important picture of how American engineering practice has evolved over the last 150 years," said William Worthington, engineering specialist for the National Museum of American History.

"They reveal details that are recorded nowhere else. Researchers and engineering historians will have a field day with the information," he said.

Worthington said it's rare for a company to keep such records for so long.

Lockwood Greene was founded in 1832 in Boston by Amos Lockwood and Greene. The Lockwood Greene archives have been stored in a Boston warehouse since the 1940s.



The Ames Ironworks at Falls Village, Connecticut, in 1853. This works operated from 1832-1871 and here artisans manufactured a variety of products, mostly heavy forgings such as axles, cranks, and tires for locomotives. Ames also fabricated a small number of wrought-iron, rifled cannon during the Civil War. (From the L. Fagan Map of Canaan, 1853. Courtesy of the Sterling Memorial Library, Yale University.)

Gaining Insight into New England Iron Industry

Since early last fall Greg Galer, Robert Gordon, and Fran Kemmish have been studying the history of the Ames Ironworks in Salisbury, Connecticut. Galer is in the midst of dissertation research on the Ames family of Easton, Massachusetts, and its industrial operations, including this one on the Housatonic River. Gordon and Kemmish have been studying northwestern Connecticut industry as part of a National Science Foundation grant. The research draws on a wide variety of material from manuscripts to slag analysis. Sources such as extant correspondence, account books, maps, land records, and credit reports provide a rich resource for conclusions about the lives of workers and the complexity of managing an ironworks from the 1830s to 1870.

Now, as the end of the research and writing is coming into view, what began as a small paper is looking more like a short book which addresses many issues of interest to industrial archeologists. Perhaps the single most interesting conclusion is that Horatio Ames along with his partners John Eddy and Leonard Kinsley were the first to adapt the British technique of puddling to the American environment by firing their furnaces with wood.

The difficulty of getting an enterprise such as this one operating and at a continued level of profitability becomes clear when one realizes the numerous resources to be managed: raw materials, water power, finances in an erratic and immature economy, difficulty in reaching distant markets, and employee-employer relations that had yet to be fully transformed from artisanal traditions. The research also addresses the dangerous work environment and the isolated social environment workers endured, technology transfer, and technical innovation in ironworking before trained metallurgists. Account books provide the ability to trace worker purchases, and this resource combined with land records allows study of domestic life.

The Amesville works produced plates for Oliver Ames's shovels made in Massachusetts, bar iron for axes, crow bars, huge shafts and cranks for steam engines and steam ships, and axles and tires for locomotives. The works was involved in production of locomotive supplies very early and built a large following from railroads in and beyond New England. During the Civil

This Greek Revival home is typical of several extant homes on Puddlers Lane (c. 1850) near the site of the Ames Ironworks. Horatio Ames provided mortgages of approximately $600 to some of his more skilled artisans to allow them to build these homes. Most of the puddlers originated in England. Ames hoped that married puddlers, who had an investment in a home such as this one, would provide a more stable work force than the single, "rum-drinking devils" with whom he had struggled. Upwards of 300 men were employed at the Ames works.

War Horatio Ames turned to development and production of an innovative cannon design. Unfortunately, government officers were not convinced of the benefits of Ames's heavy ordnance and few guns were ordered or made.

After the Ames works closed up shop in 1871, the site was sold to the Housatonic Railroad for their repair shops. Unfortunately, that facility shut down too and was demolished by 1904. There are no extant buildings on the factory site, but much worker housing remains, as do cellar holes of additional buildings from this former industrial community.

Galer, Gordon, and Kemmish are working towards an interdisciplinary examination of American industrial development through study of this one particular ironworks. The publisher of this study has not yet been determined.

Greg Galer
North Easton, MA

NNEC to Hold Spring Meeting at the Belknap Mill, Laconia

SATURDAY, MAY 17, 1997
9:00 AM

The Beklnap Mill Society will host the Northern New England Chapter as it holds its Spring Meeting at the historic Belknap Mill in Laconia, New Hampshire, on Saturday, May 17. Tours of the Belknap Mill, Star Specialty Knitting Mill and the Allen Rogers wood working mill will be on the day's program.

The Belknap Mill tour relates to the Norton-Prize winning article by Mary Boswell in *IA* (Vol.XX Nos. 1& 2). The Belknap Mill is the oldest unaltered brick textile building in the United States and the only remaining example of architecture representing the early stage of industrialization in this country. The nearby Busiel Mill represents a second stage. Both were among the first mills in the U.S. to convert from weaving to knitting.

Star Specialty Knitting is the only remaining knitting mill in operation in Laconia, which was once a leading international center of that form of industry.

Allen Rogers is a wood-turning mill that still relies on water to power its turbine to produce electricity. All mills are within walking distance from one another. Booklets will be provided which include essays on Laconia's industrial history, biographies of the mills, and a map.

The Belknap Mill Society is working with the City of Laconia to convert an adjacent lot (south of the Belknap Mill) into a park with walking tours along the river. It will be completed by June 21, 1997.

Anyone wishing further information may call Dennis Howe, (603) 225-6649.

NEW MEMBERS SOUGHT

Both the Southern & Northern
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