

## Society for Industrial Archeology · New England Chapters

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### Berlin Paper Mill Faces Demolition

News came in October, 2006, that the enormous pulp mill that has stood on the eastern bank of the Androscoggin River in Berlin had been sold. The purchasers of the property, North American Dismantling Corporation of Michigan, began removal of the plant in November, announcing their intention to clear the 121acre site for redevelopment within a year. Historians throughout New Hampshire are mobilizing to rescue archival materials from the site and to record the appearance of the buildings and machinery before they disappear forever.

Riverside Pulp and Paper Mills and Burgess Pulp Mill, which constitute the core of the property to be cleared, were flagship facilities of the Brown Company. The Brown Company evolved from the former Berlin Mills Company, which had descended from a sawmilling operation that began in 1852 with the arrival of the railroad at this formerly remote location on the Androscoggin River.

Berlin Mills Company acquired the interests of the nearby Burgess Sulphite Fiber Company in 1906, gradually increasing production until the Berlin Mills (later Brown) Company complex became the largest chemical pulp mill in the world. The company continued its operations, with varying degrees of prosperity, until Gulf and Western Industries acquired control of its properties in 1968. Through a series of stock purchases, the Berlin holdings successively operated under the names of James River Corporation, Crown Vantage, Pulp and Paper of America (an affiliate of American Tissue), and Fraser Paper.

The longevity of the Brown Company generated a huge, and still largely unevaluated, body of records that were stored in several buildings on both sides of the Androscoggin River. The company's extensive photographic archives were transferred to Plymouth State University in the 1980s. The New Hampshire



A section of the Brown Company mill undergoing demolition. Photo by David Starbuck.

Historical Society recently received some 200 Brown Company account books. But quantities of architectural drawings, blueprints, and other engineering records remain on-site, in buildings that will soon be demolished. Efforts are now underway by the New Hampshire Historical Society, advised by Berlin's Northern Forest Heritage Park and assisted by the New Hampshire Division of Records Management and Archives, to move these records to a safe refuge for later assessment and arrangement.

Elements of Berlin's century-old industrial landscape are disappearing daily as the bewildering array of structures and utilities at the site are reduced to rubble. In an effort to secure a visual record before it is too late, Professor David Starbuck of Plymouth State University has volunteered his skill as an excellent photographer. Historians will attempt to identify and gain access to photographic records that other individuals have made in recent years.

Berlin's industrial landscape is a legacy of American enterprise. In the early twentieth century, the Brown Company established the first and largest research department in the pulp and paper industry, and one of the earliest industrial research and development programs in the United States. As the source of pioneering innovation in the wood pulp and paper industries, the company revolutionized the utilization of forest products, greatly enhancing the value and productivity of forests across North America.

Following its construction of a caustic soda plant in 1908, the company sought ways to utilize chlorine, a byproduct of the manufacture of soda. Through chemical research, the company developed methods of manufacturing chloroform, sulfur chlorides for use in military poison gases, artificial rubber, liquid chlorine, and other products. Seeking methods to use hydrogen, a byproduct that was formerly wasted, Brown researchers developed Kream Krisp hydrogenated peanut oil shortening, the precursor of today's hydrogenated vegetable shortenings.

Controlling the timber on lands that eventually totaled some four million acres, the Brown Company became an American leader in scientific forest management and regeneration. The company always concentrated on paper products, directing much of its research to the improvement of kraft papers, newsprint, and highly purified wood pulps and cellulose fibers. The company pioneered in the production of kraft paper in the United States, transforming that specialty into the manufacture of

Nibroc towels, the first practical paper towels. The company was the first to develop means of using hardwoods as well as softwoods in the manufacture of highgrade pulp, the first to determine precisely the papermaking characteristics of pulp, and the first to measure the brightness of bleached pulp, thus permitting accurate control of the whiteness of paper. The company's purified wood pulps and fibers were found to have great utility in the manufacture of rayon, cellophane, celluloid, vegetable parchment, photographic papers, sandpaper, masking tape, electrical insulation, artificial leather, and fiber pipe and conduit.

The inventive productivity of the Brown Company established the value of pure and applied research in American industry. The company employed noted chemists and engineers who won international acclaim. The company's first research chemist, Dr. Hugh K. Moore, was awarded the Gold Medal of the American Institute of Chemical Engineers in 1920 and the Perkin Medal of the Society of Chemical Industry in 1925. His successor, George A. Richter, directed the Research Department between 1919 and 1940, being granted some 400 patents. By 1942, the Brown Company owned about 500 unexpired United States patents and 300 Canadian patents. The company's demonstration of the crucial nature of industrial research was celebrated at the period of World War I in articles by author Alfred Ellwood Hendrick, the curator of Columbia University's Museum of Chemistry and, later, in books like Maurice Holland's Industrial Explorers (1928).

> James L. Garvin, New Hampshire Division of Historical Resources



1851 Jonval Turbine still in situ at Fairmount Water Works Interpretive Center in Philadelphia. Courtesy Hagley Museum and Library.

CALL FOR PAPERS Society for Industrial Archeology 36th Annual Conference Philadelphia, Pennsylvania June 7-10, 2007

The SIA invites proposals for papers and poster sessions to be presented at the Annual Conference on Saturday, June 9, 2007, at Philadelphia, PA. Poster sessions can be works in progress. Presentations on all topics related to industrial archeology and bridges are welcome. Papers about industries in the Philadelphia/Camden region are encouraged. All papers and poster sessions should offer interpretation and synthesis of data.

Presentation Formats: Proposals may be for individual papers, themed papers filling a 90-min. session, or organized 90-min. panel discussions (formal commentator optional).

Proposal Formats: Each proposal must include: 1) title; 2) a 500 word abstract with a detailed discussion of points, findings, or conclusions to be presented in hard copy and electronic format (Word or WordPerfect); 3) résumé for the presenter(s), including postal address, telephone/fax, and e-mail; 4) a list of visual-aid requests. A panel organizer should submit all paper proposals as a group, accompanied by a title and a brief description of the theme or purpose. If any of these items are missing, the proposal will not be considered.

Presenters are encouraged to consider transforming papers into an article for IA: The Journal of the Society for Industrial Archeology. No conference proceedings are published.

Deadline for paper proposals: February 15, 2007. Send copies of all proposals to: Fred Quivik, Program Chair, SIA 2007 Paper Sessions, 715 Vernon Road, Philadelphia, PA 19119; (215) 849-1478 (phone and fax); Quivik@usfamily.net

The Twentieth Annual Conference on New England Industrial Archaeology Sponsored by the Southern and Northern New England Chapters of The Society for Industrial Archeology

### **Call for Papers**

Location: Clark University - Jefferson Hall - 950 Main Street - Worcester, Massachusetts Date: Saturday, February 24, 2007 - 10:00 AM - 4:00 PM Organizers: SNEC-SIA Board of Directors

Important Date: Last Day of Submission of Paper Abstracts is January 10, 2007

Call for Papers: The chapters are inviting members, scholars and independent researchers to submit abstracts of papers or oral presentations to the conference committee for review and possible inclusion in the program. The goal of the conference is to provide an opportunity for members, the general public, academicians and professionals interested in the field of industrial archeology to meet. The object of the conference is to illuminate current work in studies of the material culture of our industrial past. An additional goal is to encourage field investigation, research and the exchange of information about all aspects of our industrial heritage. While all studies in Industrial Archeology are invited, work pertaining to the New England area will be preferred. Past presentations have included papers on:

Crib Dam Construction	Industrial Heritage Sites and Museum Topics
Railroad Switching and Power Systems	Early Fire Alarm Systems
Roundhouses	Fireproof Construction
Power Stations	Rope Manufacture
Mining and the Metals Industries	Preservation Projects
Archaeology of a distillery site	Coastal Defense Forts
Industrial Heritage Sites and Museum Topics	The Timber Industry
Toy Drum Manufacturing	Civil Engineering Projects

Abstract Specifications:

Abstracts should be generally limited in length to 500 to 750 words. Each abstract should have a title page and text page(s). Submission of abstracts may be made via e-mail, fax or mail. e-mail is preferred. There is a limit of two contributed papers per author.

Short, informal "Show and Tell" presentations on work in progress, local preservation projects, artifacts and topics of general interest to industrial archeologists and members are also invited.

Each submission should include the following information on the title page: Title of submission Two or three keywords that describe the submission Name(s) of the author(s) Affiliation or Firm Mailing address(es) E-mail address(es) Phone or fax number(s) List of Audio-visual equipment required for presentation. Power Point presentations must be submitted on a disk ten days prior to the conference date to insure that they will be compatible with available equipment.

Submission/Contact Address: Robert Stewart 2007 NNEC-SNEC Conference 1230 Copper Hill Road West Suffield, CT 06093 Tel.: (860) 668-2928 Fax: (860) 668-9988 e-mail: robert.stewart13@att.net



On October 28, 2006, six members braved the rainy and windy conditions to tour the Vermont Plywood and Vermont Verde Antique stone quarry site.

The Vermont Plywood LLC manufacturing plant is located in Hancock in central Vermont. The plant first opened in 1925 and has been producing hardwood plywood for many decades. Once owned by Weyerhauser and running three shifts around the clock, the plant at some point was sold to Chesapeake Hardwoods which was eventually forced to close the plant three years ago due to competition from China, which currently provides 40% of the hardwood plywood used in kitchen cabinets and wall paneling.

Only six months after closure, Vermont Plywood LLC reopened the plant with 35 employees and began producing high quality hardwood plywood. The plant no longer turns and peels the hardwood logs for veneer. Instead, the company purchases the veneer, core and backing in 4ft. x 8ft. sheets, then assembles them together to produce 3-ply hardwood. The plywood can be produced in widths of 5/32", 3/16", 1/4", 1/2", and 3/4". The veneer is primarily from Vermont and Canadian mills and includes oak, maple, cherry, birch, walnut, poplar, cedar, butternut, mahogany, and occasionally pine. The hardwood plywood can be made with a single- or double-beaded surface. The core material is either particleboard, fiberboard, or lightweight wood imported from Africa or China.

Steps in manufacture include gluing the veneer, core, and backing together. The sheets sit for 20 minutes, allowing the glue to thicken before putting 40 sheets in a press for 20 minutes. The next step is placing them into a hot press at 230 degrees F for one and a half minutes. The sheets are cut to exact dimensions with saws utilizing bicycle wheels on the plywood. They are then run through a three-headed sander for three sandings, starting with 120, then 150, to the finer 180 grit. The hardwood plywood is shipped to c abinet manufacturers and lumberyards in the Northeast. A large volume is also shipped to the previous plant owner, Chesapeake Hardwoods in Virginia, for finishing. This consists of staining the veneer and applying a clear finish.

Under knowledgeable and experienced management, the company is looking to expand, despite the competition from

imported kitchen cabinets found at the large retail stores. A cheese cutting board made by Vermont Plywood LLC was handed out to all members on the tour.

The next stop was Rochester to see the Vermont Verde Antique quarry. This quarry opened in 1952 and runs for 5-6 months each year. The quarry has a small ground surface area, but runs deep vertically due to the nature of the rock formation, which was described as a "bubble" within the surrounding rocks. By the spring a large volume of water fills the quarry, which has to be pumped out before the mining operations can resume. The green serpentine stone has marble-like flowing veins, but it's not a true marble. The hardness and durability are similar to that of granite.

The stone is cut with diamond cable saws into blocks of  $10 \times 5 \times 5$  feet, each weighing between 20 and 25 tons. This is the heaviest weight that can

be hauled on the trucks leaving the quarry. Each year about 40 of these blocks are cut from the quarry. Blocks that have damage or uneven faces are cut into slabs at the quarry, which takes six hours per slab. It's estimated that 10 to 15 years remain for the quarry to continue to mine vertically before the surface area would need to be expanded.

The hardness of the stone makes it suitable for countertops and flooring, as well as exterior building stone and monuments. We were all invited to take samples of the stone from the quarry area. A short annual meeting of the NNEC-SIA, with election of officers, followed the tours at the Forest Service Ranger Station in Rochester.

> David Coughlin Bedford, New Hampshire

## Boswell New Executive Director at Enfield Shaker Museum

After nearly 20 years as executive director of the Historic Belknap Mill in Laconia, NH, Mary Rose Boswell has accepted a new position as Executive Director of Enfield Shaker Museum in Enfield, NH, near Dartmouth College, effective January 1, 2007.

Tom Boswell will be hired as Properties Manager. Enfield Shaker Museum is a not-for-profit educational institution that opened in 1986. The Enfield Shakers belonged to a national religious and communal sect who practiced celibacy and were known for their high quality architecture, agricultural products and manufactured goods. The Enfield Shakers established the village in 1793 and closed the operation in 1923.



Today, Enfield Shaker Museum includes eight Shaker structures dating from 1793-1923, a neoclassical chapel built in 1930 by the Missionaries of LaSalette, and the Great Stone Dwelling, a multi-story edifice that is one of the Shakers' greatest architectural achievements.

In elebrating its 20th

year, the Museum paid off

all of its mortgages as well as back taxes to the town of Enfield, which incurred when a business leasing the Great Stone Dwelling went bankrupt. The nonprofit organization has moved its museum operations headquarters to the Great Stone Dwelling and is embarking on a \$1.1 million campaign to address infrastructural issues related to this building. The campaign will fund much-needed energy-saving mechanical controls and weatherization, preservation of the original exterior, interior repairs, disability access and improvements to the landscape.

The Museum has also raised funds to secure a three-year contract with the executive director and properties manager. Tom and Mary Boswell were first employed by the Association for the Preservation of Virginia Antiquities (APVA), which owned 36 properties, including Jamestown Island and the Powder Magazine in Colonial Williamsburg. They oversaw restoration projects at Bacon's Castle (1655), a rare example of Jacobean architecture in America; the Rising Sun Tavern (c. 1760), a meeting place for George Washington, Thomas Jefferson and Patrick Henry; the John Marshall House (1790), the home of the fourth US Chief Justice in the U.S., who formed the U.S. Supreme Court; and Scotchtown, home of Patrick Henry from 1771-78; and Lynnhaven House (c. 1720), a living history farm.

Ms. Boswell has also worked at the NH Historical Society, Canterbury Shaker Village, and most recently the Historic Belknap Mill in Laconia. She has written many books and articles about the Shakers. One book received an award from the American Association for State & Local History.

The Historic Belknap Mill was built in 1823 and is the Official Meetinghouse of New Hampshire. It is listed on the National Register of Historic Places and is significant architecturally and historically because it is the only remaining mill left in the U.S. that replicates the Waltham, NH mill, said to have "launched the Industrial Revolution in America."

As the Historic Belknap Mill's Executive Director, she positioned the nonprofit organization as a model in the museum field. The exhibits, student programs, preservation efforts, and management received state and national awards. The Mill was recognized for Excellence in Management as one of the best managed nonprofits in the state by the Corporate Fund of the NH Charitable Foundation. In 1991, the Mill installed the nation's sole museum on industrial knitting. In 1998, she received at the White House the National Award for Museum Service.

At the APVA, Mr. Boswell was a leading restoration carpenter in the museum field. He was sought by Colonial Williamsburg to oversee their properties before moving to NH, where he worked at Strawberry Banke. For 20 years, he worked in the electronics field and oversaw top secret labs. Most recently, he has been employed at the Belknap Mill as office manager and serves on the Building Committee. He also personally manages income properties.

The Historic Belknap Mill is seeking a new executive director. For information, contact the Search Committee via email: belknapmill\_trustees@ metrocast.net or via mail:

Board of Trustees Historic Belknap Mill 25 Beacon Street East Suite 4 Laconia, NH 03246

#### SNEC President's Note

Under the canopy of the soaring Ashton Viaduct – a five-span open spandrel concrete bridge over the Blackstone River in Lincoln, Rhode Island – SNEC members met on October 14 to see the sites, share some food and hold our annual business meeting.

SNEC member Rick Greenwood and Al Klyberg, a seasonal ranger for the RI Dept. of Environmental Management and chief interpreter of the Kelly House Museum, served as our gracious and exceptionally well-informed hosts. Through their guidance, we got an intimate look at the Blackstone Canal, the area's mill history, and the remains of the road bed for the Southern New England Railway, a proposed link to the Grand Trunk Railway system that would have connected Montreal with the warmer waters of Providence, RI. Unfortunately, the railway sank with the Titanic when the principal director died in the marine catastrophe; today, an abandoned iron drill bit seems to be the last surviving evidence of the scheme.

In our business meeting, our current officers, Martha Mayer, Bill Goodwin and myself, were reelected as secretary, treasurer and president respectively for 2007. All of us agree that this is our last year serving in this capacity; we believe that in order for SNEC to thrive, our organization need to be refreshed with new ideas, knowledge and leadership.

With that in mind, I'm putting out a call to form a nominating committee who would be responsible for identifying candidates for 2008. If you're interested in participating, please call me at (781) 620-1154 or write to jonkranz@ kranzcom.com.

Also, I encourage members to take responsibility for organizing one event this upcoming year. If just five members raised their hands, we'd have five new events! It's a great way to ease yourself into a potential, future leadership role. And I assure you that you will not work alone; Martha, Bill and I will teach you what you need to know and help you along the way.

Our financial status: As of October 14, 2006, our Fidelity Cash Reserves held \$5,718.38, an increase of \$234.20 over last year. Our Citizens Bank checking account declined by \$1,580.51 to \$3,215.11. This was largely due to a one-time setup fee for our new website which cost \$1,455.75.

The website, www.snecsia.org, represents the single biggest "news" item of the year for SNEC. If you haven't done so already, please take a look at it and feel free to submit ideas for improvement/expansion. Note, too, that I will be uploading previous issues of our joint NNEC/SNEC newsletter to the site.

I want to take a moment to express my appreciation for various members (or friends) who have made this year a success. Among them: Bill Goodwin for his outstanding job as treasurer; Martha Mayer for her patient and professional mastery of communications and mail; Dennis Howe, for getting the newsletters to us in PDF format; Bob Stewart for advice and support, and for organizing the upcoming 20th Annual New England Industrial Archeology Conference; Liisa Dowd and John Grady for hosting a fine tour of their hydroelectric facility in Ayer; and, of course, for Rick Greenwood and Al Klyberg for hosting our annual meeting in Rhode Island this year.

Finally, I ask you to save the date, February 24, 2007, for the aforementioned NE IA Conference which will be held at Clark University in Worcester. Watch your mail for the call-for-papers (early November) and the invitation (in the first weeks of the new year). Our website, snecsia.org, will also feature updates about the conference.

Jonathan Kranz

### NNEC President's Note

This is my last report as to the membership as the president of the Northern New England Chapter of the Society for Industrial Archeology. David Coughlin, who has been a vice president for several years, graciously accepted the nomination at the Chapter's Annual Meeting that was held in Rochester, Vermont, on October 28, 2006. Dave has been an enthusiastic supporter of the chapter for many years. Among his contributions was the planning and implementation of the 2004 Fall Tour of several forest-industry mills in Henniker, NH. Please give Dave and the rest of the chapter officers your support: they are Victor Roland, Vice President, Carolyn Weatherwax, Treasurer, and Dennis Howe, Secretary. Leaving the board is David Starbuck, who was elected a national vice president in 2006 and is destined to become SIA President. Currently, there is a vacancy in the NNEC board for a vice president. We encourage an interested member to volunteer to be nominated and serve; the chapter can use the help.

Activities in 2006 began in February in New Hampshire when the NNEC and Plymouth State University hosted the Annual Conference on New England Industrial Archeology (see the Chapters 2006 Spring Newsletter for a summary). Later in the year, Victor Rolando arranged the annual NNEC "Spring Tour" in early July that began with a presentation of the ongoing archeology projects at the Lake Champlain Maritime Museum and a tour of the museum's lab and other facilities. Following the museum activities, Rolando led the group on a tour of industrial sites in nearby Vergennes, Vermont. The chapter's Fall Tour and Annual Meeting was also held in Vermont with a process tour of the Vermont Plywood Company mill in



Participants in the NNEC Spring Tour visit the conservation lab at the Lake Champlain Maritime Museum (above) and the water-powered pump station in Vergennes, Vermont, (below).



Hancock, and a visit to the Vermont Verde Antique quarry in Rochester that I arranged in October (see David Coughlin's report elsewhere in this Newsletter).

To end with a philosophical note: both the Northern and Southern New England Chapters are challenged with issues of modern times; issues not limited to IA but also to many other prestigious organizations, which are forcing many well-established and highly regarded institutions concerned with historical artifacts to enter new phases of reorganization and reconsideration of missions. Technology and changing

> public interests are at least partly to blame and causing, for example, the offering for sale such properties as by Carter's Grove Colonial Williamsburg, Samuel Morse's Poughkeepsie villa, and four houses by Historic New England, formerly the Society for the Preservation of New England Antiquities on the World Wide Web (see the article by Tracie Rozhon in December 31 issue of New York Times on the Web). Most historical museums are experiencing declining numbers of visitors. Regional and national organizations such as the Northeast Council for Historical Archeology and the Society for Historical Archeology, like the SIA, are attracting fewer new members as we watch our chapters experiencing declining membership. The SNEC will need a whole new board of officers next year. The NNEC is short a vice president, and there has been a decrease in participation in NNEC activities. In short, our chapter needs to find better ways to serve changing interests. The need for industrial archeology remains and is indeed expanding. As an organization devoted to important historic preservation issues we need to find a new way to increase participation and accomplish our objectives.

> > Dennis Howe

## The Cedar Swamp Mill Complex Hampton, Connecticut

Remnants of early mills are often found dotting the stream banks of Connecticut. Sometimes these remains are self explanatory, such as an earth and stone dam wall, still retaining water in a pond; other times they are not as obvious, such as a simple stone wall adjacent to a stream. With the aid of historic documents such as maps, property deeds, and local histories, we are sometimes able to bring these remains back to life and retell their story. We find such an example in the remains along the banks of the Cedar Swamp Brook in Hampton, Connecticut, a small town in what is now referred to as the "Quiet Corner" of the state. Research into these remains, which also include a stone arch bridge carrying State Route (or Route) 97 across the brook, tell of a much busier time in the area's past.

The remains of previous milling activities along Cedar Swamp Brook were first identified through an archaeological survey conducted by the Public Archaeology Laboratory (PAL) in 1999. This survey was conducted for the Connecticut Department of Transportation (ConnDOT) prior to planned road improvements along Route 97, which would have involved replacing the bridge carrying Route 97 over the Cedar Swamp Brook. Through a walkover survey and a review of cartographic resources they identified remains of a small cluster of long-abandoned mills along the brook, extending up to several hundred feet west and east of Route 97, as well as the stone arch bridge that carries the road over the brook. A small number of test pits were also excavated in the immediate vicinity of the bridge, revealing largely fill soils likely related to roadwork on Route 97. Additional site visits coupled with intensive background research were undertaken by archaeologists from Earth Tech for ConnDOT, the results of which identified these remains as the Cedar Swamp Brook Mill Complex. These remains are typical of the clustering of various types of early mills and related businesses in areas having both a suitable energy source and transportation routes.

What these remains can tell us about the activities in this area is limited due to deterioration of the abandoned structures over time. Instead information was gathered through a review of property deeds, cartographic resources, family and local histories, census records, and through interviews with local informants familiar with the property.

#### Environmental Setting of Cedar Swamp Brook Mill Complex

Hampton and the Cedar Swamp Brook Mill Complex are located in the Eastern Uplands in the northeast corner of Connecticut. The Cedar Swamp Brook, which provided power to the mill complex, flows southeasterly through a wooded area of varying topography. The brook begins winding a relatively deep channel through a level land form on the west side of Route 97, though the land elevation drops significantly east of the extant dam as the stream makes its way to the stone arch bridge carrying Route 97. Passing under the bridge, the brook flows through a narrow ravine, with steeply sloping walls, giving way occasionally to level landforms. The brook empties into the Little River, the most substantial waterway in the town of Hampton, about a half mile from the mill complex.

The Cedar Swamp Brook drains a nearby swamp (known as Cedar Swamp). This swamp was reconfigured when a dam was built across the brook on the north side of Route 6 creating Pine Lake Acres in the 1930s and likely again when improvements to Route 6 extended the road past the mill complex area in the 1940s.

Cedar Swamp Brook is also fed by runoff from the area's many hills, including a smaller brook (noted on an 1833 map as Holt's Brook), which enters the brook before it widens into the former mill pond area (about 700 feet west of the stone arch bridge). The amount of water carried by the small, rocky Cedar Swamp Brook varies considerably throughout the year, and has changed considerably from earlier times due to damming and other roadway construction activities that have diverted the course of the Cedar Swamp Brook and the waters that feed into it.

The presence of the Cedar Swamp Brook (the sec-





ond most significant waterway in Hampton), the surrounding terrain, and the fact that Route 97 (called the Highway between Hampton and Scotland during the 18th and 19th centuries) was laid out when the area was first settled make this an ideal setting for mill operations.

#### Milling on Cedar Swamp Brook

A quick walk through the area today reveals little of the past industrial activity that occurred along the Cedar Swamp Brook other than stone walls, mounds of soil, a largely drained mill pond and curious water channels. While no further subsurface testing or excavation was conducted on this property, the history of this milling operation was pieced together through cartographic data, property deeds, census records, local histories and biographical sketches, revealing that milling was established along Cedar Swamp Brook soon after the town was settled in the early 18th century and continued through the mid to late 19th century.

Operations involved in this mill complex included saw mills, grist mills (one specifically noted as a corn mill), a bark mill, a tannery, and a courier shop, as well as a shop of unspecified goods. The names attached to these operations changed over time as they passed from owner to owner, with the deeds and town minutes showing no less than six family names involved, some for more than half a century, none less than a quarter of a century.

The first mention of milling on Cedar Swamp Brook was found in the minutes of a Windham town meeting held in 1718 (Windham was the parent town of Hampton, which was not incorporated until 1786). At that time permission was granted to John Bullin to power a gristmill as long as he did not hinder the existing sawmill on the brook (the owner of which was not noted). The language of the deed suggests the new gristmill may have been located upstream, on the west side of Route 97 and the existing sawmill downstream from it to the east, though no other evidence could be found to support or refute this.

Property deeds archived at Hampton Town Hall note Thomas Stedman's corn mill as early as 1760 and existing until at least 1792 adjacent to the east side of the Route 97 bridge crossing the Cedar Swamp Brook. Stedman leased land west of the highway from Zebediah Holt to keep a mill pond for his corn mill, payment for which were a barrel of cider and one bushel of Indian corn given annually to Holt. The headrace for the corn mill would likely have run below the road through a wood or stone lined channel. Remnants of a breeched dam and head race on the west side of the road are likely the only evidence left of these features of Stedman's mill. It appears that Holt was running his own milling operation on the west side of the highway at this time, the rights for which he and Benjamin Abbott leased in 1791 to Jacob Holt (his son) and James Burnett. This lease allowed them to make improvements to an existing saw mill, including raising the height of the dam by up to two feet. This deed also notes that the mill can be used from "time to time," showing that while they were improving their operation, milling was a part-time, secondary business to many of the settlers during this period. A local history (Folklore and Firesides by Susan Jewett Griggs) also suggest the stone arch bridge that still carries Route 97 over the brook (with the aid of a 20th century addition on its west side) was constructed at the end of the 18th century.

The end of the 18th century also saw the emergence of the Searls family into the network of mill complex players. Initially owners only of a bark house, during the first quarter of the 19th century they expanded their operations into a bark mill, tannery, and courier shop, constructing wharfing for their tan yard along the north side of the brook east of the highway. While their structures were located east of the road, the deeds note that they also drew water from a mill pond kept on the west side of the road.

The Searls' also owned a gristmill, which they sold to Ezra D. Beers in 1843. The deed noted the property where the grist mill was located began 16 feet east of the wharfing for the Searls' tan yard, also on the north side of the brook (thought the exact location of this wharfing was never defined). Beers owned this property from 1843 to 1869, along the way acquiring the saw mill on the west side of the road.

By the mid 19th century, the owners/operators of mills along Cedar Swamp Brook had maximized their economic return from the natural resources available in the area. Multiple mills were in operation and the waste products of one mill (bark) could be processed for use in the tanning of animal skins in another. Finally, the finished leather products could be sold in a currier shop located in the complex. In a sense, it was the local strip mall of its day.

In 1869, Beers' granted his property on both sides

of the road to David P. Weaver, along with the water rights necessary to operate any mills on them. Weaver takes a mortgage on the property that same year, and the only structures noted on the property are a house, barn, and saw mill.

The inclusion of water rights in a property deed usually granted a mill operator permission to flood and retain a millpond on a neighboring property and was of particular importance if a mill property could not accommodate its own pond. Some water rights did not include dates of restriction for flooding or access, such as Stedman's lease of water rights on the west side of the road in the 18th century. But the property deeds reviewed for the Cedar Swamp Brook Mill Complex show that by the mid-19th century, specific dates in which a neighbor's property could be flooded for a mill pond were included in the text of the deed, possibly due to larger milling operations in use and their need to flood larger tracts of land. An 1869 deed of David Weaver's notes he has the right to flow (or flood) a neighboring property from October 20th to May 10th, and that the penstock must be kept open during the rest of the year. This deed also notes improvements to be made to a dam on the west side of the road, which may be evidence that the second episode of construction visible on the dam wall still standing in the Cedar Swamp Mill Complex occurred at this time.



Excerpt from Lester's 1833 Map of New London and Windham Counties showing a saw mill southwest of the bridge and a grist mill northeast of the bridge along the Cedar Swamp Brook

While as late as 1877 property deeds note a saw mill on the west side of the road, this appears to mark the end of the milling story on the Cedar Swamp Brook. As production shifted to larger, regional industrial centers (such as the Quinebaug River to the east or Willimantic River to the west) and retail gravitated to town centers supplied by improving road and rail networks, these smaller mills eventually proved obsolete. While industrial structures built along larger bodies of water in the late 19th century are more likely to be found today (sometimes even preserved and reused), the once vital smaller mills that once provided the necessary products for everyday life are often left abandoned and forgotten, as seen in the stone walls remaining on the Cedar Swamp Brook today.

One element of the Cedar Swamp Brook Mill Complex that continues to remind people of the past are the discarded mill stones recovered from the brook by members of the Bigelow-Howard Valley Game Club, the current owner of the former mill complex property. They have carried some of these stones from the brook and they now dot the area around their clubhouse located several hundred feet to the southeast. Some of these mill stones serve as doorsteps into the clubhouse, an ever-present reminder of the land's past.

#### **Trouble with Cartographic Data**

A number of maps were reviewed during the course of this research in order to help piece together the story of the mill remains on the Cedar Swamp Brook. Most of the maps dated to the 19th century, though a late-18th century map and a number of early to mid-20th century maps were also utilized. The 19th century maps reviewed that depict mills along the Cedar Swamp Brook were a source of some suspicion as the location and type mills appeared to change often over a relatively short period of time

An 1811 map by Warren and Gillet shows both a saw mill and grist mill located on the south side of Cedar Swamp Brook, west of Route 97. An 1832 map of the Town of Hampton by the County Surveyor Jonathon Clarke (found at the Hampton Town Hall), depicts two saw mills on the Cedar Swamp Brook, one west of the road on the south bank and one east of the road on the north bank. Another map published in 1833 by Lester shows a saw mill on the west side of the road (as depicted in 1832), but a grist mill on the east side where a saw mill had been depicted only a year before. Lastly, an 1869 Atlas of Windham and Tolland Counties published by G. Keeney depicts a lone saw mill west of the road, this time on the north side of Cedar Swamp Brook where one had never been shown before and for which field evidence was not obvious.

That the locations and mill types seemed to change so frequently over a 58 year period between 1811 and 1869 was puzzling. However, it is possible that these changes can be explained through a number of factors: changes in ownership of a mill or property; infrequent or part-time use of mills; or simply changes in demand for products due to competition with other nearby mills or markets. However, as there are times for which the deed records do not provide clear information about the mill complex, these maps are used to help tell the story.

In addition to the maps which caused some confusion, there were the maps that simply did not exist. Unfortunately, the large majority of deeds reviewed in the Hampton and Windham Town Halls did not have property maps accompanying them, which could have proved valuable in showing the presence and location of structures and features on a property.

#### What Remains of the Cedar Swamp Brook Mill Complex Today?

The following is a brief discussion of the primary visible remains of the Cedar Swamp Brook Mill Complex. These remains are discussed from west (upstream) to east (downstream), with Route 97 lying in the center.

West of Route 97, about 350 feet from where it crosses the Cedar Swamp Brook are the remains of a large millpond, dam, and adjacent stone walls. The dam is a substantial structure several feet thick made of earth and fieldstone, the flat top of it long overgrown with vegetation. The west side of the dam faces the mill pond, the current landform around the pond suggesting it had extended as much as 300 feet to the west.

The dam wall extends six feet above the water surface on its west side and nine feet on the east, the difference likely being a combination of both the depth of water still in the pond and the change in elevation from west to east. A later episode of construction is evident on the east side of the dam wall, at the base of which there is an east-west oriented metal pipe. This pipe, for which a gate control exists on the west side of the dam, appears to mark a change in wheel use at the mill. An 1869 deed (noted earlier) talks of making improve-



Looking east towards the Route 97 bridge over Cedar Swamp Brook; the walls of the modern cement addition are visible to the right and left and the western face of the earlier stone arch bridge is in the center.

ments to a dam along Cedar Swamp Brook on the west side of Route 97, which may be when this second episode of construction dates to.

According to the Bigelow-Howard Valley Fish and Game Club the dam was rebuilt about 40 years ago (though this rebuilding may have been confined to construction of a new gate north of the existing dam) and the old mill pond dredged in order to create a fishing pond. Large mounds of soil on the north side of the pond are likely the dredge spoils from this activity. In the 1980s the Club breached the dam, and now only a low level of water remains in the pond.

There are also a series of stone walls situated adjacent to the east side of the dam that would have supported a mill structure and water wheel. The tail race of this mill would have extended to the east where the water would have been channeled back to the brook or possibly into another, smaller mill pond, for which there is evidence in both the deeds reviewed (see earli-



Mill stone from the Cedar Swamp Brook Mill Complex, finding a second life as a door step into the clubhouse of the Bigelow-Howard Valley Fish and Game Club.

er discussion of Thomas Stedman and Searls) as well as in the field.

The remnants of a series of low stone walls are located within 100 feet of the west side of the stone arch bridge. These remains may have at one point been part of a dam and headrace for a mill located on the east side of the bridge. The headrace for such a mill operation would likely have run in a channel beneath the road surface, but previous roadwork activities along Route 97 have either covered this channel from view or completely erased it.

The bridge carrying Route 97 over Cedar Swamp Brook displays various periods of construction and improvement. Firm documentation for any of the phases of construction on this bridge could not be identified during research. Discussion of the bridge is instead based largely on field inspection. The earliest part of the stone arch bridge appears to have been originally constructed during the late-18th century and consists of a narrow, arched tunnel or culvert constructed of roughlaid fieldstone. This archway, the eastern face of the bridge, and a dry-laid fieldstone wall extending east of it were in more recent times coated with concrete. The bridge was widened on the west side, likely in the early 20th century with a modern concrete extension. The surface level of the bridge was also raised in at least two stages through the early 20th century.

The dry-laid fieldstone wall mentioned above extends east from the bridge on the north side of the

brook and appears to be integrated into the bridge structure, though the modern concrete coating makes this difficult to determine. This wall and a smaller perpendicular stone wall extending north from it (parallel to Route 97) may have been part of the foundation of a mill and/or the tanning complex situated just east of the road. Substantial fill from road improvements may be covering additional remains. A gap in the wall that extends east from the stone arch bridge is probably the remains of a mill's tail race.

Further east of these stone walls are the remains of at least two additional stone walls running perpendicular to Cedar Swamp Brook. These walls are likely the remains of other mill structure(s) that once occupied the north side of brook (such as the grist mill owned by Searls and Beers). A large piece of a mill stone was also observed lying within the stream in this area, remnant of an earlier time.

The absence of more obvious mill remains dating to various periods of operation can be explained by a number of factors. Over time individual mill structures, foundations, raceways, and the dams themselves were repaired, improved, modified, and destroyed to suit the needs of the operators. The natural processes of erosion and silt build up also served to further tumble, hide, and erase the historic mill remains.

It is also likely that the building materials from earlier mills and walls were regularly recycled for later construction needs, not to mention that improvements and development in the area of the mill complex, such as the 1930s widening of Route 97 over the brook, the 1940s construction of Route 6 within several hundred feet north of the mill complex, and the 1980s parking lot constructed on the south side of Route 6, northeast of the stone arch bridge, may have also obscured or erased remnants of the mills.

It is possible that more remains could be recovered if archaeologists were to one day conduct a detailed survey of the area, record and map all observable remains, and excavate below the more recently deposited soils from the foundations of the historic structures and features.

> Michele Besson A. Michael Pappalardo

## Connecticut Yankee Haddam Neck Plant Records Donated to U Conn Archive



In March 2006 Connecticut Yankee Atomic Power Company, through coordination with the Connecticut State Historic Preservation Office, donated the historical records of the Haddam Neck plant to the Connecticut Business Archive in Archives & Special Collections at the Thomas J. Dodd Research Center, University of Connecticut Libraries in Storrs. The records span the lifetime of the plant and consist of plant design drawings, plant historical records, employee newsletters, scrapbooks, plaques, photographs, and other audiovisual materials.

Connecticut Yankee was a nuclear power plant located in Haddam Neck , Connecticut . The first commercial nuclear power plant in the state, it began operation on January 1, 1968, with an initial capacity of 490,000 kilowatts. Its capacity was later increased to 582,000 kilowatts. In its 29 years of service the plant produced over 110 billion kilowatt-hours of electricity. The plant was formally retired on December 6, 1996, when the Board of Directors voted to permanently close the plant after an economic analysis determined the cost of supplying electricity was not beneficial to its customers.

Decommissioning of the plant, known as a "construction in reverse" process, has been underway since 1998. Connecticut Yankee chose to dismantle the site, as opposed to placing it in protective storage or sealing it and leaving it in place for decades. The process to decommission a nuclear power plant involves reducing the amount of radioactivity on the site to a level that allows the site to be released for future use. It is a step-bystep process that takes years to complete and involves the decontamination and dismantling of existing facilities, cleanup for any contaminated soil, and possible groundwater treatment.

The dismantling of the plant has been monitored by the Nuclear Regulatory Commission and other government agencies as well as local citizen groups. A storage facility was constructed about 3/4 mile from the reactor site for dry cask storage of the plant's 1019 spent fuel assemblies. Decommissioning of the plant is scheduled to conclude by the end of 2006.

The decommissioning project required compliance with federal legislation and consultation with the Connecticut State Historic Preservation Office regarding the preservation and management of historic and archaeological sites. From 2002 to 2006 Connecticut Yankee has commissioned American Cultural Specialists to undertake reconnaissance surveys to identify and evaluate archaeological resources on the Haddam Neck property. Copies of the archaeological surveys are available at the Thomas J. Dodd Research Center, in the Connecticut Historic Preservation Collection. It is anticipated that HAER-quality historic and photographic documentation of the Connecticut Yankee Atomic Power Company nuclear plant will be deposited the Thomas J. Dodd Research Center in early 2007.

Michele Besson

# The East Hampton, Connecticut Village Center Fire Protection System

The documentation of the East Hampton Village Center Fire protection System resulted from a Memorandum of Agreement executed between the Connecticut State Historic Commission and The Town of East Hampton. The significance of the site lies in two areas of interest to industrial archaeologists: First, its relationship to the historic industrial site where the factory and offices of the Gong Bell Manufacturing Company were located. Secondly, the fire protection system is an interesting example of an ingenious vernacular engineering design created and built by factory maintenance personnel. Research on the site's history revealed details on East Hampton's bell industry that enhanced the significance of the project.

During the Colonial period commercial agriculture was not profitable because of the town's topography, hills and steep valleys. Soil was fertile but very rocky. The farmers who did not move to more favorable areas remained in town and practiced subsistence farming. Generally, to supplement income they found parttime or seasonal work in local shops. The East Hampton area was not without resources. Timber was plentiful and the area supported several shipyards during the Colonial period. Smiths, riggers and woodworkers developed their skills in the shipyards. The shortage and relatively high cost of labor encouraged early mechanization, inventiveness and "Yankee Ingenuity". Additionally, waterpower was plentiful and made small manufacturing businesses practical.

The damning of Lake Pocotopaug in East Hampton created a reservoir for waterpower. Water from the dam at the south end of the lake drained into Pocotopaug Creek The waterway drops from an elevation of 459 feet at the dam to 320 feet at the site of a saw and grist mill, a distance of slightly over one mile. This drop of 139 feet provided the power for several 19th century mills and factories.

The history of East Hampton, Connecticut is closely associated with the development of bell and stamped metal goods manufacturing. East Hampton was home to thirty bell and stamped metal goods factories in the late 19th century and around 1900 the town's plants produced 90% of the world's stamped and small cast bells. The town became known as "Jingletown" or "Belltown". Bells were an essential item in 19th century life. Bells were used to tell the time of day, call worshipers to religious services, to alert employees that the workday had begun and to call volunteer firefighters to fires. In boarding houses, middle-class and upper class homes, tea or dinner bells summoned residents or family to dinner or called servants. Hand bells called children into schoolhouses from recess. Bells were omnipresent on horses and cattle. Peddler's wagons and junk collectors featured distinctive bells. By law, horses drawing sleighs had to wear bells to warn pedestrians of their approach The bell factories of East Hampton provided bells for this use and produced about twenty sizes and styles of sleigh bells in globe, band or rim styles.

#### The East Hampton Bell Industry

William Barton is credited with the creation of East Hampton's bell manufacturing industry in 1808. Barton taught his indentured servant, William Bevin, the art of bell making. After his service was fulfilled, Bevin's articles of indenture allowed him to use the skills learned during his apprenticeship anywhere. William Bevin returned to East Hampton and with his brother, Chauncey, manufactured bells, coffee mills, kettles, and cranes. The Bevin Brothers bell factory was established in 1832 when a third brother, Abner, joined the firm. In 1868, after being joined by a fourth brother, Philo, Bevin Brothers incorporated as the Bevin Brothers Manufacturing Company. The company's products included sleigh, hand, house, cow, sheep, door, ship's bells and the first bicycle bells.

Employees left the company and formed their own companies. Thirty bell manufacturers were active in East Hampton over the years. Prominent manufacturers in the East Hampton area during the 1800s included William Barton, sons Hiram and Hubbard Barton, Bevin Bros. Mfg. Co., Gong Bell Co., East Hampton Bell Co., N. N. Hill Brass Co., Starr Brothers, Veazey & White, and W. E. Barton & Clark (W.E. was William Barton's grandson). William Barton's willingness to teach the bell trade to others was essential for the establishment of bell manufacturing in East Hampton.

Founded in 1866 by H. H. Abbe, E. C. Barton, E.

G. Cone and A. H. Conklin, the Gong Bell Manufacturing Co. was a partnership. In April 1899 it was incorporated under the laws of the State of Connecticut. The innovative company produced useful inventions in the manufacturing methods for producing gongs, bells and toys. An 1872 patent by E.C. Barton made claims for a toy called "Revolving Chimes" - "a pair of cast brass gongs, mounted between two malleable iron wheels." This was Gong Bell's first toy product. The company's toys from this period were sturdy. They featured cast iron frames, wheels and stamped metal bells and chimes. In the 1880's, Gong Bell introduced the "Chestnut Bell" that became a popular fad all over America. Worn on a person's lapel, it was rung to alert conversationalists that their story had been heard before. Gong bell also produced the first foot bell ever used on American automobiles.

In 1921 Gong Bell produced the popular ringing toy telephone called "Playphone 600". It was a successful and profitable product. A few years later Gong Bell started concentrating on producing wooden pull toys that featured a ringing bell. Collectors prize these toys and examples may be viewed on the Internet.

The development of efficient plastic injection molding machines enabled manufacturers to produce a wide variety of inexpensive toys. Gong Bell did not convert to the newer manufacturing technology. It was unable to price toys competitively and the Gong Bell Manufacturing Company went out of business in 1961.

#### **Gong Bell's Fire Protection System**

The East Hampton Village Center Fire Protection System was a vernacular design originally installed in 1938 to provide fire fighting water to an automatic sprinkler system and on site hydrants at the Gong Bell Manufacturing Company. The main components of the system are a main pump powered by a gasoline engine, a jockey pump driven by an electric motor and an electro-mechanical control console. Water came from a reservoir on Pocotopaug Brook. An iron grating prevents debris from entering the inlet pipe. In the event of pump failure a 55,000 gallon elevated water tank located close to the pump house provided a back-up water supply at 50 PSI. Originally, a Chrysler engine that required considerable manual adjustment and operator attention powered the pump.

An electric powered jockey pump is plumbed in parallel with the main pump and maintains pressure in the system when the main pump is not activated. As pressure in the system drops, a pressure sensor actuates a Mercoid mercury switch and turns the electric jockey pump on. If the jockey pump cannot maintain pressure in the system then another sensor activates a mercury switch to start the gasoline engine and run the main pump. If the main pump fails to start or maintain pressure, a check valve opens and water from the tank on the tower maintains pressure and flow to the hydrants.

The Gong Bell Manufacturing Company ceased operations in 1961 and the J.C. Barton Company purchased the fire pump system in the late 1960s. A fire in 1973 destroyed some of the old Gong Bell Company's buildings that had housed shipping, receiving and storage facilities. Although these wood buildings surrounded the brick pump building, it survived the fire. Mr. Barton replaced the original Chrysler pump engine with a Chevrolet 283 CI short block V8 engine. This was retrofitted to the extant pump around 1975. The engine is cooled by strained water from the reservoir and exhaust is piped through the west wall of the building. A 12-volt lead-acid battery provided starting power for the engine. Gasoline for the engine was stored in a 50gallon horizontal tank that was manually filled from portable gas cans. The pump has a capacity of 1000 GPM @ 100 PSI discharge. Mr. Barton also installed a hydrant at his factory on Skinner Street about one-quarter mile away from the pump and another in the East Hampton Village Center.

The control system designed by Barton's electrical maintenance personnel monitored and recorded pressure in the system. A test header, mercury pressure switches and pressure gages completed the control system.

The Barton Company went out of business and offered the fire protection system to the town. In recent years changing fire protection requirements and advances in technology made the system obsolete. The original system required back up with a gravity fed water supply. Modern diesel systems are continuously monitored and alarmed and do not require gravity back up. The tower is covered with graffiti and was vandalized by drilling small holes in the tank to cause leakage. The tank is not safe to be filled, as the corroded tower legs can no longer support the weight of water. Nor is it safe to remain empty because it will not stand high wind loading. In spite of the present problems, the system performed reliably over its lifetime.

#### **Pump House Construction**

The Village Fire Protection System pump house was built in 1937-1938 to house a fire pump system that provided water to an automatic sprinkler system and several hydrants at the Gong Bell Manufacturing Company of East Hampton, Connecticut. It is a small brick building 17' 8" wide and 17' 2" deep. It has a sloping shed roof that is 9' 10" high in the front and 13' high in the rear. The roof overhangs the front of the building by about 9" and 3" on the other sides. The roof is concrete covered with composition shingles and has three encased reinforcing beams running from the high to the low side of the roof. The brickwork is laid in a variant of common or American bond. That is, every sixth course has every other brick (rather than every brick) laid as a header. The alternate bricks in the sixth courses are laid as stretchers as are the bricks in the other courses.

There is a single window opening in the front that has been covered with plywood. A steel lintel carries the weight of the brickwork and roof above this opening. A row of soldier bricks (set on end) rests on the lintel. The lower portion of the opening has a concrete sill resting on brickwork. An opening, presumably for ventilation, but blocked with plywood, is located below the window and protected by a vertical steel grate. The other opening in the front of the building accommodates a 4' wide steel sliding door that is not airtight. Steel channels frame this opening. Construction at the top of the door opening reveals a row of soldier bricks and is similar to the brickwork over the window. A padlock secures the sliding door. A single exterior light fixture is located under the roofline at the left side of the door and a single centrally located overhead fixture provides the main lighting on the inside.

#### Power

The power plant for the East Hampton Town Center Fire Hydrant Supply System was a gasoline fueled Chevrolet small-block V8 having a displacement of 283 cubic inches (4.6 Liters). The 283 engine was in production from 1957 to1967. It produced 220 to 315 hp (164–235 kW). Because of its compact size it was dubbed the "mouse motor". More than 90,000,000 engines based on this design were built. Production numbers were impressive, with more than 90,000,000



Sketch of East Hampton Village Center Pump House and System Schematic

built. Engine displacement was changed over the years; finally reaching 400 cubic inches (6.6 liters) before production in the United States ceased in 2004. The smallblock was on the "Ward's 10 Best Engines of the 20th Century list".

#### Conclusion

The Village Center Fire Protection System was a good example of vernacular engineering. Built by skilled factory maintenance workers using standard off-the-shelf components, it offered easy maintainability and local availability of repair parts. With skilled and regular maintenance it was a reliable system. Changing technology and fire codes required higher reliability and improved automatic monitoring and alarms. Additionally, the components of the system had reached the end of their design lifetimes. The system is an indication of the consideration that local factory owners gave to fire protection.

Robert C. Stewart



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