Call for Papers
26th Annual Conference
On New England Industrial Archeology
March 1, 2014
At Plymouth State University
Plymouth, New Hampshire

Deadline for paper proposals: January 12, 2014

The Northern New England Chapter of the Society for Industrial Archeology invites proposals for papers to be presented at the 26th Annual Conference on New England Industrial Archeology. The conference is alternately hosted by the Southern New England and Northern New England Chapters as a forum for presenting research on America’s industrial past. This year’s conference is to be held at Plymouth State University in Plymouth, NH, on March 1, 2014. Papers are welcomed on all topics related to industrial history, architecture, manufacturing, archeology, etc. Proposals may be submitted for individual papers, team papers, or reports on works-in-progress. As in past conferences, it is anticipated that the time limit for each presenter will be 30 minutes.

Student Papers are welcomed.

Format: Each presentation proposal must include: 1) title; 2) an abstract of not more than 300 words; 3) a brief (half-page) resume of the author(s), including postal address, telephone/fax, and e-mail; and 4) a list of the presenter’s audio-visual requirements.

Deadline: Proposals must be received by January 12, 2014.

E-mail proposals in PDF format to:
ykforestry@yahoo.com
USPS to: Dave Coughlin
276 Back River Road,
Bedford NH 03110
SNEC-SIA President’s Report

The Southern New England Chapter held its fall tour and meeting on October 19, 2013 in New Britain, Connecticut. Approximately twenty members and guests gathered at Connecticut Shotgun Manufacturing Company (CSM) for a special tour arranged by Karen Hudkins and Paulette Kellerstedt of the New Britain Industrial Museum. Founded in 1975 by Anthony Galazan, CSM manufactures high-end shotguns in a plant which it has occupied for about ten years, which was originally part of the Stanley Works. CSM is currently the only American manufacturer of side-by-side double-barrel shotguns, which are marketed as a high-quality alternative to more expensive European models. Tour participants got to see the company’s remarkable and expansive showroom, containing thousands of antique and collector-grade used guns, which is part of their retail business - priced anywhere from about $3,000 to over $200,000. CSM’s Lou Frutuoso explained how the company is able to remain competitive by utilizing a combination of the latest technology and traditional craftsmanship to produce various lines of prized sporting shotguns. For instance, the wooden stocks are made utilizing computer and CNC technology and can be custom sized for the buyer’s needs. Unfortunately, the company does not allow tours of its factory, in an effort to safeguard its proprietary practices. They also do not allow photography within their facility. Frutuoso did, however, provide an informative overview of the basic parts of a shotgun and how they are constructed. CSM employs about 60 workers, and produces only about 1,000 new guns per year which are sold around the world.

After lunch, the tour reconvened at the New Britain Industrial Museum. Last visited by SNEC as part of the 2001 Winter Conference, the small but mighty NBIM is filled with an excellent collection of artifacts from the many manufacturers of the “Hardware City,” including Stanley; Landers, Frary and Clark (Universal); Corbin; Fafnir bearing; Russell and Irwin and others. The chapter also held its annual business meeting at the museum. For the first time, the internet communication service Skype was utilized to enable Treasurer Sara Wermiel to login into the meeting from her home, as she was unable to attend in person. Ms. Wermiel gave a brief summary of her annual treasurer’s report, which will be sent to members later this year. As required in the chapter by-laws, a vote was taken and it was decided that the annual dues should remain at their current levels for 2014. Michael Green volunteered and was elected to serve as the new chapter secretary, while Sara and I will continue as treasurer and president, respectively. However, the position of vice-president/program coordinator will remain unfilled, since nobody has offered to serve. Over the past several months, I have received many good suggestions for possible tour locations. Unfortunately, I do not have time to visit or pursue them all. It would be nice to have somebody willing to help out in this role. With all the great IA resources in our region, there is no reason why we cannot have more than two events per year, if more people can come forward to help. If you are interested in serving as vice-president/program coordinator, please let me know.

The meeting also included a discussion on several items that will require further investigation and should ideally be decided upon by a larger portion of the membership, or perhaps by an “advisory committee” comprised of three or so members that could assist the officers. One idea that has been raised over the past several months is whether the chapter should change its status from an unincorporated association to a non-profit corporation. While this idea has its merits, it would also require a greater long-term responsibility and costs associated with the necessary paperwork. Also related to this is the need to reinstate the chapter’s liability insurance. If you are interested in serving as part of an advisory committee for these important issues, please let me know. Potentially, we could schedule a conference call and/or utilize services such as Skype where members could dial in to listen / discuss pertinent chapter business, without having to travel far or take an entire day out of their busy schedules.

Lastly, is an update on the newsletter scanning project that I began last spring; as of this mid-October writing, I am missing only three issues (1983 – both, and fall 1984). In the near future I plan to make the scanned PDFs available to all members on CDROM, and eventually on-line. It will be possible to index tour summaries, articles, etc., into a searchable format. Ideally, the chapter website should be re-tooled and updated to provide a better platform for this information.

Marc N. Belanger
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NNEC-SIA President’s Report
October 2013

We held our fall annual meeting on August 24, 2013, commensurate with the fall tour in Conway, NH. You might not have noticed the meeting because I was so busy directing the tours that I almost forgot it. The only business to deal with was officer elections. I was elected for another term (and we didn’t give anyone else a chance to bow out). Be thinking about your taking a turn as president next year. In any group, the leader gains the most; even after all of the time and effort put into this role, with all the great IA resources in our region, there is no reason why we cannot have more than two events per year, if more people come forward to help. If you are interested in serving as vice-president/program coordinator, please let me know.

We had great tours of the old sleigh factory and the Redstone Granite Quarries. Since we ran these early in the season to get ahead of the fall foliage traffic, you’ll have to wait for the spring newsletter for details. For now read about last spring’s tour of Scytheville, elsewhere in this issue. Wel-
come aboard to Jim Perkins who presented his research of Scytheville Factory Village to us. He just joined our chapter.

SAVE THE DATES of May 15-18, 2014 for next spring’s tour, in Maine. It will also be the national tour and conference. Friday, May 16, is the only day for bus tours. Saturday will be conferences, with Thursday and Sunday being for travel and possibly short visits. Friday we’ll have three or more choices of tours. One will include the Maine Maritime (indoor/outdoor) Museum plus the Bath Iron Works modern working naval shipyard. It will also include a very big, high bridge and tidal mills. We might have an optional tour choice, just on tidal mills. Another bus tour will be to Livermore Falls to see and learn about Maine’s lumber and paper making history, including a tour of a working paper mill.

Other tour choices will include a working large pleasure boat factory and a food processing plant. You may also opt for a boat ride out to an old fort in Portland harbor and/or a tour of old downtown Portland. The board will be meeting for detailed planning this fall.

David Dunning, NNEC President
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NNEC-SIA Spring Tour 2013
New London, NH
Scytheville, Ice House Museum, and Springfield Power LLC

Scytheville
May 4th was a perfect spring day for a tour. It wasn’t too hot, and the bugs weren’t out yet. King Solomon’s Lodge in the village of Elkins generously hosted us in its building, formerly called Mechanics’ Hall. It was built as a community center in 1872 on property owned by the New London Scythe Company. Here the town archivist, Jim Perkins, presented an illustrated history of Scythe Factory Village (later simply “Scytheville”). Afterwards we walked along the watercourse from “the bulkhead” at the outlet of Pleasant Lake down past three other dams and a canal, viewing old buildings and foundations along the way.

Jim provided this brief account of the local industry:

In 1790, a grist mill first harnessed water flowing from Pleasant Lake to the Blackwater River. Over the next few decades, a tannery, saw mill, and carding mill joined the grist mill, and a small village was forming. When Richard Messer, Joseph Phillips and Anthony Colby established their scythe works in 1835, they built three factory shops, owner and worker housing, and a company store. They also recruited a dozen skilled workers, some from edge tool manufacturers in central Massachusetts, and others from Maine.

Between 1835 and 1888, the firm imported untold tons of raw material: iron and steel, coal and borax, grindstones and paint. It shipped scythe blades, axes, and hay knives to merchants around New England and far beyond. All of this heavy material was transported by oxen and wagons to the train station in Concord, about 40 miles away. By 1846, the railroad had been extended to Potter Place. That was only 5 miles from Scytheville (now Elkins).

Scythes were made in five other western New Hampshire towns during portions of its lifespan, but New London’s factory was the largest—ultimately employing 71 men and two women in five factory shops. Tyler water turbines powered the 14 trip-hammers and 12 grindstones used in the manufacturing process.

The Scytheville factory closed in 1888, and its assets were auctioned off. None of the factory shops remains, but the stream banks and millponds still contain grindstones and machinery parts, and the landscape still bears the imprint of the once vibrant Scythe Factory Village.

Map depicting the 1855 Factory Village

Stone Forge Shop in Scytheville (built 1866).
After lunch, we went to The Ice House Museum in New London. This is a private collection of the Kidder family. Bill Kidder had a Ford garage in town in the first half of the 20th century and he collected everything mechanical that looked interesting. Of course that included lots of old cars, especially Fords. We learned about the Abenaque engine and tractor company on our Bellows Falls, VT, tour last fall. In the photo, a group of us are discussing how these old one-lungers worked. They used the basic four stroke principle; however, the spark plugs only fired when the rpm got below a certain point. In between, a heavy flywheel kept the engine going. This saved fuel, which was not as readily available as it is now. One-lungers were often used as stationary engines for tasks such as pumping water or running a saw mill. One of the best parts of these tours is putting our heads together to figure things like this out.

Ice House Museum

Some of the classic automobiles exhibited at the Ice House Museum in New London, NH.

An Abenaque one-lunger engine exhibited at the Ice House Museum in New London, NH.

NNEC Spring Tour participants view the stack of the Springfield Power, LLC, 18 megawatt wood-fired power plant.
Springfield Power LLC
Later in the afternoon we went to Springfield Power, LLC, in the next town. This is an 18 megawatt wood-fired power plant. It uses 2 megawatts for its own use and the rest goes into the grid. We saw and learned about the whole process from logs to steam to electricity.

David Dunning

Lonsdale Company Bleachery Fire
A Halloween night fire has destroyed the Dry Can Building (1903), at the Lonsdale Company Bleachery. (SIA Annual Conference, 2004) The bleachery dates to 1901 when two of the three original Lonsdale Mills were demolished to make way for this enlarged plant that handled the bleaching for the corporation’s neighboring Ann & Hope Mill in the new Lonsdale village, Berkeley Mill and Ashton Mill. The Lonsdale Company, established by the Providence merchant firm of Brown & Ives, was the one of the leading textile corporations in Rhode Island. The bleachery complex consists of multiple buildings, located alongside the Blackstone Canal on the west bank of the Blackstone River in Lincoln RI. The fire occurred in the central section of the main bleachery building, a long two-and-three story brick structure. The firefighters’ response, which drew multiple companies from neighboring towns in RI and Massachusetts, was able to contain the fire within a couple of hours, reflecting the Lincoln fire department’s advance planning (see photo below showing the density of the complex). Damage was effectively limited to the Dry Can Building, which had to be demolished, but the adjoining portions of the bleachery, which are occupied by multiple businesses, appear to have been spared. No cause has been determined as yet.

Richard Greenwood

Lewiston’s Bates Mill No. 5 Saved
Lewiston, Maine (Oct. 2, 2013, 5:34 p.m.): A mill building that was slated for demolition is being saved by city council and a developer. The city council voted last night to let a developer take over the Bates Mill No. 5. Developer Tom Platz owns several other buildings in the Bates Mill complex. He would like to redevelop building No. 5 as well. It will cost at least 13 million dollars to make basic repairs since the building dates back to the Civil War.

Richard Greenwood

\[\text{The photo (Pamela Kennedy, RIHPHC, 1980) shows the main bleachery building on the right. The fire was confined to the two-story Dry Can Building on the far right.}\]
A Mystery Solved

In the Vol. 5:2, 1985 issue of this newsletter, I published a short article with the drawing shown in Figure 1 (below) and a photograph that asked readers to help identify the artifact depicted. It was discovered in a wooded area near the Sewalls Falls hydropower station in Concord, New Hampshire, during an archeological survey headed by Dr. David Starbuck, after the power station had been decommissioned and acquired by the State of New Hampshire Fish and Game Department from the former Concord Electric Company. At the time of its discovery, no documentation that could identify the artifact was found, and no response came from Newsletter readers. We surveyors thought it perhaps to be a boiler shell with a special manufacturing application. But what was its purpose? What was it doing there? Who was responsible for it?

During July and August of 2012, I revisited the artifact and resolved to identify it. I renewed the documentation research with the aid of Google on the World Wide Web (a method not possible in 1985). This effort was fruitful and found that the City of Concord had issued a special tax exemption to the Taylor Chemical Company for a plant at Sewalls Falls on November 12, 1895. Further research discovered two patents by Edward R. Taylor of Penn Yan, New York, for an Electric Furnace (No. 688364, filed Dec. 21, 1899 and granted Dec. 10, 1901) and a Method of Producing Chemicals in Electric Furnaces (805501, filed Jan. 24, 1902 and granted Nov. 28, 1905). The drawings provided by these patents very closely matched the drawing I made in 1985 (see Figure 2 and Plates 1 and 2).

The Taylor company constructed the plant at Sewalls Falls after the Concord Land and Water Power Company put its new hydropower station on line in February of 1894 and advertised for industries to locate there. The Concord Land and Water Power Company, headed by George Page, had been organized in the late 1880s to develop a plant to utilize

Figure 1. A measured field drawing recording an artifact discovered at Sewalls Falls, Concord, NH, that appeared in the Vol. 5:2, 1985 issue of the Society for Industrial Archeology New England Chapters Newsletter.

Figure 2. A Drawing of an electric furnace published in Edward R. Taylor’s patent filed in 1899.
the energy of the falls. The company managed to construct the first three-phase AC power plant to go on line in the United States. (See The Electrical Engineer, Vol. 17, No. 308, March 1894, pp. 270-273.) The Concord Land and Water Power Company went into bankruptcy c.1897, and the power station and land was acquired by a newly-formed Concord Electric Company. It is thought that the Taylor Chemical Company abandoned the site c.1900.

The NH Division of Historical Resources recorded the area with the Taylor furnace remains and nearby structural features as The Taylor Chemical Company Historical Archaeological Site. The site form (27-MR-386) states that the research potential and other values are based on the documented information that the electric furnace had been installed at the site in 1895, four years before the first patent had been filed, which suggests that the remains at the site represent one of (if not) the first such furnace described in the 1901 patent. The remains at the site can provide industrial archeologists and chemical industry historians an opportunity for useful research. This type of electric furnace was applied to the manufacture carbon disulfide (CS$_2$) from the time of its invention in the mid-1890s to the mid-20th century by the reaction of charcoal with sulfur vapor at 1500°F. The process has been replaced with one based on the reaction of natural gas with sulfur. Carbon disulfide is used in the manufacture viscose rayon and other polymers. It is toxic and, when it was being produced in the late-19th and early-20th century, it was used primarily as an insecticide and rodenticide. Recent testing by the NH Department of Environmental Services found no carbon disulfide hazard at the site.

The Taylor Chemical Company site adds another aspect to the significant archeological remains located at what has become the Sewalls Falls Recreational area.

Dennis Howe
Concord, NH

Wheel Power at the Schwamb Mill

The Old Schwamb Mill is a historic picture frame manufactory in the town of Arlington, Massachusetts. The site has been used continually for mills since the 1600s, and German immigrants Charles and Frederick Schwamb established their woodworking mill there in 1864. The Schwambs made oval frames on eccentric faceplate lathes. When the Schwamb's bought the mill, it had an overshot water wheel, located in the basement of the factory. This article attempts to estimate the power output of the wheel, of which no parts survive.

The Schwamb wheel was eighteen feet in diameter and ten feet wide, driving all the original lathes and auxiliary equipment. It was fed from a small pond right in front of the building, which was, in turn, filled from a much larger pond, upstream. Below is an 1835 drawing of the site. The big pond (“reservoir”) is left of center, and the mill building is just above the pond at right. Overflow from the reservoir spilled from the north end of the dam, and followed the natural brook under Middlesex Turnpike and behind the mill.

It is possible to make an educated guess about the performance of the mill’s wheel from water wheel engineering practices. An overshot wheel’s power depends upon a number of factors, including the capacity of the buckets, the drop from the top to the bottom, and the rate at which water enters the wheel. I present two versions of wheel design: the first from A Textbook in Civil Engineering, the second from Theory and Test of an Overshot Water Wheel. The two texts differ in the parameters they establish a priori, and those they
calculate. My general approach is to start with the known mechanical values for the site, and work backwards to compute the likely water flow through the wheel. That flow, falling the 18 foot diameter of the wheel, determines the power. The following two formulae apply:

1. The velocity of water, $V$, released under $H$ feet of head is $\sqrt{2 \times g \times H}$ feet per second, where $g$ is the gravitational constant.
2. A flow of $F$ cubic feet per second down a drop of $H$ feet ideally produces $62.5 \times F \times H / 550$ horsepower.
All calculated figures, below, are rounded.

From A Textbook (hereafter, “AT”), we find that the rim of the wheel should turn at about 1/2 to 2/3 the velocity of the water entering the wheel. Water enters the wheel through the millrace, which has a sluice gate where it leaves the pond. Water comes though a gap at the bottom of the gate, and is under pressure from the head above the wheel. This pressure determines the velocity of the water in the race. The mill privilege drawing shows the millpond rising about two feet above the wheel. A head of two feet will drive water at 11.4 feet per second (fps), and if we lose 10% of the velocity due to friction, we have a stream of 10.3 fps. entering the wheel. That translates to a rim velocity between 5.2 and 6.9 fps. Splitting the difference gives us 6 fps. AT recommends a depth of 8 to 16 inches for a water wheel bucket— I will assume 12 inches. The width of the buckets was 10 feet, and AT recommends that the buckets be filed only 25% to 33% full. With these values, we can estimate the water flow as about 17.5 cubic feet per second (cfs). This much water falling 18 feet ideally generates 35.8 horsepower (hp). If the wheel assembly was 85% efficient, that would translate into 30.4 horsepower to run the mill.

Theory and Test (hereafter, “T&T”), simply states that an 18 foot water wheel should turn between five and six revolutions per minute (rpm). I will assume 5.5 rpm. For an 18 foot wheel, this means 5.2 feet per second at the rim. To estimate the velocity at which water should enter the wheel, T&T recommends a value of 4.54 times the square root of the rim velocity, which yields 10.4 fps. This entrance velocity agrees well with the one we got from the AT estimate, though it was computed completely differently. T&T gives a formula for choosing bucket depth based on the head, which computes as 1.2 feet, and recommends bucket filling of 25% to 50%. This gives a water flow of 23.4 cfs, translating to 47 theoretical horsepower, or 40.7 hp at 85% efficiency.

While the difference between the two power numbers is considerable, keep in mind that each approach allows a substantial range of variation in the values for wheel velocity, bucket depth, and the fraction of bucket filling, all of which affect the flow calculation. I chose mid-range values for these parameters; they could be adjusted to make the estimates match. If we simply average the net power from both designs, we get 35.5 hp. Interestingly, the steam engine that the Schwamb purchased in 1914 was nominally rated at 35 hp, a fact not known when the above estimate was computed. While the mix of equipment in 1914 differed from that in 1864, a figure of 35.5 hp for the wheel is clearly in the right ballpark.

Today, the Schwamb Mill is a living museum, where frames are still made by traditional craftsmanship, and we celebrate our 150th anniversary next year. For additional details, visit http://oldschwambmill.org.

Sources:
Theory and Test of an Overshot Water Wheel, Carl Robert Weidner, Bulletin of the University of Wisconsin #529, 1913.
Engines and Boilers, Houston, Stanwood, and Gamble Company (date uncertain); Smithsonian index SILN-MAHTL_19992)

Acknowledgements:
Helpful information was provided by civil engineers Bill Fay and Ken Smith.

Tom Calderwood
Old Schwamb Mill
Arlington, MA

Charles River Museum of Industry and Innovation, Inc. (CRMII)

154 Moody Street
Waltham, MA 02453

Executive Director Job Description:

The Executive Director is responsible for the overall operation, management and performance of the Museum. The Executive Director reports to the Board of Trustees, primarily through the Board’s Management Committee, and implements the policies, procedures and programs as directed by the Trustees (through the Management Committee).

The Executive Director’s job responsibilities include:

1) LEADERSHIP AND ADMINISTRATION

• To work in collaboration with the Board of Trustees (through the Management Committee) to establish the vision and strategic plans for CRMII to achieve its mission and to ensure sound operation of the Museum, consistent with the vision and strategic plans.

• To ensure sound financial management of the Museum, including preparation of an annual budget for the Museum on or before October 15 of each year, preparation of monthly and annual financial statements for presentation to the Board of Trustees and/or Management Committee as requested, to ensure compliance with all accounting standards for nonprofit organizations, and to provide oversight of bookkeeping and related accounting activities performed by the Operations Director and/or outside consultants.

• To act as liaison between the Museum’s staff and Museum
Committees and the Board of Trustees (through the Management Committee) by establishing clear lines of communication, collaborating closely with the Management Committee, reporting progress and problem areas, assisting with the preparation of Trustee and Management Committee meeting agendas, and executing the policies and programs enacted by the Trustees and/or Management Committee.

- To oversee, supervise, manage and mentor Museum staff, volunteers and Museum Committees.

- To oversee all staffing operations, including hiring and staff management, making recommendations to the Board of Trustees (through the Management Committee) regarding staffing needs, and ensuring that CRMII staff members and volunteers represent CRMII in a positive and professional manner.

2) DEVELOPMENT AND FUNDRAISING

- To plan and implement a fundraising program that meets the Museum’s short and long-term goals, working with the Board of Trustees (directly and through the Management Committee) and volunteer consultants. To work with the Board of Trustees (directly and through the Management Committee) to identify grant sources, and to apply for and manage grant funding, and to cultivate strong relationships with the funding community, including individual and corporate grantors and donors, foundations, and city, state, and national agencies, including representing the Museum at public events, acting as the Museum’s spokesperson with the media and participating in conferences, panels and presentations in order to promote such relationships.

- To oversee the planning, promotion, and implementation of fundraising events with Museum staff, volunteers, and consultants.

- To oversee the management of events to promote earned income, including Museum admissions, sales in Museum store, and event rentals.

3) MARKETING AND PUBLIC RELATIONS

- To develop and implement a marketing plan in collaboration with appropriate members of the Board of Trustees, volunteers, and consultants.

- To oversee all public communications, including social media, and to collaborate with staff to develop and sustain marketing and public relations efforts, including design of Museum brochures, promotional materials, social media efforts, media relations, and promotions.

- To develop talking points for presenting CRMII to the public in a consistent and positive way and train and mentor Museum staff and volunteers in such communications.

4) COLLECTIONS, EXHIBITS, AND PROGRAMS

- To oversee the physical structure of the Museum so that it is appropriately maintained as necessary for ongoing operations and display and storage of the Museum’s collections.

- To provide oversight for the care, cataloging, maintenance, and interpretation of objects belonging to or on loan to the Museum.

- To provide strategic planning to guide collections policies.

- To collaborate with the Collections Committee and consultants to make best use of exhibit spaces with a goal of improving attendance.

- To collaborate with staff and the Board of Trustees (primarily through its Management Committee) to evaluate current programming and determine how the Museum can best achieve its mission through outreach and on-site educational programming.

- To oversee the use of Museum facilities for programs, exhibitions, and events to ensure appropriate use.

- To provide leadership and direction to the volunteer program to ensure appropriate use of volunteers and docents, as well as continuing to recruit appropriate new volunteers.

Please visit the Chapters’ Websites for information about Membership • Officers • Events • Publications
Northern New England Chapter - Society for Industrial Archeology
www.sia-web.org/chapters/nnec/
Southern New England Chapter - Society for Industrial Archeology
www.ecom-venture.com/snecsia/sneccindex.html