Society for Industrial Archeology · New England Chapters

VOLUME 41 NUMBER 1 2020

CONTENTS

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33rd Annual Winter Conference Cancelled

Due to the worldwide coronavirus outbreak, the 33rd Annual New England Chapters Society of Industrial Archeology Conference to take place in Plymouth, N.H., on Saturday, March 14th was cancelled. This was done after consultation with conference speakers and Northern New England Chapter officers. The Northern Chapter plans to hold the 33rd Conference next winter in better conditions.

Dave Coughlin,
Conference Chairperson

IMPORTANT REQUEST

Northern New England Chapter

Life Members Email Addresses Needed

One problem that showed up when we cancelled the Winter Conference was that emails announcing the cancellation did not go out to all life members. This is because annual dues members put their email addresses on the renewal forms, but life members have not used these forms.

Also, some annual membership chapter members have changed their email addresses, so their emails were sent to a former address.

To update our email list, please send your current email address to ***RCoughlin@myfairpoint.net*** and keep it current. If you do not have email, then please call Rick Coughlin at 207-384-2645 so we'll have your phone number if an event or tour is cancelled.

NNEC-SIA President's Report

Thank you very much to you who have generously contributed funds to keep our NNEC chapter afloat. That thanks also surely comes from your fellow members.

Note to life members: We are out-of-touch with you. Are you still alive and in NH? Please contact Treasurer Rick Coughlin with your updated contact information. 207-384-2645 or preferably RCoughlin@myfairpoint.net . Thank you very much.

Treasurer's Report - Spring 2020

Bank Balance: $4,482 as of February 27, 2020
2020 Annual Paid Membership by March 2, 2020: 22
Life Members: Estimated at 30.
Year 2019 Total Income: $1,657
Year 2019 Total Expenses: $887
2019 increase in savings: $771

This was a large turnaround from the typical annual losses. This was due to a very generous donation of $602 by a member and several other generous member donations.

Submitted on March 2, 2020 by:
Rick Coughlin, Treasurer, NNEC-SIA

The Winter Conference had to be cancelled as a virus precaution. However, we are going to try and reschedule it for next fall or winter. One of the presentations, the Slack Shoddy Mill, is included in the newsletter.

David Dunning
NNEC President

Southern New England Chapter SIA Treasurer's Report for 2019

In 2019, SNEC had 136 members, a net increase of 5 members over 2018. At the start of 2019, SNEC had about $10,700 in the bank (i.e., in an account at Fidelity Investments), and it ended the year with about $11,100, for an increase of about $400. Most of SNEC's income comes from member dues and donations, which in 2019 totaled $1,294. Other routine income was interest from certificates of deposit and a bank account: $223.43.

Annual dues, for those who send them in before March, are $10/year, $8/year for new members and students. The dues levels will remain unchanged for 2020. Many members (and SNEC has some generous members), including life members, send donations to SNEC in addition to dues.

Last year SNEC hosted the annual conference on New England Industrial Archeology at Clark University in Worcester, Massachusetts. The cost of the meeting, for room rental, table rental, and lunch catering, came to $937.65, and attendance fees collected totaled $750. SNEC pays for the lunches of presenters, with our thanks, and covers the difference between fees collected and expenses.

SNEC offered more tours than usual in 2019 and covered the cost of some refreshments, copying of handouts, and the like, for the tours, which amounted to $84.48. We made donations to two organizations in Whitinsville that hosted us: Open Sky Community Services and the Northbridge Historical Society, for $50.00.

SNEC's share of the cost of printing two newsletters was $366.70. The cost of mailing the newsletters to members who want hardcopy and announcements to members who do not use email came to $332.47.

Normally, SNEC holds an election for officers in the fall. However, this year, no one offered to run for any office. The current incumbents – Sara Wermiel, Treasurer and Leonard Henkin, Secretary – agreed to continue in their offices for 2020. Without any contest, there was no reason to hold an election. Rather, at the suggestion of member Betsey Dyer, a Committee-of-the-whole was established to help do the work of the chapter, specifically, to organize tours and programs. A call was put out for members to join this committee. In addition to the two officers, Betsey and Ron Klodenski volunteered to participate. Another member offered but was not available for the first committee meeting, which was held via conference call on Feb. 1, 2020. Betsey is taking the lead in the committee.

The committee is particularly seeking suggestions for tours and projects. If you have a tour in mind, please contact Betsey Dyer bdyer@wheatonma.edu or me swermiel@verizon.net.

SNEC is an all-volunteer organization. Good things don't happen unless members do them. If you're interested in joining the committee, organizing a tour, or helping out in some other way, please contact Betsey or Sara.

Sara E. Wermiel,
SNEC Treasurer and Registrar

Errata:

Corrections to the Society for Industrial Archeology – *New England Chapters Newsletter*, Vol. 40, No. 2, 2019, pages 5 and 6. A photo is missing from:

Amesbury Carriage Museum presented *Learning from the Industrial Landscape – an Introduction to Industrial Archaeology* on Saturday, September 7 (by John Mayer)

and a second article:
Tour of Blackstone Canal and Whitinsville, April 20, 2019 (by Rick Ashton) has an incorrect caption,
See next page for the corrections.

A happy group took part in the program "Learning from the Industrial Landscape" in Amesbury, Massachusetts (courtesy Amesbury Carriage Museum, Frank Gurczak image)

Whitinsville tour participants gather in front of the so-called Old Brick Mill in Whitinsville, built by Paul Whitin and Sons ca. 1826 and later expanded, originally for cotton spinning.

NNEC Fall Tour Rport - October 18, 2019

Precision Valley, or what's left of it, was the focus of this tour. First meeting at the old Bryant Grinder building across from the Jones & Lampson (J&L) building, and then to the old Fellows Gearshaper building, we ended up at the Lovejoy Tool Company. Jones & Lampson was here first. James Hartness, president, encouraged his innovative engineers to pursue their own ideas. If the technologies looked promising, he helped them start their own companies (for a share of the profits). That's how each of these other companies came to be.

The first technology company in Springfield was Parks & Woolson, begun in the 1830's. They designed and built textile machinery. They employed waterpower from the Black River. Jones & Lampson was founded in 1829 in Windsor, VT, in the building that now houses The American Precision Museum. There they made a variety of products, at various times, from rotary pumps to sewing machines to rifles. In the 1880's they were floundering. Adna Brown, president of Parks & Woolson, looked into buying J&L and moving it to Springfield as the town was losing population to western migration. The deal went through in 1888. To run J&L, Brown recruited a well-known innovative machinist from Connecticut, James Hartness. Hartness was awarded over 100 patents in his lifetime. One was a unique, greatly improved, metal-cutting turret lathe. He agreed to come to run J&L only if they would abandon all the earlier products and only make his J&L turret lathe. The deal was made, and he was paid $1000/year plus $100 on every turret lathe sold! In 1888, that was a lot of money. He became very wealthy as sales of his lathe soared, selling ten per week at the height ($1000/wk. in royalties). Fellows Gearshaper was spun off in 1896, Bryant Grinder in 1909, and Lovejoy Tool Co. in 1916. Lovejoy is still in business. Also, a small division of J&L (the comparator group) is making optical comparators for visually inspecting parts, on a blown-up screen with precise grid lines.

Our tour moved from the empty Bryant Grinder building, which is for sale but has pollution problems (like the others), to the first Fellows Gearshaper building. It has recently been renovated to house medical offices. There, local historian Hugh Putnam told us the above history and showed several pictures. Hugh also shared many behind-the-scenes stories from his lifetime in the shops.

After lunch and an annual meeting, we proceeded to tour the (active) Lovejoy Tool Company. They make cutting tool inserts. As many products are either made of metal or have metal components, special tools are needed. Metal parts must be cut to specific sizes and shapes to match their blueprints (or today, CAD drawings). Rectangular parts are machined on milling machines, of various types. Round parts are cut (turned) on lathes, of various types. Those machines have interchangeable cutting tools for various sizes and shapes and types of cuts. In the old days, the cutting tools were sharpened as needed and put back in the machine for continued cutting. Today, instead of resharpening, the interchangeable tools have interchangeable carbide tips. Those carbide tips (of various grades and shapes) cut metal extremely well and so don't need sharpening as often. When they do wear out, they are quickly and easily replaced. Also, many cutting tools now have indexable heads, so the operator just rotates the head to expose a new tip. To see and learn more about this, go to www.lovejoytool.com

Finally, we went just across the Black River to the Slack Dam. This is one of five old hydropower dams in Springfield. They are very close together, where the Black River drops 110 feet in just 1/8 of a mile. Right below the Slack Dam is the Lovejoy Tool Co. dam and right above it is the COMTU Falls dam (at the bridge), and the dam right above the bridge powered Parks & Wilson. The next one up powered Fellows Gearshaper, the building that our morning presentation was in. Four of those dams are still generating power. See the separate Slack Dam article below.

David Dunning
NNEC President

The Slack Shoddy Mill

Springfield, VT 1871-1952

Shoddy is used cloth, mostly wool, which was recycled and sold to textile manufacturers for use in making lower grade products. Common uses for shoddy were work or military uniforms, horse blankets and other blankets, etc. The market for shoddy was overtaken in the mid-1900s by synthetic fabrics. Shoddy, as a noun, is the same word used as an adjective today. Shoddy was first processed in 1813, so recycling isn't new, it was being done 200 years ago. (Processing shoddy was a rags-to-riches business.)

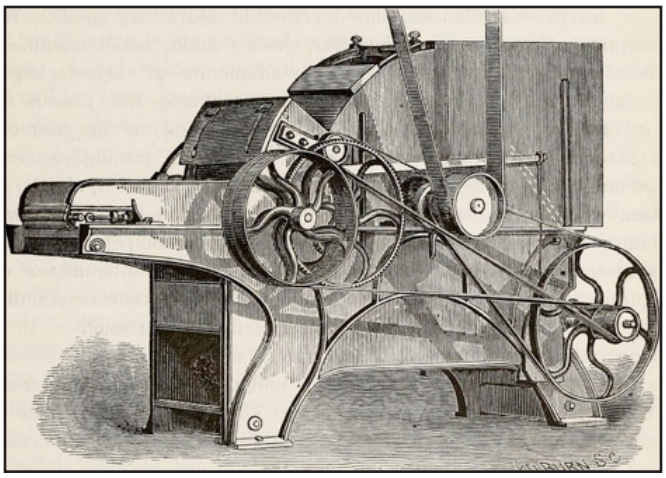
The Slack Shoddy Mill began business in 1871 when W.H. Slack joined with C. Ellison to form Slack & Ellison. They purchased a building and its waterpower (a water-turbine in a canal) from the defunct Vermont Novelty Co. That company made wooden children's toys and baby buggies; they had the first patent on a wooden doll. Formed in 1858, they became the biggest company in town with 125 employees. However, the Vermont Novelty Co. didn't recover from a devastating flood in 1869 followed by a devastating fire. Their foundation and twin waterwheels were just right for Slack. That waterpower was ample to turn the line shafts for the machinery, at first. In 1891, the Springfield Hydro-Electric Co. was formed to provide electricity for motors and lights. The Black River had to be dug out. A force of men was employed in blasting and breaking the boulders in the Black River for filling the crib. A tramway was built for the wheelbarrow gang to take the rocks down to the dam. The blasted rock was used for the dam crib. More rock was blasted to make a place for the penstock in a canal.

The Bryant Grinder building, the first stop on the NNE Chapter 2019 Fall Tour.

NNE Chapter 2019 Fall Tour meet inside the Bryant Grinder building.

Hugh Putnam presents Precision Valley history and technology to the NNE Chapter Fall Tour particpants.

In 1895, Slack purchased the Springfield Toy Co. to use that building for their carding machinery. In 1896, the Springfield Hydro-Electric Co. changed its water wheels for more improved patterns that developed 40-50% more horsepower. Also, that year, a new bigger boiler arrived. Delivering it required two wagons with 12 horses pulling. In 1905, a tall brick chimney was built, and steam turbines were installed to generate electricity and supply heat, from coal. From this, the Slack Corporation was able to supply electricity and heat to the town of Springfield as well. That chimney was taken down (blasted) in 1986 when the dam was rebuilt and the current power generating station constructed. See the following article by Hugh & Rosanne Putnam, Springfield, Vt.:



A shoddy picker used in the shredding process.
Image courtesy of Harold B. Lee Library on Flickr NKCR

"Shoddy is the name given to an inferior woolen yarn made by shredding scraps of woolen rags into fibers, grinding them and then mixing them with small amounts of new wool. The object was to manufacture a cheap cloth which could be made into products and clothes. It was also known as Rag-Wool. An even finer shredding process produced what was called Mungo. The rags were sorted, and any seams, or parts of the rag not suitable, were left to rot and then sold to farmers to manure crops. Or, they were used for bedding or stuffing. The remaining wool rags were then used in processing.

"The rags were again sorted before the shredding process. This shredding created a very fine dust which, again, was used for manure on the fields. But the fine dust also caused health problems for many of the shoddy workers who breathed in the fine dust. It was known as 'shoddy fever'. During the manufacturing process not all of the shoddy could be used as some of it was too short to spin. After spinning, the coarse cloth was sold to textile manufacturers." (Charles Day of Henry Day & Sons, Ltd.)

The following details are specific to the Slack Corporation. "Operations and manufacturing – Raw material, primarily baled rags and woolen mill scraps, was delivered to the western portion of the site by rail, and with carts and trucks, was moved about the site to various stages of the cleaning and carding process. Overhead bridges and metal pipe, for blowing waste wool fibers between buildings, were also used for the movement of material." Materials were also dropped, through shoots, from the receiving dock to the factory below. See the enclosed picture.

"The shoddy mill's 23-hour day is worthy of explanation. First, the quantity of the mill's end-product, reworked wool, depended on just two factors: the number of hours the carding machines ran, and the adjustment of the balancing weights that govern the operation of the automatic feeders to the machines. This last adjustment itself was limited by the nature of the fiber being run at the moment, but essentially everything else in the plant could be readily adjusted to whatever the carding machines were doing".

"The 23-hour day was run in two shifts, without overtime pay. The day shift came on at 7 a.m., worked until 12 noon, came back at 1 p.m. (here is where the hour was lost), and then worked until 9 p.m. The shift was allowed to take 45 minutes for supper, in subshifts, so that the machines were not shut down, without loss of pay, which might be considered overtime. The second shift worked from 9 p.m. until 7 a.m." The workforce consisted mostly of immigrants that were recruited from Russia and Poland.

"Working in the carding rooms had one great advantage in really cold winter days. The cards would not function properly at temperatures much below 60 degrees owing to the stiffening of the wool. Slack's had long since learned this, the carding rooms had ample heat, and on a winter's day with the temperature 10° below or worse and the wind blowing, were perhaps the one comfortable place to work."

The Slack Corporation became the largest shoddy mill in the world at its height of business (1930s). It produced over 800 different grades of product. They sold byproducts of their manufacturing to other markets. One was ammonia-dissolved bone and potash. This was sold as a fertilizer for farmers. The company had many patents on equipment that they developed for their processes, also on related inventions such as a fire extinguisher. The mill closed in 1952, in bankruptcy, and the equipment was auctioned off. The buildings were demolished in 1971 except for the one brick building, which now houses State of Vermont offices. It can be seen in the photos and was seen on the tour. The 115' smokestack came down in 1986. See page 9.

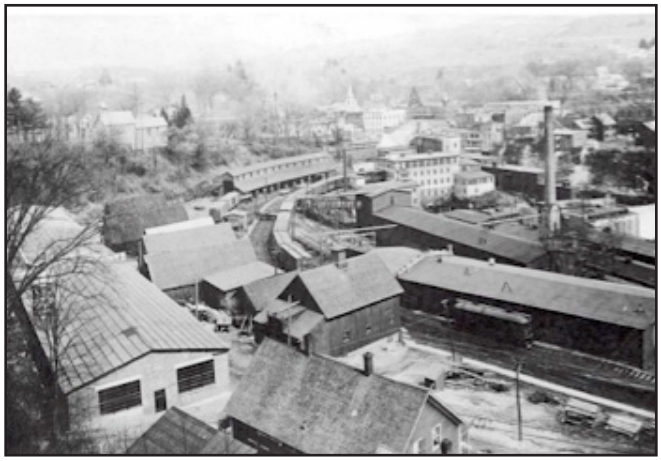
Historic Slack Shoddy Mill Photographs

The first Slack wooden dam.

First Slack building.

Incoming rags, from the train in NH.

Slack production floor.



Slack mill before the brick building.

1930s view of the brick office building.

The Slack Dam

NNEC 2019 Fall Tour

This was the last site visited on last fall's tour. The Black River drops 110 feet in just 1/8 of a mile as it flows through Springfield, Vermont. Five dams have been built over the years to power various industries. One was a wooden dam built for the Vermont Novelty Company, formed in 1858. They made children's toys and baby buggies. In 1871, they were out of business and a new company bought the site to set up a shoddy mill, Slack & Ellison. They started out with the waterpower turning their line shafts, the old way. By 1891 electricity became available and the Springfield Hydro-electric Company was formed. The riverbed was excavated to install waterwheels and all the related equipment and facilities. See above "The Slack Shoddy Mill" for details of the excavation. In 1896, the waterwheels were changed to a more improved pattern that generated 40-50% more horse-power. Also, that year, the Slack Corporation installed a new boiler for their shoddy mill.

In 1905, a 118' brick chimney was built for a new steam-powered generating station. The steam from twin hand-fired vertical boilers was used to drive a 500-horse-power Corliss engine with a 30,000-pound flywheel and rope drive. Electric power generated by the dynamo was used to illuminate Springfield Village and to operate traction motors on the town's street railway system. The coal-fired facility produced electricity and municipal steam from 1905 until its closing in 1953, when the Slack Corporation filed bankruptcy. The buildings were demolished in 1971.

In 1986, the Low Impact Hydropower Institute (LIHI) studied the old dam to see how a new modern facility might work. The project required a licensing exception from the government, which it received. LIHI developed a plan, arranged for funding, and authorized Springfield Hydroelectric Company to be formed. The new station has a capacity of 400 KW. The project is run-of-the-river, meaning that there is no reservoir. When there is more water, it can generate more electricity. When there is less, a smaller amount is put out. There is 21' of gross head, between the headwater and tailwater. A steel penstock, 8' in diameter and 80' in length, conducts water from the intake to the powerhouse. The powerhouse is 20' x 20' square and houses one horizontal full Kaplan turbine driving a vertical induction generator by means of an internal bevel gear, together with associated hydraulic, mechanical, electrical and electronic equipment. A pad mounted transformer connects the station to 3-phase 4,160 V electrical service. Its average annual generation is 2,000 MWH. A fishway, constructed in 2007, provides for downstream fish passage.

David Dunning
NNEC President

Tour participants view the Slack Dam gate mechanical controls.

View of the turbine from above.

Downstream Slack Dam fishway.

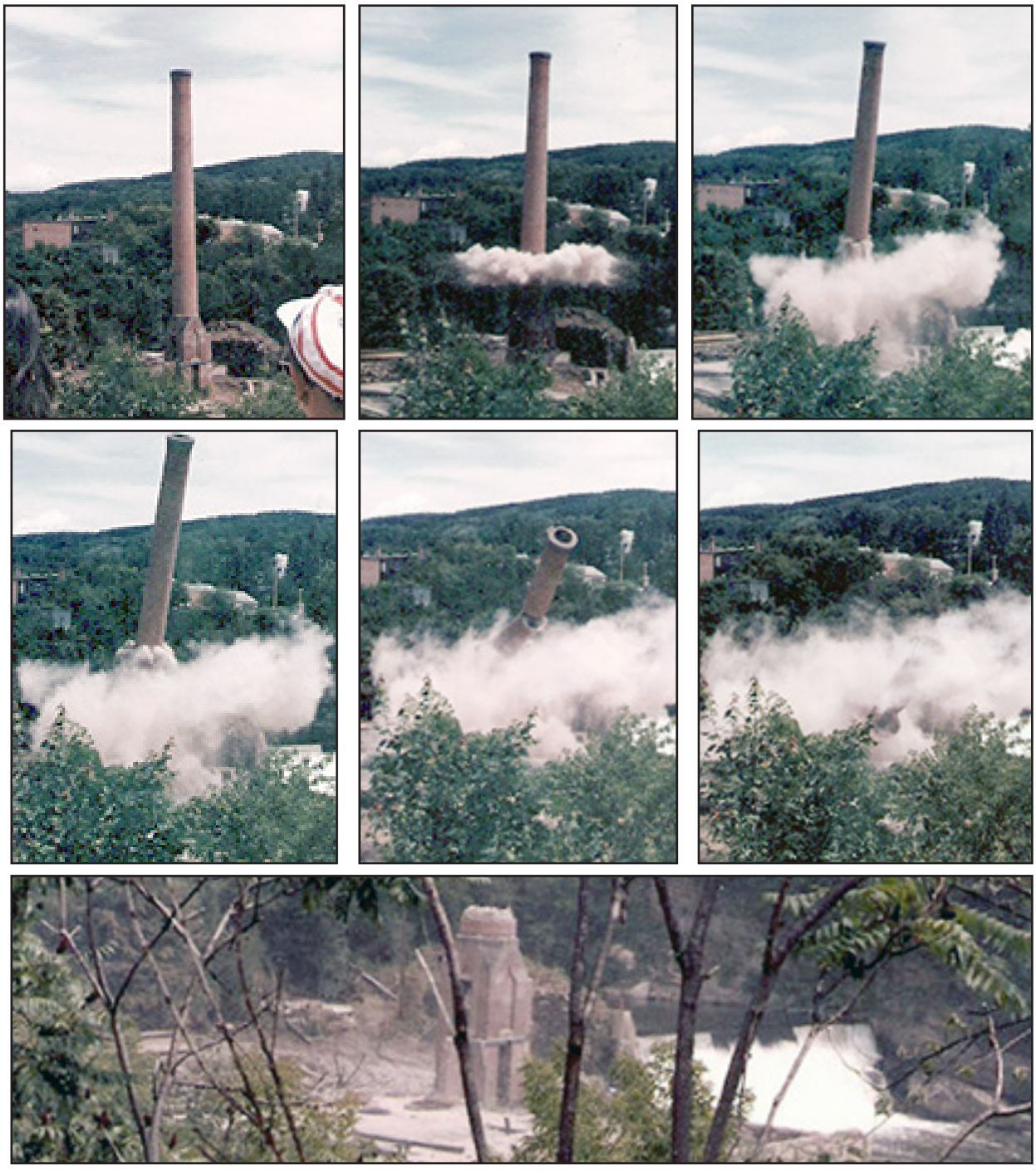
Slack Stack Demolition

August 13, 1986

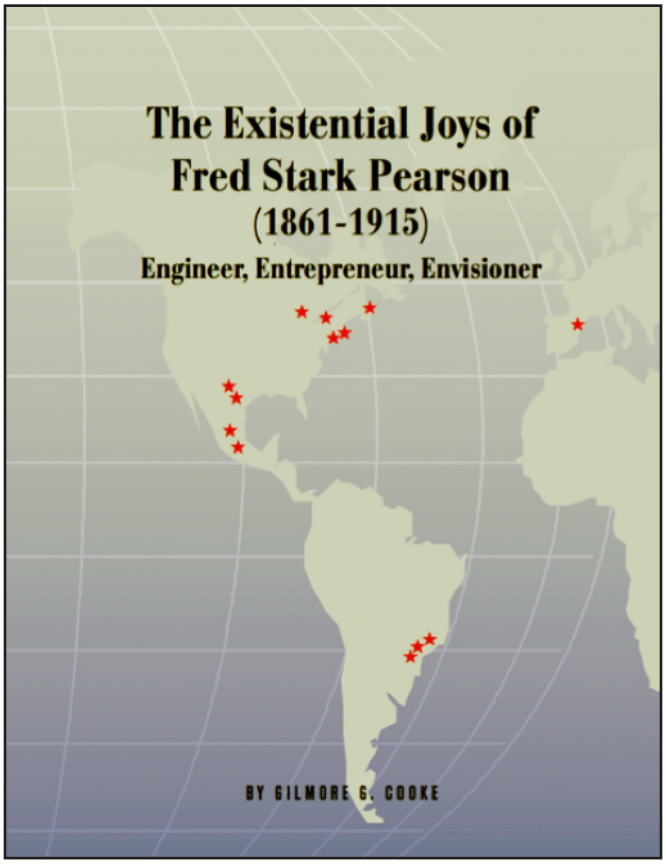
This Springfield landmark had to go to make way for the new Springfield Hydroelecric Co. generating station. It was built in 1905, by the Slack Corporation, as part of their new steam-powered heating and generating plant. That totally new project is requiring $1.1 million. Many onlookers lined up to witness this passing memery of the massive factory where their parents and grandparents worked. The chimney was lined with soot from almost a century of coal fires. Although it was sad to see it go, the chimney was slowly becoming a potential hazard as the bricks decayed.

Douglas Malnati, of Barre, VT, engineered the demolition. He is an expert in this and the 118 foot stack fell only one degree off from where he was aiming. He inserted just five pounds of gelatin explosives inside the stack, strategically placed. Mr. Malnati drilled through 16 inches of brick – two courses – midway up the stack. At the bottom, the stack was two feet thick, while at the top it narrowed to 14 inches. These photos show the fall.

Credit: Susan Smallheer,
The Times Argus, Barre-Mountpelier, VT

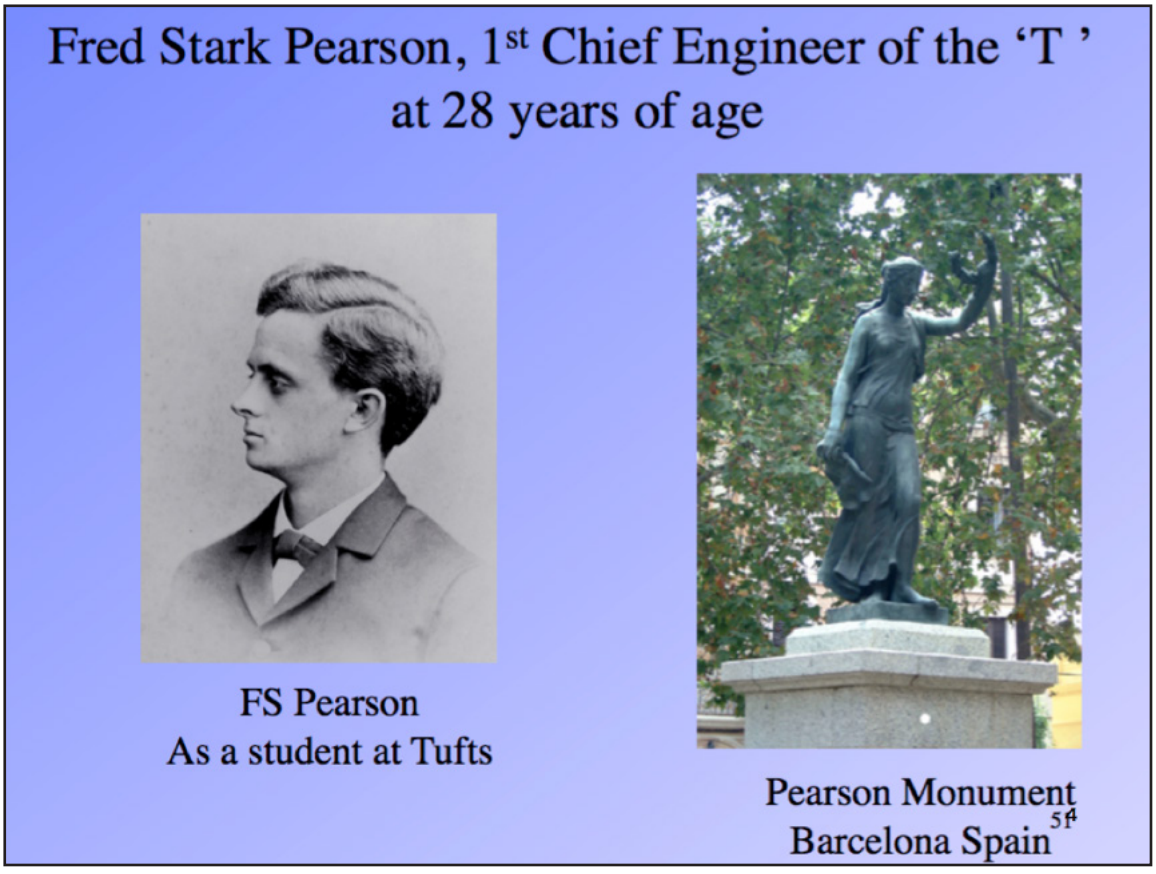


Announcing the Release of
Fred Stark Pearson's Biography:



This man was a highly gifted individual from New England. Writing his story was difficult because he accomplished so much on three continents. Yet Fred Stark Pearson deserves recognition by the SIA. He was born in New England. He graduated as electrical and civil engineer from Tufts College. More importantly, he engineered Boston's milestone electric mass transit system, the so-called 'T', which at the time was the world's first and largest. He then left the area to develop the landmark electrical conduit system in New York, replacing the San Francisco style mechanical system. He continued as an engineer-entrepreneur doing great things on three continents. He and his wife Mabel were received by the Royals in Buckingham Palace. Soon afterward the Pearsons drowned aboard the Lusitania in 1915. Spain memorialized his work by erecting the Pearson Memorial in Barcelona located in the beautiful district of Pedralbes. I believe this is the only monument memorializing an American engineer. Be aware that five streets, e.g., 'Avenida Pearson' were named after him.

When Fred and Mabel first visited Brazil in 1887, they rode a cog railway to the top of Mount Corcovado. At the time of his visit, he envisioned how this colonial city with its narrow crowded streets could one day be transformed into the city it is today by using modern streetlights, underground wiring, telephone, consumer gas, by replacing mules with electric streetcars, and supplying the city with hydroelectric energy. He later returned to Brazil to transform the city with the Rio



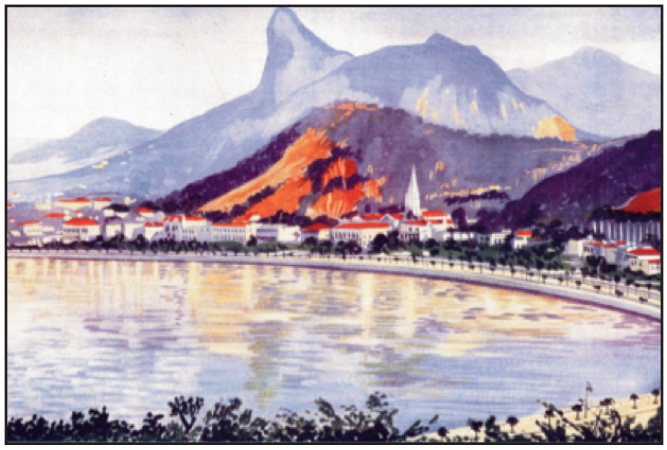
Born in Lowell, Fred Pearson's photo was taken in 1884 as a student at Tufts. This monument was erected in Barcelona as a tribute for his great engineering achievements in Spain.

de Janeiro Tramway, Light and Power Company. He was only 54 when he died, yet his accomplishments on three continents helped reshape the world at the turn of the 19th Century. The book tells the Lost Story of Engineer-Entrepreneur Fred Stark Pearson and describes his work in Boston, New York City, Brazil, Mexico, Texas, Canada, and Spain.

After years of part-time research, the biography is finally available through Amazon.com. The title is "The Existential Joys of Fred Stark Pearson (1861-1915): Engineer, Entrepreneur, Envisioner". It's about this young engineer who stood head and shoulders above most of his contemporaries. An innovator who built systems and built businesses from the emerging inventions of the age, Pearson could claim to have been the central figure in creating the pioneer transit systems in Boston and New York as well as building entire electric utility systems, generating plants, mining, and railroad systems, and more across three continents. Little known today, Pearson was the ultimate 'mover and shaker' of his time, masterminding businesses in North and South America and in Europe; setting standards for quality, reliability, and public service while also earning handsome profits for himself and his investors. Because of his tragic death, along with his beloved wife Mabel, on the Lusitania in 1915, his potential was only partially realized and his legacy obscured. A driven man, and a family man, Pearson's good works – and great accomplishments – are finally brought back into focus through a masterful biography of the man and the enterprises he created and shaped.

The paperback edition of "The Existential Joys of Fred Stark Pearson (1861-1915): Engineer, Entrepreneur, Envisioner" is available for purchase on Amazon.com. Special Edition
ISBN 978-1-7332378-0-2
Paperback 8.5 x 11 inches; page count 373. Illustrated with 150 images, many in color.

Gilmore Cooke



An early postcard shows a portion of Rio's streetlights overlooked by Mount Corcovado. A minor accomplishment was getting to the top of this iconic peak using electricity.

Tour of S & D Spinning Mill, Inc. and other Historic Mills in Millbury, Mass.: Report

S & D Spinning Mill, Inc. is a rare business: a textile factory, operating in 21st-century New England, occupying a historic 19th-century textile mill building. Textile manufacturing once comprised an enormous share of New England's economy – the region where the industry began in North America, in the late 18th century, and where it flourished through the 19th century. But the number of firms and their workers have declined through the 20th century – so much so that it's surprising to find any companies still in existence in this region. In Massachusetts today, about 100 textile establishments are operating, although they employ only about 2,300 people among them.

One of these firms is S & D Spinning Mill, located on West Main St. in Millbury, Mass. The company occupies two buildings: the historic, multistory brick mill (more on this shortly) and a newer, one-story building across the mill pond from it. The company spins yarn made of wool and wool blends, and its principal customer (for about 85% of its product) supplies a manufacturer of Major League baseballs. The baseball maker wraps S & D's yarn around a center, then the ball is covered with leather, to make a regulation ball. To meet the quantity needed by customers, this small plant often operates day and night.

The tour, which took place on Friday, Nov. 8, 2019, began in the historic mill. A large group that included SNEC members, presumably some NNEC members, and some people who came of their own accord (don't know who they were) were shown around by John Dearnley, vice president of S & D Spinning Mill. This being a workday, the mill was in operation and very noisy. Because of the difficulty hearing, we trooped up to the (relatively) quieter top floor, where John explained the overall production process and answered questions.

Spinning wool involves a series of processes involving different kinds of machines. In the S & D mill, the location of these operations is determined largely by the size and weight of the machines. Thus, the top floor is the picker area. Here, bales of raw materials are treated (which made the floors slippery). One of the large picker machines was being operated while we were there: raw material was fed in to break it up and prepare the fibers for carding and spinning. The prepared fibers were suctioned into tubes, external to the building, and deposited into holding bins (storerooms) on the first floor.

After getting an overview of the company, we visitors went with John or on our own through the other floors. The first floor had carding machines and the holding bins. Floors 2 and 3 had long spinning machines, and the second floor

S & D Spinning Mill, West Main St., Millbury, Mass. (Photo: Sara Wermiel).

also had co-winding machines. We were able to see all the machines and speak a bit to workers, although they wore ear protection and wanted to keep this in their ears.
After touring the building, we went with John to the other building, which is a large one-story shed. Here the yarn was taken off bobbins and put on cones, then twisted and wound onto cones in a final step. These cones were packaged for shipping.

S & D Spinning Mill is owned by a family with a long history in textile manufacture. John Dearnley's grandfather and father had experience working in the textile business. The Dearnleys became co-owners of S & D in 1957, at which point the business was located in South Grafton. In 1961, they moved into the West Main St. building. At the time, this mill was being used for storing wool, and also a weaver worked and lived on the second floor. S & D outfitted the mill for spinning. Later, in the 1960s, the Dearnleys bought the company.

The Historic Mill and Its Occupants
If you imagine that a place named Millbury would have many mills, you'd be right. From the earliest days of European settlement, the streams in the town supported mills of various sorts and, from the early 19th century on, textile manufacturing. A cluster of textile and other mills grew up along Singletary Brook, which flowed east from Singletary Pond. The first mill in the line, nearest to Singletary Pond, was at the site of today's S & D Spinning Mill. This was an old mill privilege, where grist mills had been started in the 18th century; a plan of the town from 1831 shows a "corn mill" near this site.

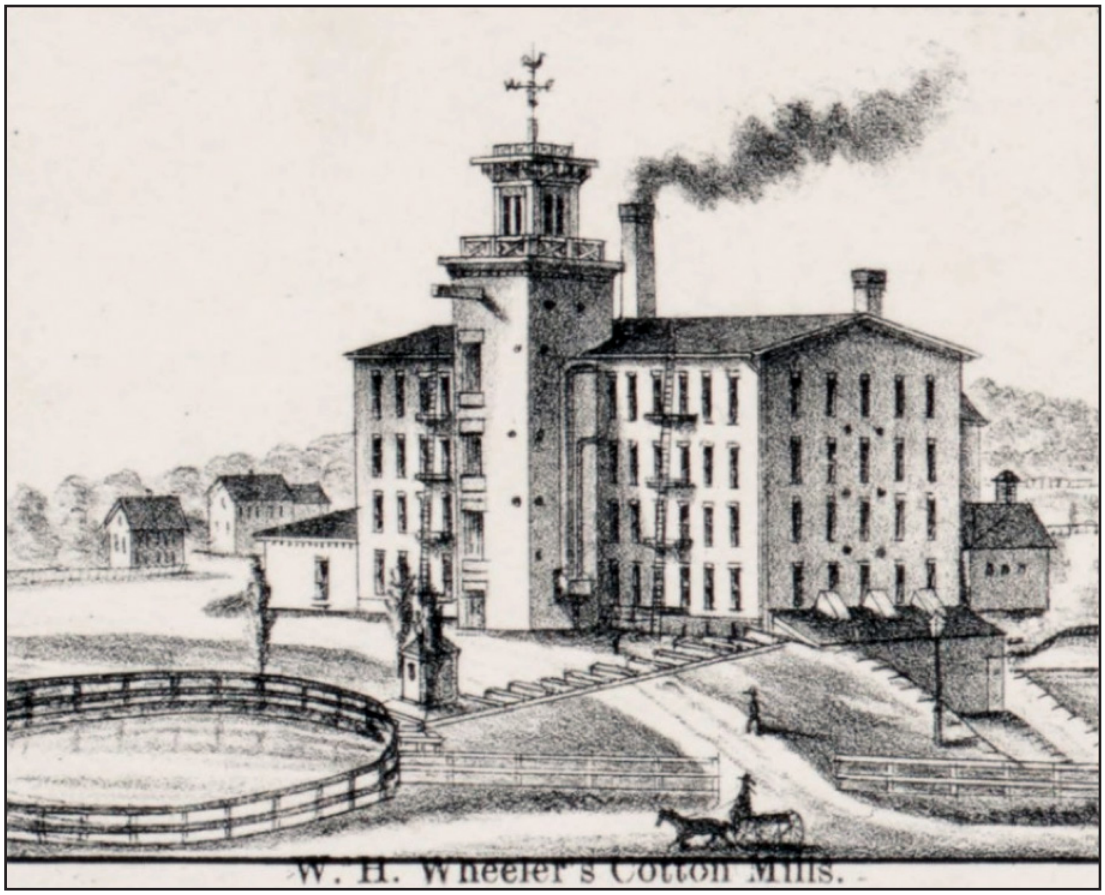
According to a history of Worcester County, it was around that time that textile manufacture began at the site: cotton batting was made in the old mill building. Then around 1835, woolen cloth manufacture began at the site. In 1837, the Singletary Manufacturing Co. was incorporated to manufacture

Spinning machine and worker inside the historic S & D Spinning Mill (Photo: Sara Wermiel).

woolen and satinet cloth. It apparently built a new factory where the old mills once stood. A succession of owners followed. In April 1846, the mill burned.

Exactly when the historic mill that we toured, standing today, was built is uncertain. If the preceding mill was destroyed in the fire, then it may have gone up around 1846-47. But, as the editor of a Worcester County history dolefully noted, "There have been other fires at this place." None of the local histories give a date for the construction of the building. A 1926 fire insurance plan, made by the Associated Factory Mutual Fire Insurance Companies, states that the building was erected about 1845. The mill's construction features (apart from the roof) are consistent with mid-1840s buildings, so ca. 1846-47 is probably right. This makes it the oldest standing textile mill in the town.

Around this time, the mill was known as M. Farnum & Co.,



Drawing of S & D's historic mill, as it looked ca. 1880; detail from Millbury, Mass., birds-eye-view map (Beck & Paul, 1880, Boston Public Library)

Showing the east end of S & D Spinning; the shed on the right is the location of the old wheelhouse, now a room holding bin for fibers drawn down in tubes from the fourth floor. Standing at the right are SNEC members Rick Ashton, who booked the tour for SNEC; Bill Burt, Robert Grodzicki, and Leonard Henkin (Photo: Sara Wermiel)

cotton manufacture. Then Jonathan D. Wheeler of Grafton joined the business, and the firm was called Farnum & Wheeler. After the Farnum family decamped for Iowa (around 1855), Wheeler took over and it was called Singletary Mills. In 1867, the firm was reorganized as Wheeler Cotton Mills and Jonathan's son William took charge. The mill made cotton print and sheetings, and around 1879, it employed 60 operatives.

The Wheelers continued in the mill until early in the 1890s, when it closed, then changed hands, and by 1904 was occupied by Mayo Woolen Mills and known as Mayo Woolen Mills No. 2. The next occupant was the West End Thread Co., which also called it No. 2. At this point it was a spinning mill, making cotton and linen thread. When this last company left the building, it was used for a time by another textile company in town to store wool. It was full of wool when S & D Spinning Mill bought it in 1961.

The main mill building is brick, four stories with a basement, and has a stair-tower on the main (south) façade, facing the mill pond. It measures 100 x 45 feet. Attached to its west side is a one-story brick building, once the picker house, later used for other purposes, and today is a collecting site (holding bin) for the fibers from the picker machine. On the north side of the building is a one-story building, site of the former boiler and coal house; the associated tall chimney is no longer standing. On the east, over the pipes that carried water from the mill pond to power the mill, stood a wooden wheelhouse. The one-story structure in its place serves as another holding bin. Remnants of the old waterpower system can be seen in the basement.

Two notable features of the exterior are the plainness of the buildings, without a dab of ornamentation, and the very shallow, pitched roof. Several 19th-century Millbury mills had odd roofs, although none had a roof like this. An 1880 drawing of the mill shows a shallow roof, so the mill has had a roof with this shape for a long time. But whether the current roof is the original or a replacement is unknown. The 1880 drawing also shows that the stair tower was once topped with a rectangular cupola surrounded by a fence-like railing. This feature was removed when the top of the stair tower was raised in the 20th century.

What remains of the (presumed) original interior structure of the building is typical of an 1840s textile mill, i.e., wood posts, wood beams, and plank floors without joists. Later in the 19th century, this kind of construction was dubbed "slow-burning construction." The frame has been replaced in places, and reinforced in others, with steel. The historic mill is charmingly situated near to its mill pond. Originally the mill property included tenement houses to accommodate mill workers, and a couple of these houses remain nearby.

It was quite thrilling to see such an old mill building still being used for its original purpose. We greatly appreciate John Dearnley's willingness to show us his business, answer our questions, and let us walk freely through the historic mill.

Thanks to Rick Ashton for arranging the tour and providing the all-important snacks for we tourons.

Following the tour of S & D Spinning, I led a few of the visitors on a tour of other historic mills along Singletary Brook in Millbury.

Sara E. Wermiel,
Treasurer, SNEC

Tour of the Electric Time Company

Fifteen members of the New England chapters of the Society for Industrial Archeology gathered at the Electric Time Company in Medfield, Massachusetts, on November 4, 2019, for a tour of this manufacturer of bespoke street clocks and other large timepieces. There we were treated to a complete tour of the factory by director of marketing Brandie Morris. Electric Time grew out of the Telechron Electric Clock Company, which made a huge variety of plug-in household clocks. In the 1910's, Electric Time was the sales company for Telechron. Then Electric Time was incorporated in 1928 as a clock manufacturer specializing in custom-made street and tower clocks designed for outdoor and indoor use. They also make outdoor thermometers and barometers. Thomas Erb, President, took over the Electric Time factory in the mid 1980's. Tom had actually worked at Electric Time at its former Natick location, as a boy.

Electric Time is one of the biggest designers and builders of outdoor clocks in the world. Brandie said that there is very little competition for this highly specialized work. Electric Time clocks may be found on municipal buildings and towers worldwide. Recently Electric Time completed a clock of 20 feet in diameter for the largest railroad station in southeast Asia, in Bangkok, Thailand.

Canonical street clocks often seen outside of banks are very likely to have been made by Electric Time. Our tour group now knows to look for the Electric Time name forged or engraved near the base. An exception are the clocks made for Disney. Electric Time was asked not to put their name on those. [1]

The tour began with a history and introduction in Electric Time's conference room, where a collection of antique Telechrons are on display. Among other things, we learned that an indicator on the face of those early plug-in clocks clicks into place showing a red dot upon a power outage, so that users would realize the time was incorrect.

After passing through a design room, our group entered the cavernous 50,000 square foot space that contains the various manufacturing areas that are required to build a clock from raw materials. The workday had just ended for Electric Time's twenty-five employees, and every workbench and area had been left tidy and clean. Brandie assured us that they build an entire clock using only domestic materials, and that most of the parts are made on the premises. This

includes — depending on the design — the containers for the clocks, the face, the hands the numbers, and the movement. One exception is metal castings, which they subcontract to foundries. However, painting — such as for street clock bases — is done at the factory, in special painting sheds contained within the large plant.

The varied machines and specialized work areas were impressive. For example, an enormous waterjet cutter (affectionately named "Flow") uses water and garnet sand to cut through any material with laser-like precision. It can be adjusted by computer to make the least wasteful use of a starting material, such as a large sheet of metal. Although there is very little turnover among the employees of Electric Time, Brandie noted that once they become expert on technical machines such as the waterjet cutter, those workers are in great demand by other companies.

Brandie and Tom still prefer not to use laser cutters, which are increasingly popular in manufacturing. They are trying to avoid burned edges, which can sometimes occur with particular starting materials cut by laser. Brandie also noted that for such specialized machinery they typically rely on in house adjustments and repairs.

In addition to designing and building custom clocks, Electric Time also repairs antique outdoor clocks; we saw several in various stages of being rebuilt such as an original cast Seth Thomas clock.

Electric Time has moved its operations several times since 1928: first it was in Boston, then, in the 1930's, in South Natick, and in 1951 moved to Natick. The original Medfield location to which they moved in 1986 was much smaller than the current one, occupied since 2007. It makes a great difference to be able to move smoothly from one operation to another in the factory, on one level, especially when handling enormous clock faces of several feet in diameter.

Electric Time was featured in a How it is Made episode on the Discovery Channel and on Chronicle (WCVB). The videos may be seen as links on the Electric Time website and are well worth watching. And while you are at the site, check out a few other videos showing the installations of enormous clocks.

We thank Brandie for her hospitality and sharing the story of Electric Time with us!

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[1] Another interesting Medfield connection with Disney is this: Walt Disney was a friend of Justin Dart of Medfield and used the name Medfield in several films about a fictitious Medfield College. Disney used to fly into Medfield to visit Dart at Holiday Farm which had a private air strip. [now part of the Wheelock School Conservation Area off Elm Street]

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Historic Railway Turntable in Wakefield, NH

In the Fall of 2019 the remains of a feature representing a significant period in American transportation history was recorded by this author, during a Phase 1A Archeological Survey working with Victoria Bunker, Inc., and the Wakefield, New Hampshire, Heritage Commission. The feature is a railroad steam locomotive turntable (Figures 1 and 2) constructed in the 1880s, a time when railroad technology was rapidly improving and being applied to more efficiently move the country's people and freight.

The turntable feature is the centerpiece of Turntable Park in the section of Wakefield known as Sanbornville. A quick search of the Internet will reveal that a "turntable park" is not unique. There are many of them throughout the country. They developed during the last half of the 20th century as many railroads ceased operation and their properties were acquired by local towns and cities. The recording of the Sanbornville turntable remains and research of associated documentation revealed that it was a genius, invention (the opinion of the author). Turntables for steam locomotives became necessary because those locomotives were unable to pull loads backwards as today's diesel-powered engines do. A configuration of Y-shaped track layout and rail switches were applied so that the steam locomotives could zig-zag back and forth to turn in the opposite direction. This method required much ground space and several workers to operate the track switches.

In her history, *Footsteps of Pride to the Past, 1774-1974, Wakefield, New Hampshire* (1987), Elizabeth Banks MacRury informs us that transportation between Boston

Figure 1. *A view of Turntable Park in Wakefield, NH, looking northerly with the turntable in the foreground.*

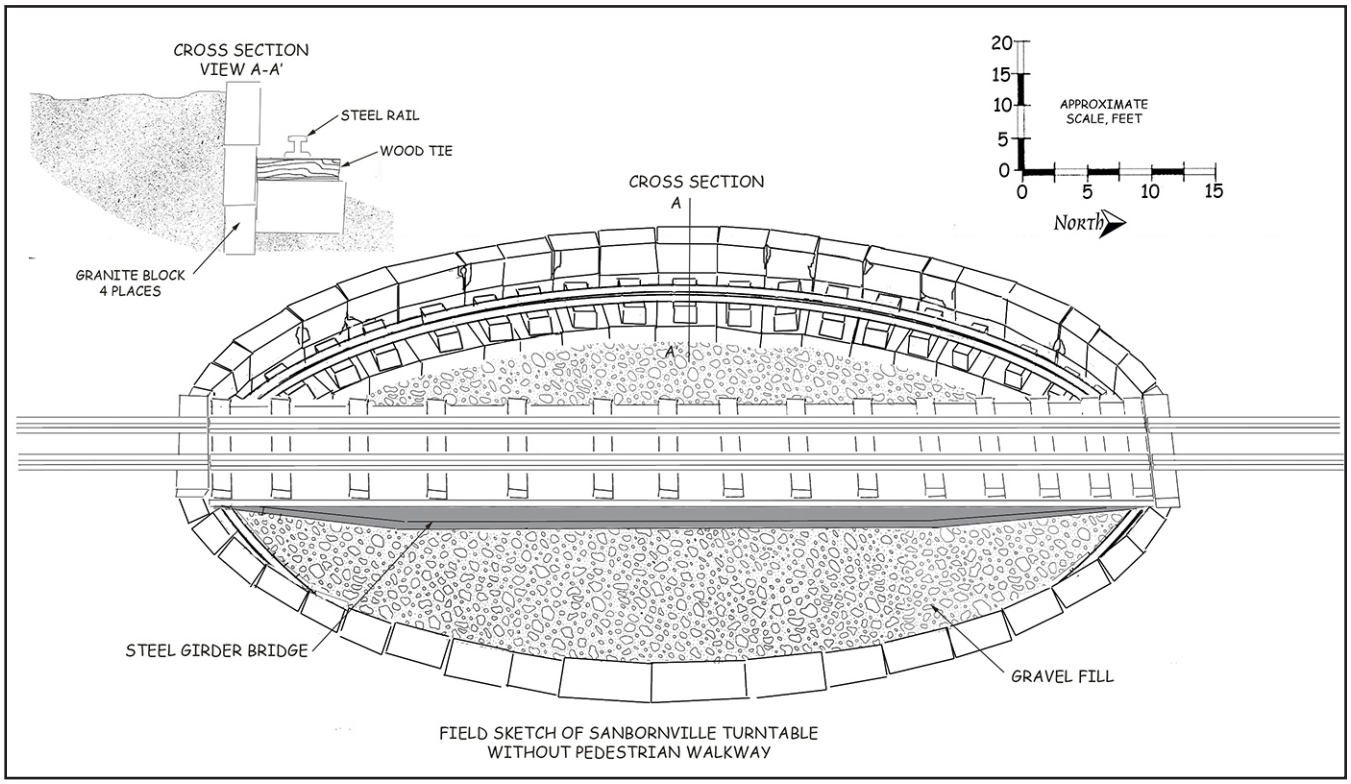

Figure 2. *Scaled isometric field sketch of the Wakefield Turntable Park feature recorded by the author. It is shown without the wooden pedestrian bridge seen in the Figure 1 photo, which had been added for the safety of persons enjoying the park who may walk over it.*

and Portsmouth was being provided by the Eastern Railroad company in 1840 (p527). In 1848, the Eastern Railroad extended its rail lines in New Hampshire and provided service to Great Falls (Somersworth), and by 1854 the rail lines reached Union (Wakefield) (p528). In 1861, rails from Union north to Ossipee, NH were laid. "Soon after the Portsmouth, Great Falls and Conway Road was opened and leased indefinitely to the Eastern Railroad" (p528). By 1871 the number of Eastern Railroad locomotives had increased from 29 to 55, and its number of passenger cars grew from 47 to 103, while other rolling stock numbered about 2000 cars. By 1872, a branch line was completed from Wakefield to Wolfborough, NH, on Lake Winnepesaukee and the railroad station in Union became known as Wolfborough Junction. This location was ideal for the establishment of a facility for repair and maintenance of the Eastern Railroads' increasing numbers of locomotives and rolling stock.

Later, the area became known as Sanbornville after John Sanborn, who served as Superintendent of the Eastern Railroad from 1878 to 1884 and then, after the Boston and Maine Railroad assumed control of Eastern in 1885, he was General Superintendent of the Boston and Maine system until 1906. He influenced the establishment of locomotive repair shops, a carpenter shop, a machine shop and a car shop in Wolfborough Junction, making it the center of railroad rolling stock and locomotive repair and maintenance activity for the region. To serve the several locomotive shops, which were grouped together and known as a roundhouse, a turntable was constructed.

The Sanbornville turntable design had been developed by D.M. Carhart and W.H. Ward about twenty years before it was installed in Sanbornville. "As with most other railroad devices and appliances, inventors proposed many improvements for turntables but most were unnecessarily complicated and provided solutions that could be achieved by simpler and less expensive designs. For example, in 1854 J.C. Robie offered a turntable that was completely supported on a rug-

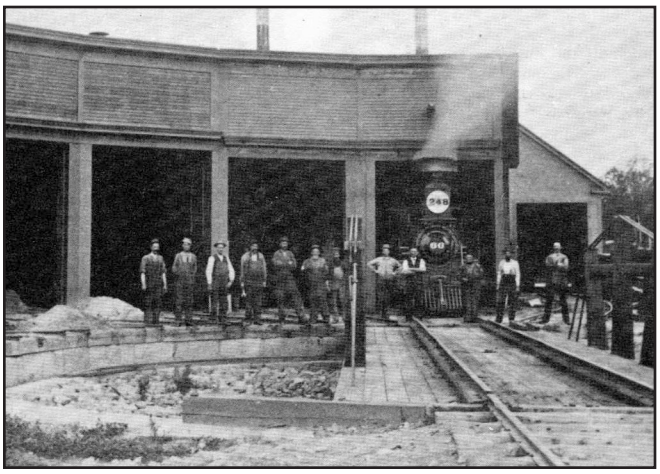

Figure 3. *The first Sanbornville turntable and engine house in 1885. Source: Elizabeth Banks MacRury,* Footsteps of Pride to the Past, 1774-1974, Wakefield, New Hampshire, *page 541.*

Figure 4. *The turntable steel girder bridge supported on a central pier. The ball bearing mechanism is behind the girder.*

Figure 5. *One of several pivot wheels that roll on the curved track at the circumference wall.*

ged shaft that allowed the turntable to be raised and lowered at either end to adjust its rails to meet the track rails, similar to the way that a cannon was elevated or depressed on its trunnions. A number of cams and eccentrics were used to make the adjustment. More practical turntables were advertised by D.M. Carhart and W.H. Ward in the American Railroad Journal in the 1850s. Carhart's turntable was supported on a central pier and pivot wheels at the circumference" (Figures 4 and 5). "In advertisements, the claim was made that one man could turn this table in twenty-five seconds while it was supporting a thirty-ton load. Ward's table relied upon a center bearing only, but this was a ball bearing. The table rested on a series of large balls and its top sides were closed in." (Anthony J. Bianculli, *Trains and Technology: The American Railroad in the Nineteenth Century*, Volume 3, *Tracks and Technology,* 2005.) This design proved to be efficient and easily maintained.

The Sanbornville repair shop facility grew rapidly after 1870, beginning with a 50-foot diameter turntable (which was increased to 60-feet in diameter soon after). By end of the century the facility included an 8-bay roundhouse (Figure 3), a machine shop, a car repair shop, a paint shop, an oil house, a pile-driver shed, a boiler house and several other buildings and structures to support its activities. Unfortunately, on April 8, 1911, the roundhouse and all the shops were totally destroyed by fire. Before 1920, a 3-bay roundhouse was constructed to replace the larger one that had been destroyed by the fire. The period between 1911 and 1920 saw rapidly changing transportation technology. Better roads were being constructed for trucking, buses were carrying passengers longer distances, and fewer people were passengers on rail cars, which reduced demand on the railroad and the Sanbornville shops and the property slipped into disuse.

With the exception of the turntable, little of the once impressive facility is recognizable today. The Victoria Bunker archeological survey was accomplished without excavation. However, historic research using archival sources was completed, as well as mapping and recording visible surface features. Subsurface archeological features were located and recoded along transects in a grid arrangement within the park by Horizons Engineering, Inc., using ground-penetrating radar. Results of the survey have been compiled in an archeological sites inventory form and filed with the NH Division of Historical Resources. Turntable Park continues to be much enjoyed by the people of Wakefield.

Dennis Howe
Northern New England Chapter

Figure 6. *Fireman Norman Spicer turns No. 29 on the armstrong turntable in front of the Baltimore roundhouse in March 1952. James P. Gallagher photo (http://cs.trains.com/cfs-file.ashx/).*

Membership Application to the Northern and Southern New England Chapters of the Society for Industrial Archeology

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