Society for Industrial Archeology · New England Chapters

Volume #44 Number 1 2023

Contents

SNEC Treasurer's Report 1
NNEC President and Treasurer's Reports 2
What is this Gismo in my Basement? 2
SNEC Tour of Buccacio Sculpture 3
NNEC Fall 2022 Tour 6
Exploring 17th Century Tide-Mill Dams with Drone Photography 9
Report of the NEC IA Conference 13
Possible NH Tour Sites 14
Summaries, 2023 NEC IA Conference papers 14
Picture of Great Stone Dam, Lawrence 16

Contributors

Dave Coughlin, Rick Coughlin, Dennis DeWitt, David Dunning, Steve Dunwell, Betsey Dexter Dyer, Robert Gordon, Eric Peterson, Rex Swain, Sara Wermiel

Newsletter Editor

Robert Timmerman, 25 Upton St, Boston, MA 02118, rwtimmerman@gmail.com

SNEC-SIA Treasurer's Report for 2022

Sara E. Wermiel, Treasurer/Registrar

In 2022, the Southern New England Chapter of the Society for Industrial Archeology (SNEC) had 122 members. Welcome to new SNEC members Cooper Sheldon of Torrington, CT; Doug Swain of Lincoln, MA; and David Varholy of Mystic, CT. Life member Robert Hayden, formerly of Wilton, NH, passed away in 2021.

SNEC did not collect dues for 2022 from members who had paid dues in 2021. Therefore, the dues received in 2022 were from new members and former members. In addition, SNEC received donations from several generous members. The total amount of dues and donations received in 2022 was $643. SNEC also had income from bank and certificate of deposit interest: $115.83. The sum of all income was $758.83.

Expenditures in 2022 were for printing and mailing the semi-annual newsletters, biannual fee for web hosting for the NEC website, and dues for membership in the national SIA for SNEC's two elected officers. Total expenditures came to $877.11.

Although SNEC's bank account declined slightly last year, the chapter starts 2023 with $11,371.56, $8,000 of which is in CDs.

SNEC is currently led by the chapter's Treasurer/Registrar, Sara Wermiel. Leonard Henkin is the chapter's Secretary. In addition, there is a Management Committee with six members: Betsey Dyer, Ron Klodenski, Robert Timmerman, and two new additions, Peter Stott and Saul Tannenbaum, as well as Sara and Leonard. The committee meets periodically via Zoom. This past year we produced the newsletters, worked on planning the 2023 conference, and discussed other chapter matters.

Betsey Dyer organized the annual New England IA conference and is the contact for other SNEC activities: tours and programs. Robert Timmerman edits the newsletter of the New England chapters. Items for the newsletter can be sent to him at any time. The newsletters are published in the spring and fall.

Regrettably, SNEC offered no tours in 2022. We rely on members to propose tours and help organize them. Members with ideas for tours should contact Betsey Dyer, bdyer@wheatoncollege.edu.

Thanks to the members of the Management Committee and three cheers for Marc Belanger, who continues to manage the website and email distributions for both New England SIA chapters.

NNEC President's Report

David Dunning

The Spring Tour on Friday June 2nd was very well-attended and educational. The next issue will give the details of our tours of the Portsmouth Naval Shipyard, Fort McClary, and the exploratory submarine Albacore. Be thinking about what/where we should tour next fall.

Chapter elections will be held next fall, as usual. Dianne Chase was unable to finish her term as 1st V.P. Nelson Lawry is filling in until elections are held.

NNEC Treasurer's Report

Rick Coughlin

Bank balance on May 31, 2023: $3,147
Bank balance on May 31, 2022: $3,445
Thus, the bank balance has decreased $298 in the past year. The 2023 annual paid membership as of June 10, is 30. Number of life members: estimated at 30. The bank balance decrease is primarily due to newsletter costs.

What is this Gizmo in my Basement?

Rex Swain

This gizmo was mounted on the wooden stairway wall in the basement of my ca 1890 house in Connecticut. It was there when we bought the house in 1986.

This is the front with the cover removed. Note the big spring on the right and the gear mechanism on the left.

This is the left side (above, L). When the mechanism is running, the gears turn and the paddles (4) spin rapidly. The copper coil (5) looks like a magnet which would start and stop the mechanism. There is another spool-shaped device behind (5). It has been suggested that the paddles act as a speed governor.

A closer view of the left side. When the magnet is not on, a gap (6) is created as the lever above it rises. A piece of metal (7) catches the spinning paddles and stops the mechanism as you see here. When the magnet is activated, the lever just above it is pulled down, paddles are released, starting the mechanism.

[Editor's note: The author came up with a theory of what it was, but then appended this explanation:]

The Answer... It's Part of a "Damper Flapper" System!

Eureka! My friend Randy Robinson pointed me in the right direction.

I was on the right track, but the actual purpose of the device was to control the *damper* of a coal stove. Here's some history: in 1885 the inventor Albert Butz in Minneapolis patented a furnace regulator and alarm. His company eventually became **Honeywell** (from the Hennepin History Museum, [The Invention of the Damper Flapper and the Birth of Honeywell]).

The damper flapper was a system that controlled coal fire furnaces. When the temperature inside a home became too cold, Butz's invention would lift the damper on the furnace, allowing air to fan the flames, thus automatically increasing the temperature of the residence. The device was composed of three components: a thermostat, a battery, and a motor. I gather that the most innovative part of the system was using a thermometer to create an action: a thermostat, which would make Honeywell a household name.

My gizmo was an early version of the "motor," using a wind-up clock-like mechanism before electric motors were readily available. (Subsequent versions of damper flappers would use electric motors.)

SNEC Tour of Buccacio Sculpture Studio Canton, Mass., February 4, 2023

Betsey Dexter Dyer

Eight members of SNEC woke up early on a minus six-degree Saturday morning in February to get to the Buccacio Sculpture Studio in Canton, Mass., by 8:30 a.m. Owner Jeff Buccacio, who gets up even earlier, was already there at work. Jeff's son Jeffrey (age 13), who began to learn welding in his father's shop at age 6, was also there working on re-building an engine, entirely on his own.

Jeff Buccacio (in the hat) and our group around the 3D Miller

The trip was well worth it as we were treated to a two-hour tour of a large shop packed with equipment, dedicated workspaces, and a large number of projects in various stages of construction. Jeff provided detailed descriptions of every step in creating and then casting large (in many cases monumental) bronze sculptures.

Jeff works on commission and asked that we not take photos of any artwork as many of the pieces were contracted by or for very well-known people and organizations. Indeed, the eight of us can attest to the prominence of the subjects who could be recognized in many of the sculptures in progress; nothing more will be divulged about that.

Jeff began sculpting with clay as a boy, then was fortunate to work under the tutelage of Paul Cavanagh of Paul King Foundry in Providence; a partnership between Buccacio and Cavanagh evolved. When the Paul King Foundry closed, Jeff took up their specialized niche in the industry, creating monumental bronze statues.

Meanwhile, Jeff admits that art school was not pivotal in his career. Nor was teaching sculpture at an art school. Instead, plenty of hands-on work and persistence and being in the right place at the right time to work for and learn from master craftsmen were essential. Several years in Hollywood as a designer and sculptor for movies such as Spiderman III, honed his skills for working precisely and under pressure.

The following is the sequence of steps from beginning to end to create a work of sculpture. The entire process can take many months and even years.

1. We saw Jeff's sketches, both rough and detailed, lying around the studio.

2. Jeff is an expert sculptor in clay and renders at least one a small, detailed model a foot or so high for each sculpture, including ones that will eventually be larger than life- size proportions.

3. A larger clay model or maquette about a third the size of the intended final size of the piece is made. This magnifies any imperfections that need correction.

4. Scaffolding for a full- scale model is built of steel wires and rods or carved in foam or other material. Large sculptures are always created and cast in 20-30 pieces (arms, legs, all sorts of details etc.), and then assembled later.

Jeff not only uses ancient techniques but also has large computerized 3D equipment to create small models or parts for a sculpture. He has a computerized large format miller for cutting in three dimensions, a large 3D printer that molds in plastic, and a resin printer that uses ultraviolet light to selectively harden resin in 3 dimensions. Because sculptures will be cast in many different pieces, many preliminary analyses are required to be sure that the pieces will fit together and look right.

5. The scaffolding is built up and covered with a special malleable, non-drying clay that can be worked methodically over long periods of time. That clay is sculpted to look like the finished, full- size piece.

Great care is taken with every detail as those will be carried along through many steps.

6. The full-scale clay sculpture is covered by several layers of liquid silicone, which hardens to form a flexible mold.

7. The silicone is covered with plaster, reinforced with burlap. (And keep in mind that this is done piece by piece: arms, legs, head, etc.)

8. The silicone mold with its sturdy covering of plaster is cut away from the clay sculpture within. The clay sculpture is discarded.

9. The cut pieces (silicone covered with plaster) are reassembled to make a hollow negative mold.

10. A proprietary wax formulation (a type of synthetic beeswax) is custom-mixed by Jeff. That melted wax is poured and brushed into the mold. This is the foundation of the ancient "lost wax" technique, which at one time used actual bee's wax. However, the very large scale of Jeff's pieces necessitates using a more available synthetic version.

11. The outer casings of silicone and plaster are broken away and discarded. That leaves a sturdy wax mold of the sculpture (or more likely of one of its parts).

12. At this point an intricate pouring system is added using wax rods attached strategically all over the piece, topped by a paper coffee cup! Fortunately, Jeff allowed us to photograph it as words are inadequate. That wax and cup system will be coated with the ceramic mix and it will end up being channels of tubing by which bronze will be poured into every crevice or tubing, out of which air will escape during casting. The coffee cup serves as a temporary mold for what will be a pouring spout for the bronze.

13. A synthetic liquid ceramic mix is applied very thickly and hardened. This is followed by a coating of stucco. The result is a large vessel with all its intricate

pour and venting tubes and the mold itself concealed. The coffee cup is the opening at the top.

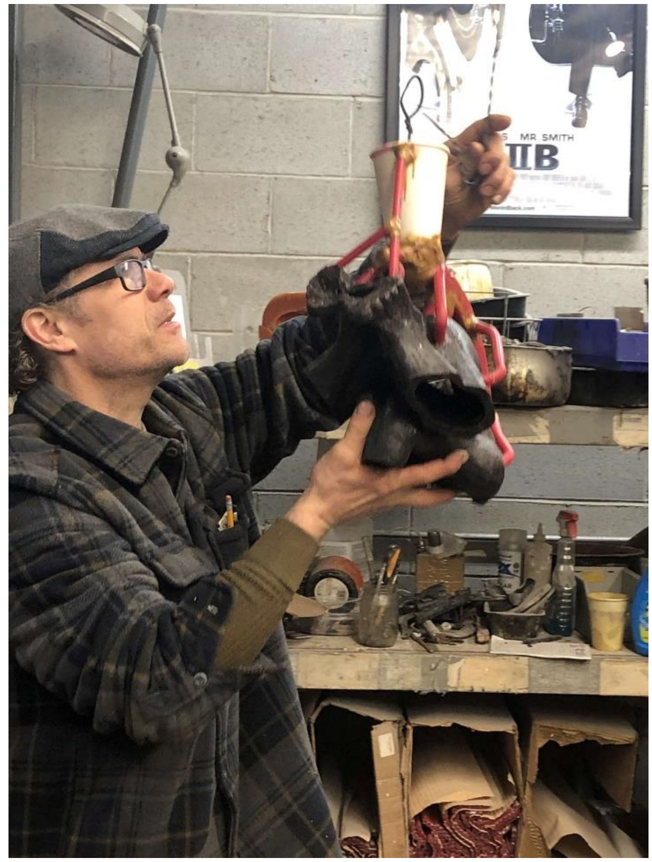
Jeff at his wax station where tools are being heated

14. The sculpture of wax, ceramic, and stucco is boiled to remove the wax. Some studios reuse the wax. Jeff does not because he requires a special mix for the particular pouring he is doing.

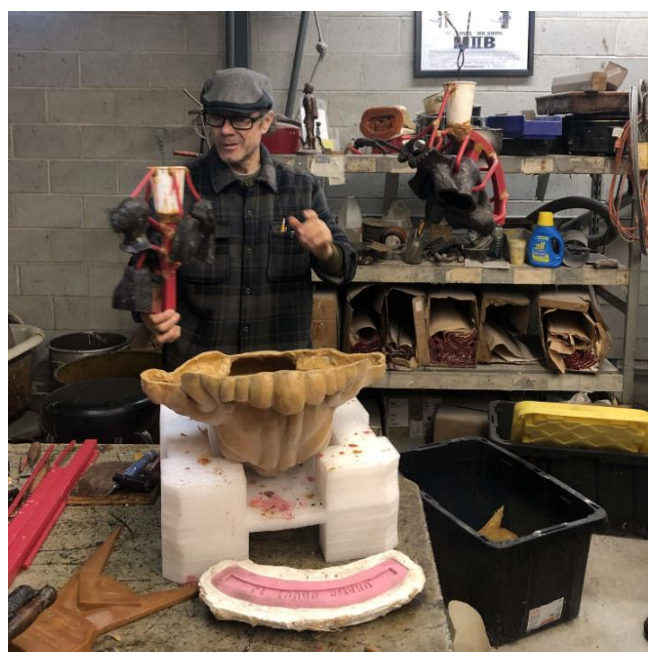
15. And now, finally, Jeff is ready to pour bronze into the ceramic mold that has been laboriously created and which should have all the details of the original clay sculpture.

16. The ceramic mold is heated to create a chemical reaction that makes it just labile enough to break open easily, but not to break open for the next step which is pouring the molten bronze.

17. We did not experience bronze casting done but were quite impressed with the cauldron and infrastructure for lifting a pouring. Asbestos suits and other protective gear were hanging nearby. Also on a freezing cold day, it was a pleasantly warm section of the studio with an enormous open gas fire blazing. Jeff also casts in other metals. Jeff does not reuse waste metal from the process as some other foundries do because he requires precise formulations. Scrap metal is recycled.



Jeff holding up a form to be cast, with the channels for pouring metal assembled to it. The coffee cup will be covered in ceramic and will serve as a reservoir for hot metal.



A piece of a sculpture in wax is in the foreground. Behind it, Jeff assembles a pouring infrastructure on another wax piece.


The bronze heated here.

Nearby were several large bronze sculptures and parts of sculptures in various states of finishing.

18. The bronze sculpture is assembled from its many individually cast pieces and welded together. Before welding was invented in the 20th century, such pieces would be assembled along carefully placed seams with an internal scaffolding system holding the pieces together. Jeff is very well-versed in ancient techniques and showed us an example of the pre-welding type of assembly. Not only does he create pieces de novo but he also is regularly on call to repair large pre-welding-era bronze statues. In his shop is a collection of antique bronze pieces originally from Roman Bronze Works (Studios) of New York City. These were given to him by Paul Cavanagh, who had apprenticed there.

19. The assembled bronze sculpture is finished to smooth out all welding seams and edges, and any slight imperfection. Some of Jeff's hand tools are 100 years old. We saw some sculptures marked up with felt tip pen to indicate where finishing work was to be done.

20. Finally, to create a patina, the piece is heated with large blow torches.

21. And, of course, moving a large piece to a site and installing it is a production unto itself.

Jeff has probably had his hand on most of the large bronze pieces in this area, either repairing them or creating them de novo. These include casting the Massachusetts memorial to fallen firefighters and repairs to the arts and sciences sculptures outside the Boston Public Library. One of the most impressive things about Jeff was his combination of artistry, craftsmanship, and technical knowledge, along with a business sense that has brought in many important commissions.

It was an extraordinary tour, with so many steps and details that that we will probably never look at a bronze sculpture the same way again. Even those of us who thought we had some basic grasp of the lost wax method found it far more complicated than we had imagined.

NNEC Fall 2022 Tour

Dave Coughlin

On Friday, Oct. 14, 2022, the Northern New England Chapter held its fall tour, of the working waterfront in Portland, Maine. Unfortunately, heavy rain was expected that day, so we only had five people for the tour.

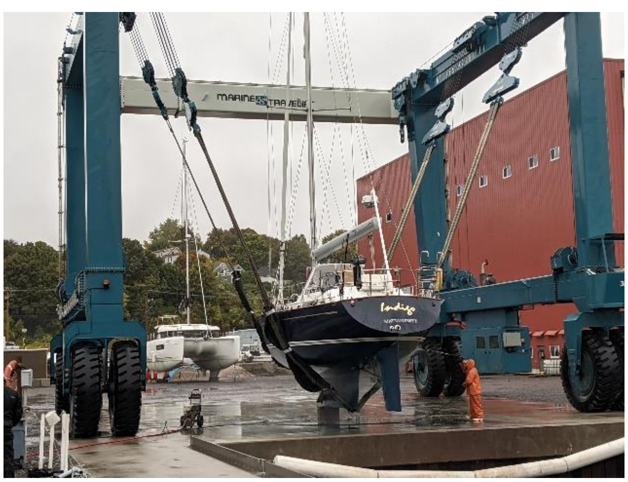

A fun but wet tour

The first stop was Portland Yacht Services on Commercial Street along the waterfront. Going back to the late 1800's, the land was originally a parcel owned by the Central Maine Railroad and another parcel owned by the local utility which had a coal gasification plant. Ten years ago, these parcels were combined by Portland Yacht Services for a total of 22 acres along the waterfront. Unfortunately for them, the State of Maine wanted a containerized cargo facility along the waterfront and took 17 of the 22 acres by eminent domain.

Within these remaining 5 acres we had a tour of their facilities. There are six buildings which hold boats, ranging from small motor and sailboats to huge yachts more than 100 ft. long. They do all types of work on these boats, including cabinet work, engines, painting, repairing, etc.

Spray paint facility

They work on the large Peak's Island auto ferry boat every couple of years, and other ferry boats, tugboats, tour boats, and schooners. These boats go into a short water channel where a massive boat lift has dropped straps into the water with its eight wheels running along the top sides of the channel.



Movable crane

Once the boat has entered the water channel, the straps tighten and pull the boat out of the water. It can lift up to 330 tons and boats up to 150 feet in length. These boats are all pressure washed to remove marine organisms before being taken into huge hanger-like boat houses for work or storage for the winter. These boathouses have aircraft-sized doors, as large as 65 by 65 feet, and cement floors. The buildings are heated by hot water pipes under the floors. Modified lawnmowers are used to move the smaller boats into them.

Boat storage unit

It's very impressive to see these huge yachts inside. To give an idea of size, one boathouse had a full-sized bus inside, and it looked very small compared to the yachts, many stories high.

There is one exception to the hangers having cement floors. Wooden boats deteriorate faster on cement floors, so they are put in a boathouse with gravel floors. Inside one was an old sailboat that a fellow has been working on for ten years. Private individuals can rent space in these boathouses and work on their own boats if they desire.

The trend is away from wooden boats, with 95% of boats stored being fiberglass. Portland Yacht Services stores approximately 450 boats over the winter, with the majority being smaller boats shrink-wrapped in plastic. Between 65-70 large boats and yachts are stored inside and cost more than twice as much as outside storage. When stored, all the sailboats have their masts taken down and are put inside long buildings on racks. The masts are too high to go inside the boathouses, and when stored outside, high winds can cause a sailboat with masts to become unstable.

Mast storage unit

There is a boathouse which repairs outboard motors that are now replacing inboard motors on many boats today. By using an outboard, there's more room inside the boat and repairs are easier to accomplish. We were told of one speedboat which has 6 outboard motors of 600 horsepower each, which cost $75,000 for each motor, giving the speedboat a total of 3,600 horsepower at the cost of $450,000, not including the boat! These are correct figures and difficult for most of us to imagine.

Large boat storage

A business such as this appears to be very profitable and largely recession-proof because they do not sell boats, but only service and store them. This year they built a large boathouse expecting it to take a couple years to fill but by fall had enough customers to fill it. Two more new buildings are in the works, and they cannot keep up with demand.

They also have experience working on newer hybrid and electric boats and recently installed solar panels on a boat. There are 50 year-round employees at Portland Yacht Services, and they expect to hire more in the future.

Our next stop was Portland Fish Exchange, which opened in the early 1980's. Before that, there were 2-3 large purchasers of fish on the waterfront, and they controlled the market, often paying late with low prices. Once the fish exchange opened, fishermen obtained higher prices for their catch and were paid within 24 hours.

The fish exchange is a public auction of groundfish, which includes cod, pollack, halibut, whiting, redfish, monkfish, white hake, haddock, flounder, and a few other species. They do not deal with larger deep-water fish such as tuna and swordfish.

The exchange was organized by the State of Maine with assistance from the City of Portland and has board members made up of fishermen and others with a stake in the working waterfront community.

Portland Fish Exchange

Once fish are unloaded from boats, they are sorted by species and graded by size to form "lots," which are auctioned off. These lots can vary greatly in size, from a few hundred to thousands of pounds of fish, depending on the size of the catch and the species caught. In the past, a bidder had to appear at the fish exchange to bid on fish. Today, bidders can hire specialists to assess the fish for them and then bid on the lots from their home or business. The bidders are primarily fish wholesalers or local fish markets. Restaurants generally do not bid at the exchange because the lots are too large for them to process the fish.

There are about 15 fishing boats which deliver to the fish exchange, and the most common fish landed at this time is monkfish. This will change according to the season and prices that fish are sold. If prices are high for a specific species, fishermen may change their gear and location of fishing. These fishermen have quotas on species, and they often lease their quotas to others. Sometimes they hold back from leasing their quotas until prices rise, then lease them to get the highest return.

Bidding paddles

The tour of the fish exchange gave us a much better idea of how caught fish are handled once they come into Portland. Some of the fish wholesalers who purchase fish at the exchange send them to Boston, New York, Chicago, and other cities.

Up until this point on the tour, we had little rain but at noon it started coming down heavy. Because of this, we decided to cancel the outdoor afternoon portion of the tour and retreated to Becky's diner for seafood and other lunch items.

Exploring 17th-Century Tide-Mill Dams with Drone Photography

Robert Gordon

No seventeenth-century buildings survive in Maine, but tide-mill dams from that time do. They can be seen in satellite images, but few have been closely examined or properly recorded. For those located in estuaries, access is not always easy. With the tide high enough to reach one by boat, the dam may be nearly submerged. At low tide, an unpleasant trek through muck is needed. We have few, if any, archaeological investigations of these historic structures.

Now a modern technology helps us address this lapse. In 2022, Deane Rykerson and colleagues from the Tide Mill Institute organized a project to examine early tide-mill sites in York, Maine, with drone photography. Satellite images show us good detail of dam structures as seen from directly above, but they don't reveal what can be seen with oblique or side views, or close-up observation (Fig. 1). The camera-bearing drone can do this for us (Fig. 2).

Fig. 1. Satellite image of the Old Mill Creek dam (Google Maps)

Fig. 2. Drone image of the same dam taken in 2022 (Photo by Jim White, Spruce Creek TV)

Colonists in the Province of Maine came not to practice their preferences in religion but to return revenue to their sponsoring proprietor back in England, Sir Fernando Gorges. They were few and their tasks large; they needed all the help they could get to ease the heavy labor of sawing boards out of the logs from old-growth trees for their houses and barns, and for export. Women faced the tedious task of grinding grain by hand. Along the coast tide power was a good choice for powering saw and grist mills. Tide mills, built beginning in 1634 along the York River, were soon followed by others (Table 1).

Table 1. Early Maine Tide-Mills

Date	Location	Dam length, in feet
1634	Old Mill Creek, York	25
1635	Castine	No data
1656	Clark and Lake Settlement	40 and 50
1652	New Mill Creek	100
1694	Kittery Spruce Creek	75
1705	South Thomaston (approximate)	230
1716	Arrowsic Island	50
1726	New Mills, York	620

Based on a compilation by Bud Warren

In 1634 Sir Fernando Gorges, proprietor of lands on the north side of the Piscataqua River, sent John Ingleby, sawyer, and Bartholomew Barnard, carpenter, to erect saw and grist mills at Agamenticus, now York. They necessarily brought the tools, saw blades, mill stones, and mill parts with them since they were coming to a newly-established frontier settlement. Ingleby and Barnard first had to find a suitable mill site, one small enough for them to build a dam and mills with the modest resources they had, but large enough power a pair of mills. Since the main channel of the York River was too deep and too wide, and had a strong current, they chose a site on the tributary later named Old Mill Creek (Fig. 3). They built the saw and grist mills adjacent to each other on one dam located about midway up the creek, where they could get the best balance between the available power and the time the mills could operate. They sustained the local economy by providing sawn-out boards and meal, first for home use and then for export to buyers in colonial ports, the West Indies, and eventually southern Europe. But problems soon arose.

Thomas Gorges, the proprietor's twenty-one-year-old cousin, who was appointed deputy governor of the Province of Maine, reported to Sir Francis in 1641 that the saw-mill cut 250 board feet and the grist-mill ground twenty bushels per tide, when they were in working order. All too frequently they were not. Breakage in the mill machinery was frequent and stopped production of lumber and meal. Then, even with all mill mechanism in order, output declined. Inadequate foundations had allowed the dam and wheels to settle, diminishing their operating time. Thomas believed the mills would have to be moved or rebuilt. The historical record is silent on what happened next but the mills were gone before 1652. No documents tell us exactly where on Old Mill Creek they had been built.

The York tide mills worked on the capture-and-release system. A pond behind the mill dam filled with water at high tide that was then released through the mill wheels once tide receded, to leave the wheels free of backwater. Once Ingleby and Bernard had chosen Old Mill Creek, they had to decide where on the creek they should place their mills. Near the mouth of the creek the available tidal energy would be highest, but it could be used for only a short time, insufficient to do useful work before the rising tide stopped the mill wheels. Higher up the creek the possible operating time was longer but the available tidal energy less. The builders had to pick a site that would give them the best balance between operating time and the needed energy for milling and sawing. What site did they pick?

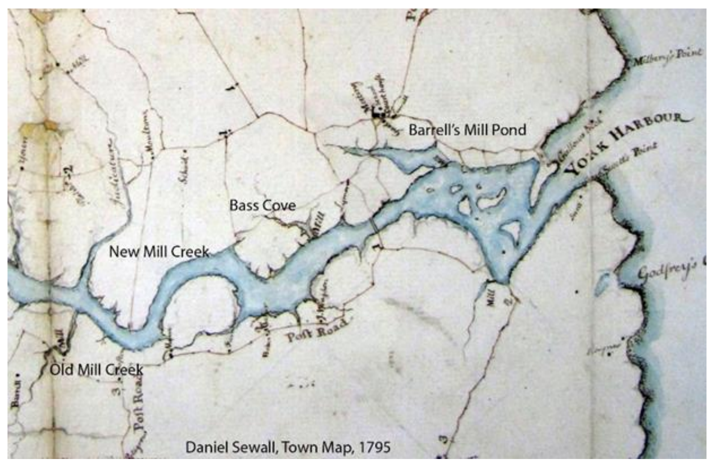


Fig. 3. Map of Old Mill Creek and New Mill Creek as tributaries of the York River. In 1795, when Daniel Sewall made this map of York tide mills, the mills on New Mill Creek had been abandoned. His map shows the 1652 mill dam located just downstream of the road crossing the Old Mill Creek.

While the historical record provides no answer, a recent survey by archaeologist Emerson Baker turned up evidence from landmarks indicating that the 1634 mill dam was about midway between the mouth and upper end of the creek. Baker identified a possible mill site where a road once crossed the creek (Fig. 3), but conclusive physical evidence of a dam at this has been missing. If it had been poorly built, as Thomas's letters home suggests, all traces of it might be gone. Or perhaps not, and it was elsewhere.

A Political Takeover

Gorges's Province of Maine was rich in old-growth, uncut forest. By 1640, speculators from Massachusetts were eying these timber resources. Two years later they engineered a takeover that annexed Maine into Massachusetts, where it remained until the 1820 Missouri Compromise. With the English proprietors' land rights extinguished, an influx of entrepreneurs in partnerships with Boston merchants arrived to fell and cut up the old-growth forest with new saw mills. They would supply timber both for export and for the thriving shipyards in Boston and other ports. William Ellingham and Hugh Gale erected tide-powered sawmills on New Mill Creek, directly across the York River from Old Mill Creek, beginning in June 1653. Their dam could still be seen in the early twentieth century, as noted by York historian Charles Banks. It was at Sayward's Point, about mid-way up the tidal part of the creek.

A few years later wealthy Boston merchants Henry Webb and Thomas Clark joined Ellingham and Gale in the sawmilling business by gaining the right to cut a thousand pine trees at the head of New Mill Creek provided they built and maintained a grist mill at the yearly rental of £12 paid to the town, effective January 1653. For this they built a dam at the south bend of the creek below Sayward's Point and placed the grist mill on the S.E. side of the stream. It served as the town's corn-mill. Since it was on New Mill Creek, people from the village could reach it without having to cross the York River, as they had to do to reach Old Mill Creek. (Only in 1752 was the York River bridged, with Samuel Sewell's novel pile-trestle structure.)

Tide-powered saw and grist milling in York throve until raiders from Canada struck January 1692. While people sheltered in the town's few garrison houses, the raiders burned their homes and carried off anyone that had not found shelter as prisoners to be held for ransom in the Quebec. Without a way to cross the York River, the raiders couldn't reach area around Old Mill Creek, so it was spared destruction. Recovery and reconstruction then took years. But by 1720, York was again prospering with a thriving trade in fish, timber, and grain, to feed and house the enslaved workers at West Indies sugar plantations. But, an economy dependent on felling the old growth forest was unsustainable. Before the end of the 18th century, York men, having cut down and sawn up all of the old-growth trees, abandoned the tide mills on New Mill Creek.

Back in 1653, Ellingham and Gale had sold their timber interest to Webb, Clark, and Edward Rishworth, who launched new timber harvesting north of Old Mill Creek, where they had acquired massive timber acreage. They replaced the defunct 1634 tide mills with new ones on a new dam. Tide-powered milling then continued here with a succession of owner-entrepreneurs into the 1890s. We know the exact location of the 1653 dam because it is visible in modern satellite images (Fig. 1). The dam spanning the creek has three openings. The northern one was for a sawmill. A grist mill was at the south end, where a mill stone was visible until recently. A tide gate at the dam center filled the pond behind the dam on the rising tide and then held it for release through the mills on the subsequent fall of the tide. Placing the mills at the ends of the dam allowed for easy access to deliver logs or grain for processing and removal of the products.

The Tide-mill Dams Recorded

York's tide-mill dams attracted little attention for decades. Then in 1968, geographer Peveril Meigs, who was gathering material for a book on U.S. east coast tide mills, visited the York dam sites. Meigs never wrote the book he intended but fortunately his family saved his notes and papers. 'Bud' Warren, one of the founders of the Tide Mill Institute, tracked down

Fig. 4. Drone photo of the remains of the tide mill dams on New Mill Creek, looking upstream. The first dam is at the top of the view and second at the bottom. Since these dams were abandoned in the late nineteenth century, erosion has nearly obliterated them. (Photo by Jim White, Spruce Creek TV)

Meigs's notes and convinced the family to make them available for study. Meigs had first visited New Mill Creek. He found only traces – discontinuous lines of stones in the creek bed – of the two dams that had been visible in the early twentieth century (Fig. 4). Meigs then examined the Old Mill Creek dam, abandoned just seventy years previously. He examined the dam's construction and details of surviving features needed for the operation of the saw and gristmills on it. He studied the dam from its ends and recorded its dimensions (Fig. 5).

Fig. 5. Drone photo of the OMC dam showing soil cover topped with upland grass and lag deposits of stones from the eroded dam. The stones range in size from hand-size to small fragments. (Photo by Jim White, Spruce Creek TV)

He found a mill stone at the south end, proving the grist mill location. His measurements, when compared with the modern satellite view, shows significant loss of dam structure since 1968. The center, tide-gate opening in the dam that had been 15 feet wide in 1968 is now 25 feet wide. Other dimensions show comparable change. Clearly the dam, one of the oldest man-made structures in Maine, is a wasting asset.

Dam Construction Revealed by Drone Photography

Comparison with the description and dimensions of the Old Mill Creek dam made by Meigs in his 1968 visit with what is seen in the drone images today tells us how the OMC tide-mill was built and what its future is. No archaeological excavation or survey has been done at the dam. Nature is doing the excavation for us; we need only to continue to watch year by year.

Both the drone and the satellite view show that all traces of the mills and the roads that serviced them are gone (Figs. 1 and 2). Also gone are the features – foundations, footings for the mills and a landing or 'hard' for boats at the grist mill site – that Meigs recorded. But upland grass is still growing on the top of the dam. The dam is surrounded by a nearly-continuous splay of stones, seen in Fig. 2 and close up in Fig. 7. They are small enough that they could have been easily dug up and carried from the shore to the dam. The large boulders typically present in Maine tide-mill dams are absent.

Why are the York dams so different from the Spruce Creek tide-mill dam in nearby Kittery with its massive stone base, for example? The answer is the local geology. The stones being exposed by erosion of the dam are generally no larger than hand size (Fig. 6). They lack the characteristic shape of glacially-transported stones. The land adjacent to the creeks is classified as the Presumscot formation, a marine deposit laid down on the sea floor when seawater flooded inland at the end of the last glaciation. There is no convenient source of large rocks near the dam site. The builders used what they had at hand. And, of course, in the seventeenth century they had very limited capacity to collect dam-building materials from distant sources even if they had wanted to. The result is a dam made of old marine sand and relatively small stones. It was stable while it was being maintained but vulnerable to disintegration once maintenance stopped. That happened at New Mill Creek by the end of the eighteenth-century, when the old-growth forest had been felled and there was no more work for its sawmills. Only the slightest traces of the tide-mill dams survive there (Fig. 4). At Old Mill Creek dam maintenance ended only about 1900. Interested observers will be able to follow the deconstruction of the OMC dam as it progresses over successive decades in the future.

Is there any evidence of the first, 1634, dam in the drone photographs? Just possibly. It would have been made with the material at hand, as was its near neighbor in 1652. Figure 6 shows two small traces of stone similar to those seen at the 1652 dam site. They are at the place where a road once crossed the creek and where Tad Baker's landmarks indicate the site of the first dam.

Fig. 6. The small piles of stones at both sides of the creek where a road once crossed may be from the first, 1634, tide mill dam. (Photo by Jim White, Spruce Creek TV)

Report of the New England Chapters IA Conference, April 22, 2023

Betsey Dyer

The SNEC conference was held at the Lawrence Heritage State Park in Lawrence, Mass., on April 22nd. Thirty-eight people attended, including several new members.

The morning session theme was "Drinking and Waste Water Treatment." Sara Wermiel provided an overview of the early research and engineering innovations in wastewater and drinking water purification, which took place in Lawrence in the late 1880s and the 1890s. The experiments in wastewater treatment led to an understanding of a biological process for destroying waterborne disease-causing bacteria. This process was then applied to filtration of drinking water: Lawrence built a slow sand filter to filter the city's drinking water, which resulted in a sharp decline in typhoid fever deaths in Lawrence.

Betsey Dyer followed with an explanation of microbial activity in sand filters. The complex and diverse community of microbes in the sand is the primary reason the method so successfully removes wastes and other organic impurities. However, many of the same microbes are responsible for clogging sand filters. An important technique for determining the purity of drinking water was developed in Lawrence and is still used today: the detection of coliform (intestinal) bacteria as indicators of the possible presence of pathogenic bacteria.

Eric Peterson presented evidence that Leavitt's Engine #5, designed to pump sewage at Boston's Calf Pasture Pumping Station, was the largest steam powered pumping engine ever built. Alas, the engine was entirely dismantled and the parts used as scrap metal during World War II. If any reader believes they have a photograph of the engine, they should contact Eric at the Metropolitan Waterworks Museum in Chestnut Hill. As far as he knows, there are no extant photographs of the engine. (See summary of paper, below.)

Finally, to conclude the morning session, Dennis De Witt showed us photographs, diagrams, and maps with locations of Parisian-style pissoirs in Boston. These were once located all over Boston, part of an effort to rid Boston's streets of human wastes. (See summary of paper, below.)

In the afternoon session, Stephen Dunwell gave a wonderful slide show of portraits of mill workers and explained in detail how the subjects in photographs likely were posed. He concluded with some of his own remarkable mill portraits.

Then Jenn Doherty gave a thorough explanation of all the ways that the MACRIS database (Massachusetts Cultural Resource Information System) of historic buildings, districts, structures, and objects in Massachusetts could be searched, used, and updated. Information on historic properties can be found through regular MACRIS – an inventory – or through MACRIS Maps, by location. Even for those who regularly use the database, it was an excellent review, or reminder, of all the ways MACRIS can be useful. (See MACRIS (mhc-macris.net) and MACRIS Maps (mhc-macris.net))

Robert Timmerman provided an overview of the Great Stone Dam of Lawrence, which was soon followed by a walk along the canal to the dam itself. Just days before, the water level had been so high the dam could scarcely be seen. On the day of the conference, we had a nice view of the spectacular structure.

Possible New Hampshire Tour Sites

David Dunning

Please do some research for us to find new sites to tour. If one of the below is near you, see what there is to see. Local historical societies and local libraries are great sources of information; so are "old timers." Start by just Googling "industrial history of (city)." The list below is mostly manufacturers – no bridges or dams. Some may be sites we've already seen. Contact me to discuss what you find: (603) 525-6939 dunmark@tds.net

Earliest textile mills: New Ipswich 1800, Goffstown 1805, Amoskeag Cotton & Woolen 1810 (not the Boston Associates)

In 1850, New Hampshire had 56 cotton mills and 61 woolen mills; some might have done both.
Other sites: Nashua, Dover, Exeter, Claremont, Newport, Keene, Lebanon, Somersworth, Jaffrey, Harrisville, Penacook, Allenstown, Franklin, Hillsboro.

Historical manufacturing and infrastructure in various towns:
Troy & Marlborough: horse blankets
Andover: harnesses
Rochester, Farmington, Derry: shoes & leather
Sunapee: clothespins
Franconia: iron works
Alstead, West Claremont: paper
Antrim: high grade cutlery
Berlin: Brown Paper Company (low grade)
Boscawen, Penacook: flour mills and twine
Boscawen: Gerrish Farmer, electrical inventions
Stratham: engines, boilers, pipe fittings
Nashua: sewing machine invented by Elias Howe in 1846, Patent #4750
New London: grass scythes
Rochester: new type of printing machine by Isaac Adams
Stoddard: glass works
Lebanon & Epping: bricks
Nottingham: barrel & box factory
Laconia: canals
Center Ossipee: blinds & shutters
South Milton: Spaulding fiber board
A VT & ME list will be in the next issue.
Have fun researching and get back to me.

Leavitt's Engine #5: The Largest Steam-Powered Pumping Engine Ever Built?

Eric Peterson

In the last quarter of the 19th century, size mattered in the steam engineering world. The 45-foot tall, 56-ton Corliss Engine, exhibited at the 1876 Centennial Exposition in Philadelphia, first showcased the potential of enormous steam-powered equipment. In the ensuing years, engineers built larger and larger machines to respond to the infrastructure needs of growing cities and for specialized industrial applications. Impressive scale and power brought fame and prestige. Largely forgotten today, the brilliant engineer Erasmus Darwin Leavitt, Jr., designed an amazing array of gigantic steam machines, which won him international recognition. His 1883 hoisting engine for a copper mining company in Michigan, aptly named *Superior,* became world famous for its astounding power. As the century ended, the competition for the title of world's largest steam engine became fierce. In 1893, the E. P. Allis company built a 54-foot tall, 725-ton water pumping engine for the Chapin Mine in Michigan's Iron Mountain range; this is still regarded by many as the largest standing steam-driven pumping engine ever built in the U.S. The two pumping engines built for the Cincinnati Waterworks in 1905, measuring

105 feet tall and weighing 1200 tons each, also make this claim. But wait! E. D. Leavitt designed a mammoth sewage pumping engine for Boston's Calf Pasture Pumping Station in 1905; this may have been the real winner. In my presentation to the NEC IA conference, I reviewed what can be learned about this forgotten monster steam-engine. How big was it, what did it do, and why was it overlooked in its time and entirely forgotten today?

[Editor's note: E. D. Leavitt, Jr., invented and designed the overhead beam engines with compound cylinders for Lawrence's first public water works, 1875.]

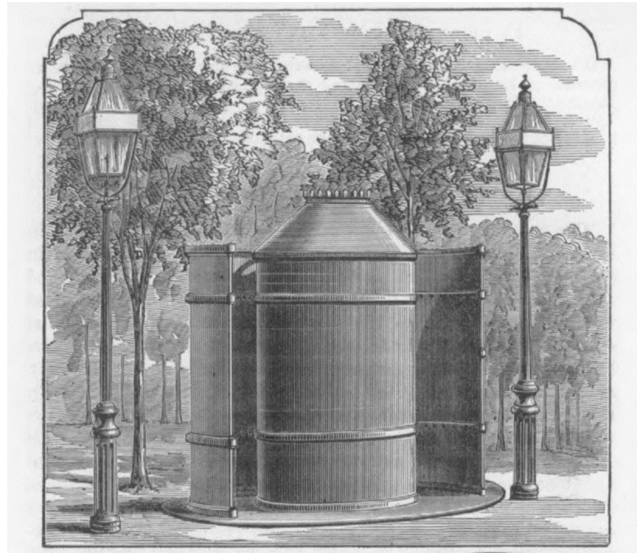
Boston's Iron Pissiors

Dennis DeWitt

An 1855 medical journal article praised Boston's Mayor, Dr Jerome Smith, for constructing [three] "iron urinals after the Parisian plan" and lamenting the resistance of abutting building owners, who opposed their placement in various locations. Between 1855 and 1880, Boston would use at least four different designs for such Pissoirs — all made of iron and always referred to as "street urinals."

We know nothing of Boston's first design, which followed the earliest European iron examples, made in Glasgow, by only five years. Parisian pissoirs then were still made of stone. We have only a verbal suggestion of Boston's second version, 1859, designed by the architect, Gridley J. F. Bryant. Ten of these were built by William Adams & Co. There may have been only one example of the 12-sided third design, 1874, which can be seen in two photographs. Its designer and builder remain unknown. There are drawings and photos of the 1879 fourth design, made by Boston's official City Architect, George Clough. Ten were built by George T. McLauthlin & Co., and later, at least two additional examples were built.

At least 26 examples of the four designs were built. At various times, they were in perhaps 26 locations in the city. But at the maximum, in the 1880s, perhaps only 15 were in use at one time. By 1907, only two remained in service. The only other U.S. city thus far identified with a similar program was Cincinnati. In 1871, it had 65 of them in place. As in Boston, they succumbed to the City Beautiful movement's desire for more architectural "Comfort Stations," which served women as well as men.



An iron "comfort station" in Boston

Photographic Portraits of Textile Mill Workers

Steve Dunwell

Textile workers made the fabric that made New England an economic success. Since the 1850s, photographers have captured images of these workers. A few rare daguerreotypes survive and some tintypes as well. Glass plate negatives were captured in the 1890s. The great documentarian Lewis Hine used sheet film to make images of child labor ca 1910, while company staff made posed photos for PR and documentation. A few stereo cards capture mill interiors with a more candid look. In the 1970s, I made dozens of portraits in New England mills on 6 cm roll film for the book *The Run of the Mill.* My presentation to the NEC IA conference covered some of the historic images, including photos at Amoskeag, Wamsutta, and the Essex Company, and the techniques photographers of the time used. I also showed some of my own photos from the 1970s and places that work in context. (See next page, for two examples of photos.)

Textile industry employment in New England peaked in the 1920s. It was reduced but not gone in the 1970s. And it is much reduced but still not gone today.

Workers in the Beaming Department, Wamsutta Co.

1970s textile industry worker (Steve Dunwell Photo)

A theme of the 2023 New England IA conference was developments in Lawrence, Massachusetts. The newsletter concludes with a picture of the Great Stone Dam, built 1845.

The Great Stone Dam in Lawrence, built 1845-48 by the Essex Company, across the Merrimack River, from under the Boston & Maine Railroad bridge (1893)