

ON THE LEVEL

MORRIS CANAL
GREENWAY ISSUE

THE CANAL SOCIETY OF NEW JERSEY

2006–2021

THE MORRIS CANAL GREENWAY

With several Morris Canal Greenway projects scheduled to make major steps forward this year, we are reminded that the work to preserve the remains of this historic canal has become a story in itself. As new restoration work is about to begin at Lock 2 East in Wharton and Inclined Plane 2 East in Ledgewood, it's time to remember all the patience and hard work it has taken to bring these two Morris County projects to where they are today.

LOCK 2 EAST, WHARTON

When the Morris Canal was abandoned in the 1920s, the Borough of Wharton acquired its canal right of way including the site of Lock 2 East. Although the lock had been dismantled and buried as part of the abandonment process, the remains of the lock tender's house were extant. In 1970 the Borough re-excavated the canal prism and restored the towpath. A connection between the canal and Stephens Brook made this quarter-mile stretch from the lock site almost to Central Avenue one of Morris County's best remaining

water-filled sections of canal. The area became Hugh Force Park, named for Hugh A. Force for his years of service to the community. Soon after, the local Rotary Club used the park as the site for its first Wharton Canal Day, an event that has become an annual celebration of the borough's canal heritage.

In 2007, when Wharton's mayor appointed local resident John Manna to its Main Street Redevelopment Committee, he remembered fishing in the canal with his children. He asked then-CSNJ president Brain Morrell and board member Joe Macasek to walk the towpath in Hugh Force Park and help think of ways to enhance the park's canal assets. Since the CSNJ had been giving tours of the park

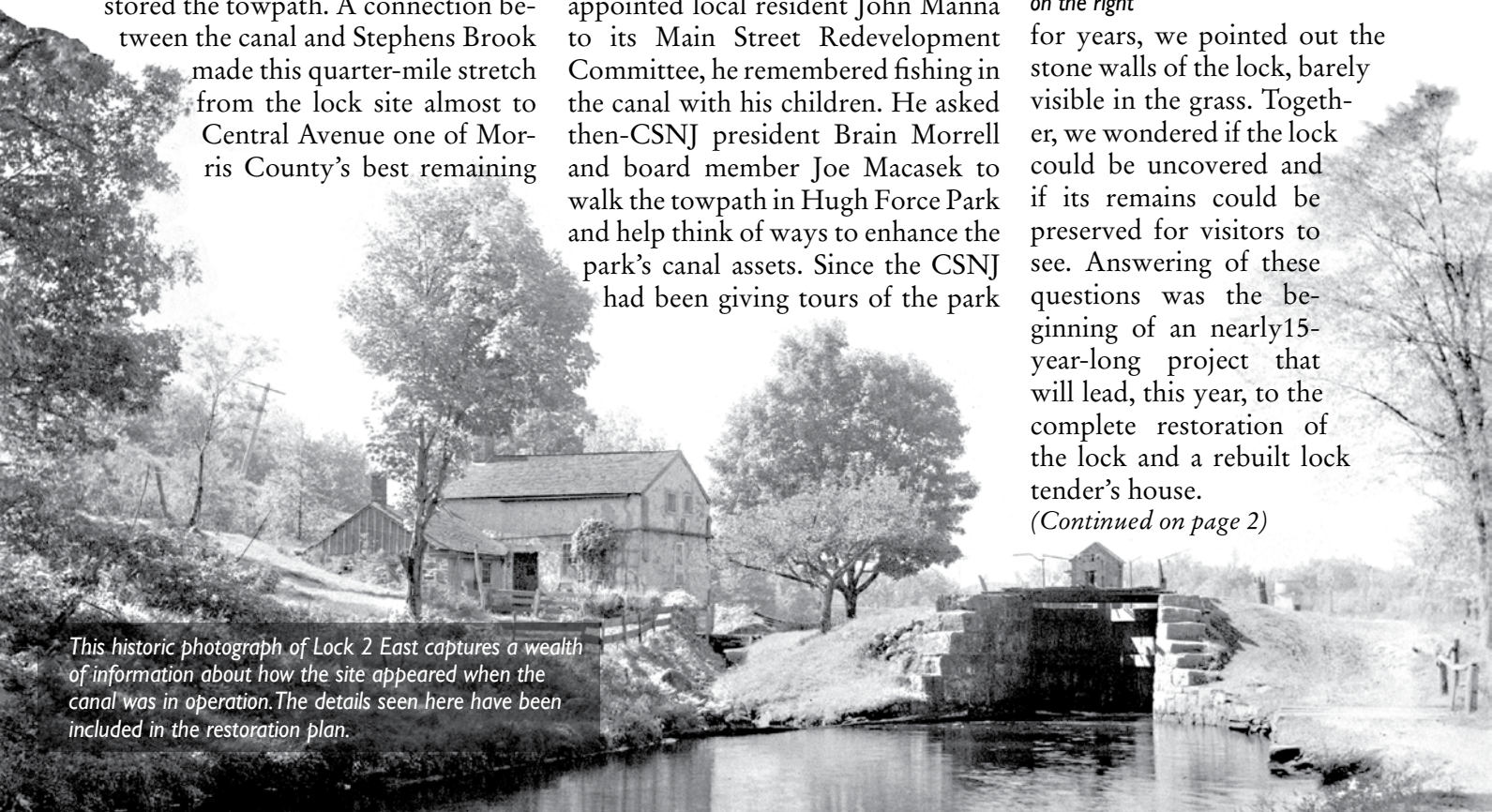


In this 2007 photo, Lock 2 East lies buried just below the surface of a grassy field. The ruins of the lock tender's house are seen in the distance on the right

for years, we pointed out the stone walls of the lock, barely visible in the grass. Together, we wondered if the lock could be uncovered and if its remains could be preserved for visitors to see. Answering of these questions was the beginning of a nearly 15-year-long project that will lead, this year, to the complete restoration of the lock and a rebuilt lock tender's house.

(Continued on page 2)

This historic photograph of Lock 2 East captures a wealth of information about how the site appeared when the canal was in operation. The details seen here have been included in the restoration plan.



RESTORING LOCK 2 EAST

(Continued from page 1)

THE LOCK

A canal lock is a massive structure whose true dimensions are not readily visible to the casual observer. The 126-foot-long stone walls were built four feet thick at the top and supported by buttresses seven feet thick at the bottom. Below, the walls rested on a platform of beams and heavy planks that formed a single unit that kept the lock walls from shifting or being undermined by the flowing water. As long as this timber platform stayed buried it would serve indefinitely. At Lock 2 East, the first questions were: a) was the buried lock substantially intact and b) were its underpinnings strong enough to support a restoration? To find out, archeologists were hired to discover what was there. To everyone's surprise, they discovered that the lock wall had been cut down but not destroyed and the wood flooring was in good condition. The lock had then been packed with earth and forgotten. A 2009 professional engineering assessment supported these findings and in 2010 the Borough of



In 2006 project manager John Manna and local historian Richard Cramond visit the lock site to inspect the work as a team of archeologists use a backhoe to partially clean soil from the upper and lower ends of the lock chamber. To everyone's surprise, they discovered that the lock had been only partially dismantled and that the lower walls and substructure were in good condition.

Wharton was awarded a \$582,000 grant to unearth the lock and to stabilize and repair the stonework.

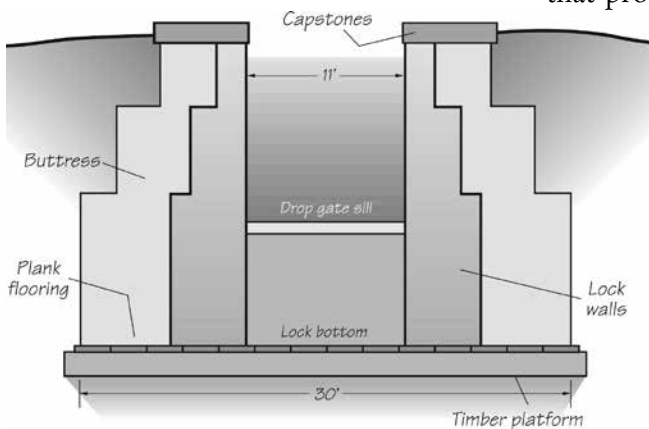
THE FUNDING

Funding this sort of a project with public grant money is a daunting task that proceeds in phases. A feasibility study must first show that the project can be done; a planning phase that shows how the project can be completed, drawings and cost estimates that lay out the details; and finally, phases of construction completed according to the approved plan. Although the CSNJ has been involved with the lock restoration since the

very start, it has required the management and engineering skills of the Borough of Wharton to keep the project moving. Three major sources have provided the funding: the Morris County Preservation Trust, the New Jersey State Historic Trust, and the North Jersey Transportation Authority Transportation Enhancement Program. Early in the process, CSNJ President Joe Macasek worked with John Manna to create signage that defined the project and engaged the public with the restoration process that would take years to reach its final goal.

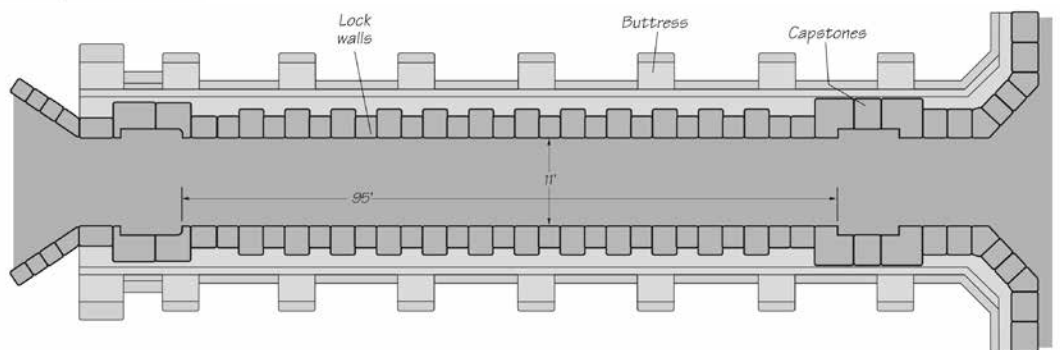
THE ARTIFACTS

As the work began, CSNJ members visited the site to watch as the lock



ABOVE: This typical cross section shows lock walls topped with large capstones and supported by heavy outer buttresses, forming an eleven-foot-wide lock chamber between them. The walls rest on a thirty-foot-wide timber platform that makes the lock a single stable unit.

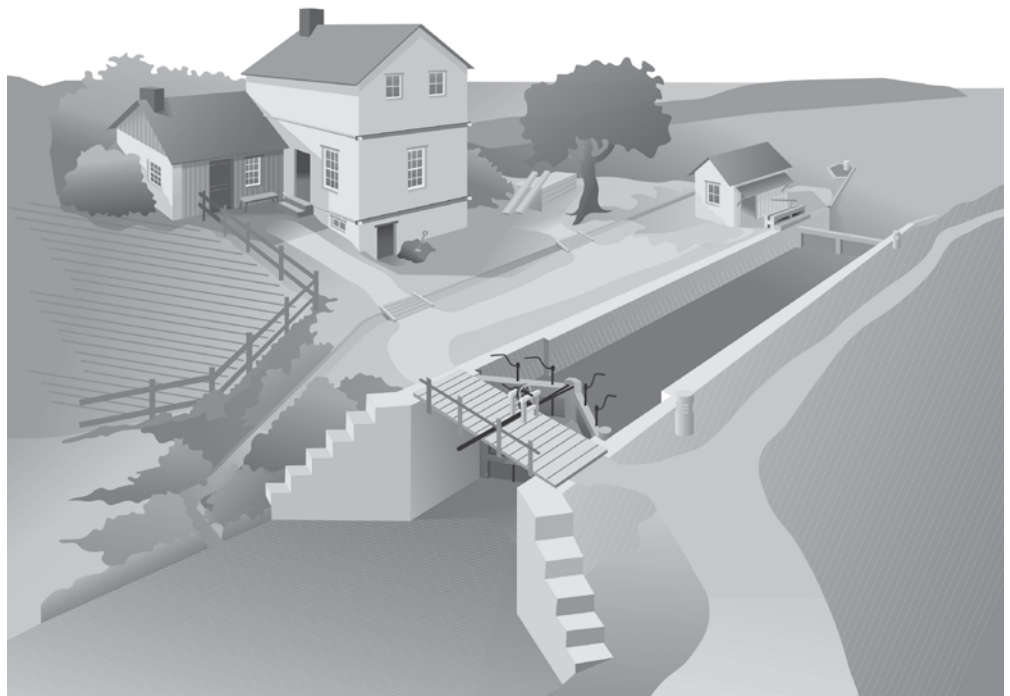
RIGHT: This plan view shows how much stonework it took to create the ninety-five-foot-long chamber in which boats were raised and lowered.



was rediscovered. A sandbag cofferdam was built between the lock and water-filled canal. Pumps kept the site dry while many feet of saturated soil were carefully removed from the lock chamber. As the lock was cleared, a treasure trove of artifacts emerged from the mud. It was found that when the lock was dismantled, its massive capstones, a few feet of its stone walls, and most of its working parts were simply pushed into the lock and buried. Timber artifacts, such as the lower miter gates were found in remarkably good condition in the waterlogged soil. Iron artifacts like the wicket valves, gears, and the controls for operating the drop gate at the upper end of the lock were also discovered. The capstones were removed and put aside to be reused when the lock was rebuilt.

THE RESTORATION

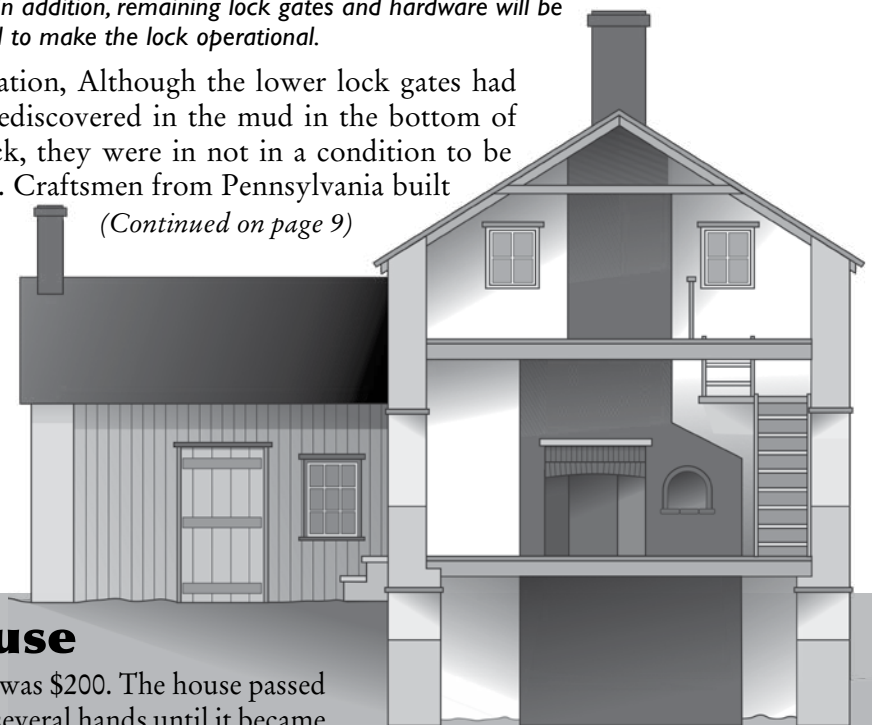
In 2011 the lock chamber was cleared and in 2012 the lower lock walls were repaired, repointed, and rebuilt where necessary. To keep the restoration accurate, the north wall, the one that was rebuilt when the lock was enlarged in the 1840s, was sheathed with planks as shown in historic photos. The wood sheathing kept boats from scraping against the rougher replacement stonework. In 2014 the capstones were reinstalled, bringing the wall back to their histor-



This illustration, based on historic photos, shows Lock 2 East as it was when the canal was in operation. To date, the lock was been carefully rebuilt and new lower lock gates installed. In the current construction phase, the lock tender's house and shanty will be rebuilt. In addition, remaining lock gates and hardware will be installed to make the lock operational.

ic elevation, Although the lower lock gates had been rediscovered in the mud in the bottom of the lock, they were in not in a condition to be reused. Craftsmen from Pennsylvania built

(Continued on page 9)



The Lock Tender's House

In writing this, I'm almost tempted to promote the Lock 2 East lock tender's house as one of the few remaining along the route of the canal. But of course, it hasn't survived yet. Until recently, the building was hardly more than a heap of rubble. It had, for several generations, been the home of the Bird family and Lock 2 East was known to canalers as Bird's lock. When the canal was abandoned it was offered for sale. The rent had been \$6.00 per month; its condition was poor and the sell-

ing price was \$200. The house passed through several hands until it became vacant in 1970 and was damaged in a fire shortly thereafter.

Fortunately, CSNJ member and Morris Canal historian Bob Goller visited the house before the fire with an interest in its survival. He visited several times thereafter, took pictures and contacted people who had lived there. When plans to restore the lock were discussed, Bob used the information he had gathered to create detailed drawings of the house that

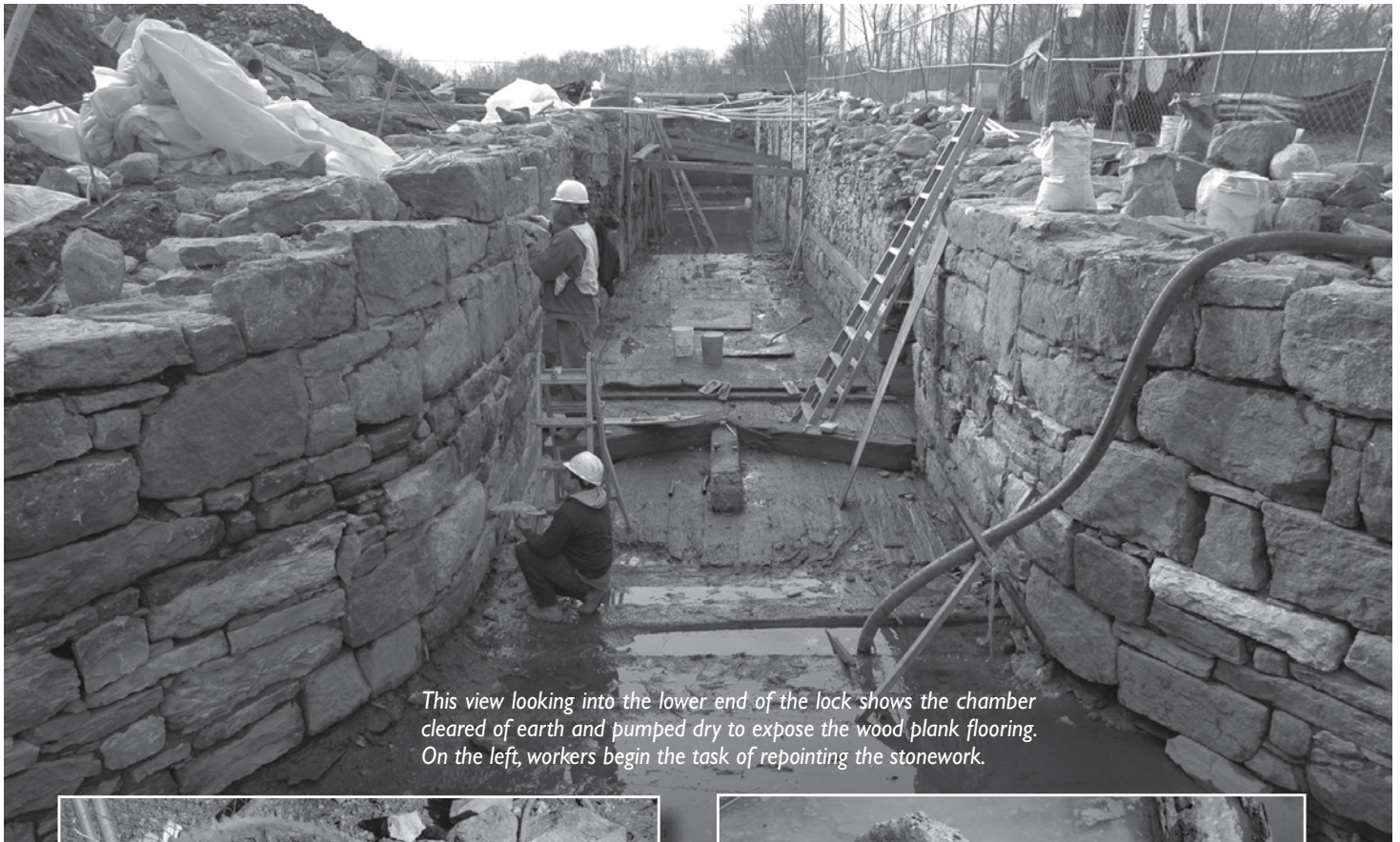
were used to plan its restoration.

The house was built by the canal company in the 1830s. It stood a story and a half tall, was built of rough-coursed rubble stone, stuccoed to produce a smooth exterior. There were two rooms on the first floor, a front parlor and a kitchen with a cooking fireplace. This hearth was blocked when a small kitchen wing was added to the east side of the building. There

(Continued on page 8)

THE LOCK 2 EAST RESTORATION 2011 – 2012

After almost six years planning, reconstruction work began at Lock 2 East in 2011. In late November, workers started carefully removing earthen fill from the lock chamber. As the work moved forward, most of the lock's working parts were discovered in the mud, the lock walls were repaired, and several feet of new stonework added to bring the lock to its historic height. Every visit to the construction site brought new insights and an opportunity to touch and feel the amazingly well-preserved fabric of the historic lock.



This view looking into the lower end of the lock shows the chamber cleared of earth and pumped dry to expose the wood plank flooring. On the left, workers begin the task of repointing the stonework.



These gears are part of the rack and pinion that enabled the lock tender to crank both lower lock gates open or closed.



Still covered in mud, this gear and drum wound the chain that pulled the upper drop gate into its upright position.

A backhoe perched on the end of the earth-filled lock delivers sand bags to workmen building a cofferdam to prevent water from the canal from filling the lock excavation.



Both massive miter gates were found during the excavating work and are seen here after being removed from the lock chamber.



The heavy timbers fastened to the floor of the lock are the sills against which the lock gates rested when in the closed position.



The wicket valve assembly, consisting of four iron shutter gates, had been knocked askew by falling stones when the lock was being filled in during the abandonment. Each shutter weighs several hundred pounds.

All photos by Joe Macasek

INCLINED PLANE 2 EAST

Plane 2 East in Canal Park in Ledgewood is one of the best preserved inclined plane sites along the route of the Morris Canal. Roxbury Township acquired the property in February 1982 and in that same year the local Rotary Club took on the job of clearing the plane of trees and brush. The full slope of the plane was still intact with its sleeper stones still in place. They also located the foundations of the power house and cleared the turbine chamber and trailrace tunnel of the tons of debris that had accumulated over the years. When the canal was abandoned, the

timber power house had been dismantled and stonework and pieces of machinery were tossed into the chamber below. The results of their Rotary Club's efforts made this one of the go-to places for canal fans wanting to understand the mysteries of the Morris Canal's inclined planes.

However, in 2007 historians discovered that the massive stonework of the turbine chamber was in danger. The timber flooring upon which the stonework rested had been exposed when the chamber was cleared and, over time, had rotted away. Without a footing, the tailrace tunnel arch had settled on the north end; it had moved out of alignment and was threatening to fail. A collapse might threaten the integrity of the entire structure.

To solve the problem the CSNJ worked with Roxbury Township to acquire a \$200,000 Morris County Historic Preservation Trust Grant to address these issues before a catastrophic failure occurred. The proj-

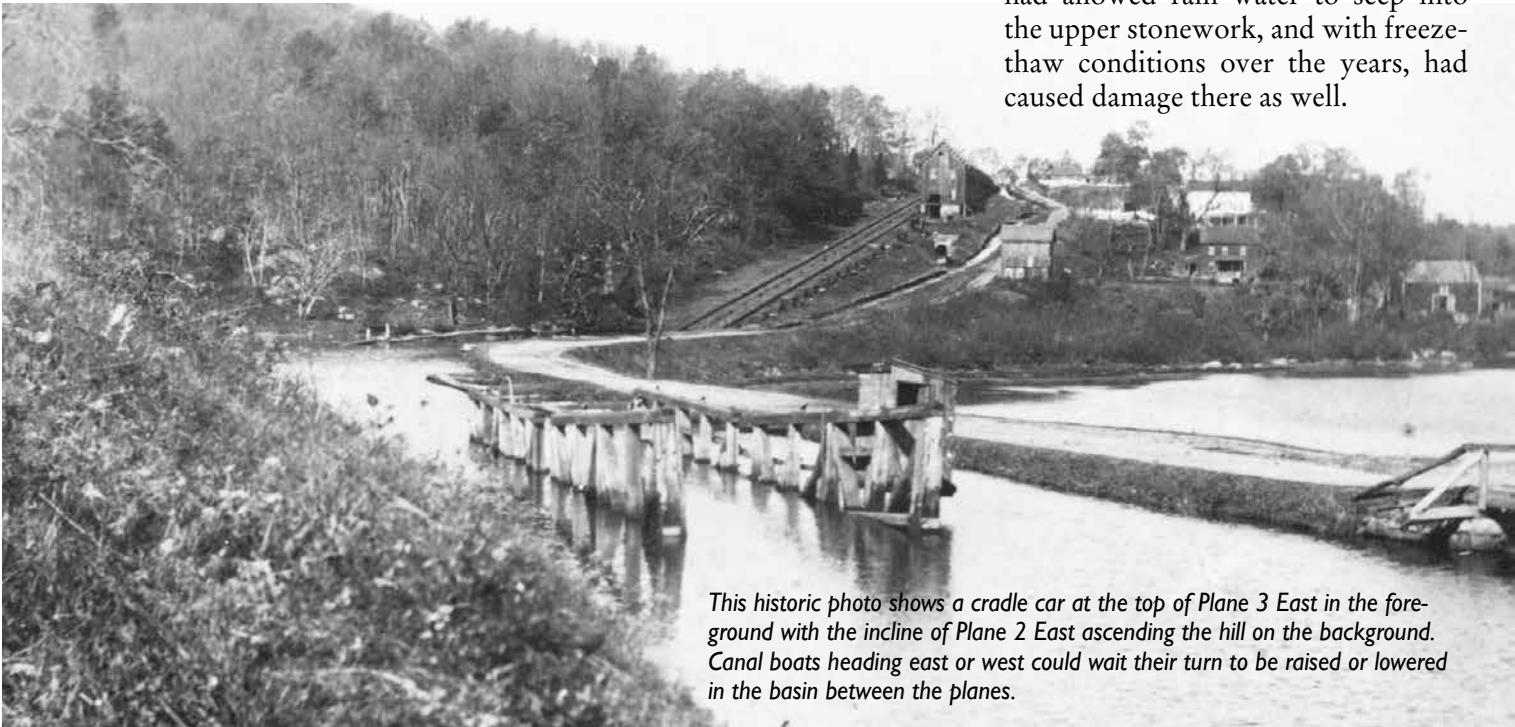


This line of sleeper stones, scarred from years of use, stretch the full length of the slope of Plane 2 East.



The top of the turbine chamber shaft before restoration.

ect proceeded in phases starting with archeology and an engineering study that showed that there was another problem. When the chamber had been cleared, the top of the turbine chamber shaft was left flush with the ground and covered with wire fencing to keep visitors from falling in. This, however, had allowed rain water to seep into the upper stonework, and with freeze-thaw conditions over the years, had caused damage there as well.



This historic photo shows a cradle car at the top of Plane 3 East in the foreground with the incline of Plane 2 East ascending the hill on the background. Canal boats heading east or west could wait their turn to be raised or lowered in the basin between the planes.

The stabilization and restoration work began by adding a new concrete footing to support the sides of the tailrace arch. With the new footings as a base, the stones of the arch were carefully jacked back into alignment. To complete the work, masons then repointed the rest of the stonework to maintain its good condition.

At ground level, the walls of the turbine chamber shaft were extended above grade using stones that had been pushed into the pit years before. The new walls were topped with blue-stone slabs and an iron grating that allows visitors to see into the chamber below without the danger of falling in. To solve the drainage problem, a pavilion was erected over the new construction with a drainage system that carries water away from the site rather than into the stonework below.

Although this project was a great success, there is still a lot to be done to make the site a good experience for visitors. It is a large site and difficult to maintain in a condition that resembles its appearance when the canal was in operation. In particu-



To complete the project, this pavilion was erected over the top of the turbine shaft to prevent ground water from once again working its way into the stonework below.

lar, the sloping ground between the plane and the bypass channel tends to become a tangle of invasive undergrowth that obscures many of the historic features. This fall a new project, funded by the Morris County Trust for Historic Preservation, will take the next step toward restoring Plane 2 East's historic viewscape. First, archeologists will examine areas of the



In the photo above, the stones in the tailrace arch without a proper footing have slipped out of alignment and the arch was about to fail.

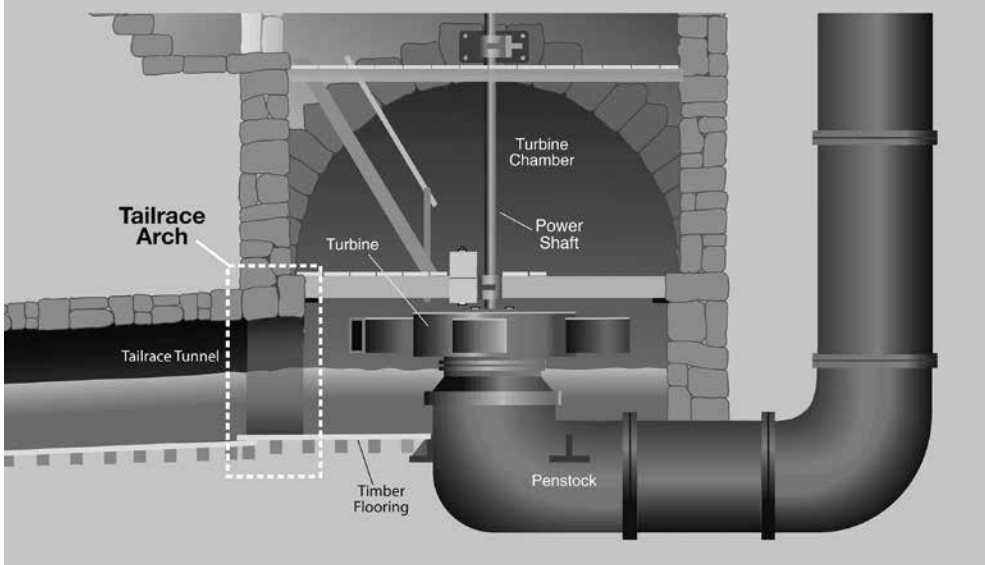


To solve the problem, masons added new concrete footings, realigned the arch and repointed all the stonework.

THE TAILRACE ARCH

The turbine chamber was a massive stone structure built to hold a huge cast iron machine meant to take in and then eject thousands of tons of water. The wooden platform on which it was built kept the walls from being undermined by

the rushing water. When the chamber was cleared its wooden underpinning deteriorated, in most cases, settled evenly into disuse. However, the tailrace arch, highlighted in the drawing below, settled unevenly and was about to collapse.



site not previously investigated. Existing above-ground stonework will be repaired, new features exposed, and a landscaping plan will be implemented to keep the site clear. Next year, the CSNJ will work with the Roxbury Township Open Space Committee to create new interpretive signage to make this complicated site visitor friendly. ■

New Meeting Location

This fall we plan to get back to normal with an in-person September program meeting. However, as a result of the pandemic, our usual meeting venue at the Morris County Park Commission's Cultural Center will not be available for the rest of this year. To bring us all together again, we have chosen a new location, the Brookside Community Club, at 1 East Main Street, Brookside, just five minutes from our old meeting place. We think you will like it. The meeting announcement that you have received contains a map with directions to make it easy to locate.

*Lehigh Crane Ironworks,
Catasaugua, PA*



Friday – November 17, 2021 at 7:30 p.m.

THE LEHIGH CRANE & GLENDON IRON WORKS

BY MARTHA CAPWELL FOX

In the 1840s, the transportation network formed by the completion of the Morris, Lehigh and Delaware Division Canals combined with advances in iron making technology to make the Lehigh Valley the center of the nation's expanding iron industry. In this presentation Martha Capwell Fox will tell how dependable supplies of Pennsylvania anthracite coal and New Jersey magnetite iron ore brought iron makers to the Lehigh Valley.

Martha Capwell Fox is a long-time Canal Society of New Jersey member. She is the Historian & Archives Coordinator for the Delaware & Lehigh National Heritage Corridor. The corridor was created by Congress in 1988 to preserve the historic transportation routes – canals and railroads – that carried anthracite coal from the mines to markets. She is the author of the book Geography, Geology and Genius: How Coal and Canals Triggered the American Industrial Revolution published in 2019.

Picture Research

Sometimes pictures tell more than one story. After you have read the cover story, take a second look at the picture across the bottom of page one to see if you can find a railroad water tank in the photo. Just west of the lock site, the High Bridge Branch of the Central Railroad of New Jersey once crossed the canal on a timber trestle. This branch left the CRRNJ at High Bridge and reached up into the Morris County iron mining district. Here, at Hopatcong Junction, the line branched off to the east toward Mt Hope and Hibernia. This track passed along the hillside just above the canal. Its right of way makes a pleasant alternate walking route from the lock site back to the parking lot.

To the north, at Lake Junction, the line branched to meet the DL&W and the Wharton & Northern railroads. A water supply was placed here to fill engines tenders before heading up into hilly terrain. For many years, its location and the remains on the trestle that crossed the canal were visible in the trees along the old roadbed. Unfortunately, the junction is for now private property. ■

Lock Tender's House

(Continued from page 3)

were three small rooms on the second floor. When the building developed structural problems, lengths used rail and cable from the nearby inclined plane were clamped around the exterior walls to hold things together.

Now, as the building is being rebuilt, it's hard to imagine what the Bird family ancestors might think of all the fuss being made over their little house, not to mention the cost of reconstruction. ■

2021 CSNJ ELECTION

Thank you for your enthusiastic participation in the 2021 Canal Society Election. Long-time members probably found the new mail-in ballot a bit different. However, a large percentage of members sent in their votes and unanimously elected the slate of candidates. We thank you for your enthusiasm and your support. Please see the new list of CSMJ officers and board members below.

Officers

Joe Macasek
President

Tim Roth
Vice President

Ken Roser
Treasurer

Carl Loutzenheiser
Recording Secretary

Board Members

Bruce Blondina
Bob Bodenstein

Janice Escobar
Rod Howarth

Judy Keith
Steve Lauf

Jim Lee
Bill Meier
Bill Pegg
Rich Richter
Bierce Riley
Jeff Stanton

RESTORING LOCK 2 EAST

(Continued from page 3)

new miter gates and, in 2015, installed them with new hardware to make them operational.

SUMMER OF 2021

After years of planning, restoration of the locktender's house began this past summer. Before work started, CSNJ Board member Jim Lee III and his team of archaeologists from Hunter Research carefully examined the site for artifacts that might be compromised during construction. The site was then cleared of extraneous debris and equipment was brought in to re-excavate the basement. Building stones from the cellar hole were carefully put aside to be reused in the reconstruction. Since then, skilled masons have been at work putting the building back together. Once progress is made on the house, work will expand to include the restoration of the upper end of the lock and the re-grading of the site somewhat close to its original contours.

The contractor expects to complete the project before the end of the year. However, as work proceeds, new discoveries are made and unexpected issues arise almost every week. Like As in any complicated project, it will be an adventure to watch as all the details come together.

WHAT HAPPENS NEXT

Next year, with the lock and house restored, the challenge will be to bring the site to life. The CSNJ plans to partner with Borough of Wharton to furnish the house, create exhibits and give tours. In the spring and fall school groups will visit and in the summer the CSNJ's canal boat will spend part of the season giving visitors rides to see the lock. Although this will all take time, we would hope to have the site open to the public as soon as possible with volunteers giving tours and telling visitors about the Morris Canal Greenway. Please consider helping in this effort. ■

In this photo taken in mid-July, the contractor has removed the existing walls of the lock tender's house down to usable stonework and re-excavated the rubble-filled basement. Scaffolding has been placed inside the building as a platform from which masons can start rebuilding the exterior walls.



By August, the height of the walls was beginning to rise with the masons framing out the door and window openings as they go. To adhere to modern building codes, proper footings are required for any wall that is being completely rebuilt. In this photo, workers are building a form for the footing of the retaining wall that will allow access to the entrance to the basement level.

PEOPLE TO REMEMBER

Gary E. Kleinedler

Gary E. Kleinedler, 83, of Allentown, PA, passed away on Friday, January 29, 2021 at Princeton Hospital in Plainsboro, NJ. Born in Lombard, IL, Gary received his bachelor's degree from Purdue University and earned his master's in metallurgical engineering from the University of Michigan. He moved to New Jersey in 1963 to work in the Engineering Research Center in Princeton and spent his entire career as a metallurgical en-

gineer with different departments within AT&T.

He was a long-time member of the Canal Society of New Jersey who used his skills as a cartographer to make maps for many CSNJ tours. He created the publication *Maps of the Morris Canal – Western Division: Phillipsburg to Lake Hopatcong*, and in 2014 worked with Jakob Franke to create the maps for *Field Guide to the Morris Canal of New Jersey*.

Mark Hamill

Mark Hamill was a longtime Canal Society member who took on many roles. He joined the board in 2002 and volunteered as Canal Museum guide coordinator, a position he held until 2012. He helped plan several Waterloo Canal

Days, ran three canoe trips on the D&R Canal, and organized a bus tour to the Union Canal in Pennsylvania. When not working on events, he helped mail newsletters and served for two years on the nominating committee.

New Canal Boat Stove Exhibit

Although canal boats were mostly about transporting tons of bulk cargos such as anthracite coal and iron ore, they did provide some small accommodations to meet the needs of the crew. A tiny ten-by-ten-foot cabin in the stern offered spartan living space for the captain, mule tender and sometimes family members as well. The cabin contained bunks, a fold-down table, storage for provisions and a cook stove appropriate for the tight quarters.

This summer the Canal Society acquired such a canal boat stove as a new addition to our Canal Boat Exhibit at Waterloo. It was bought from long-time CSNJ member Don Mayberry and had once belonged to Jim Lee, Sr. The stove is an "Improved Boatman's Choice," manufactured by Orr, Painter & Co, Reading, PA, and is a rare find. Pictures in our archives show this same model stove in

use on canal boats. Ours is in excellent condition and could actually be used for cooking.

To help bring the new exhibit to life, CSNJ board member Steve Lauf built a display platform, and weaver Pat Mueller and tinsmith John Holochwost donated artifacts to create a setting reminiscent of a stove in use on the deck of a canal boat. Until now our displays in the White Barn have been about the boats. This new acquisition gives us an opportunity to offer some insight into the lives of the people who ran them.

Those captains who chose to postpone dinner might hang a night-hawker lantern on the dashboard reflector at the bow of their boat to add a few more miles to the day's journey



The new canal boat stove, now on display in the Canal Boat Exhibit at Waterloo, surrounded by the items needed to start dinner for the crew.

before stopping for the night. A second new exhibit is a brightly decorated dashboard built by carpenter Earle Post and painted by Steve Lauf. We have added a lantern from the CSNJ's collection to round out the display. ■

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