Unlocking the Industrial Midwest:

A Pictorial History of Locks at the Soo

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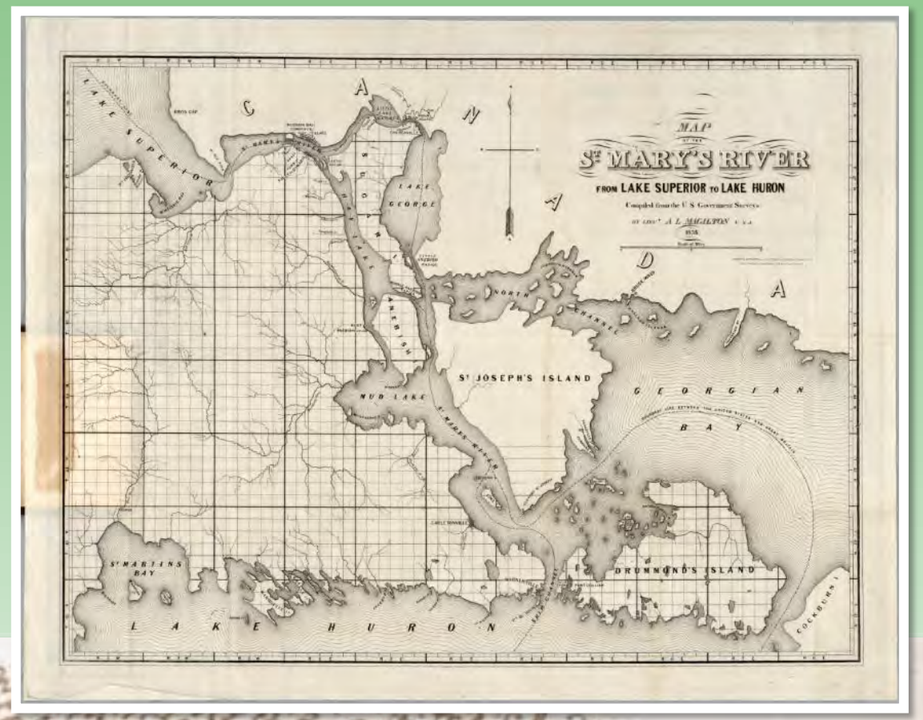
Locks at the Soo

The only water connection between Lake Superior and the lower lakes, the St. Marys River has always been a critical waterway. Native American trade routes followed it and the river played a key role in the European fur trade. In 1798, to bypass the rapids here at the Soo, the Northwest Fur Company built a lock on the Canadian side of the river.

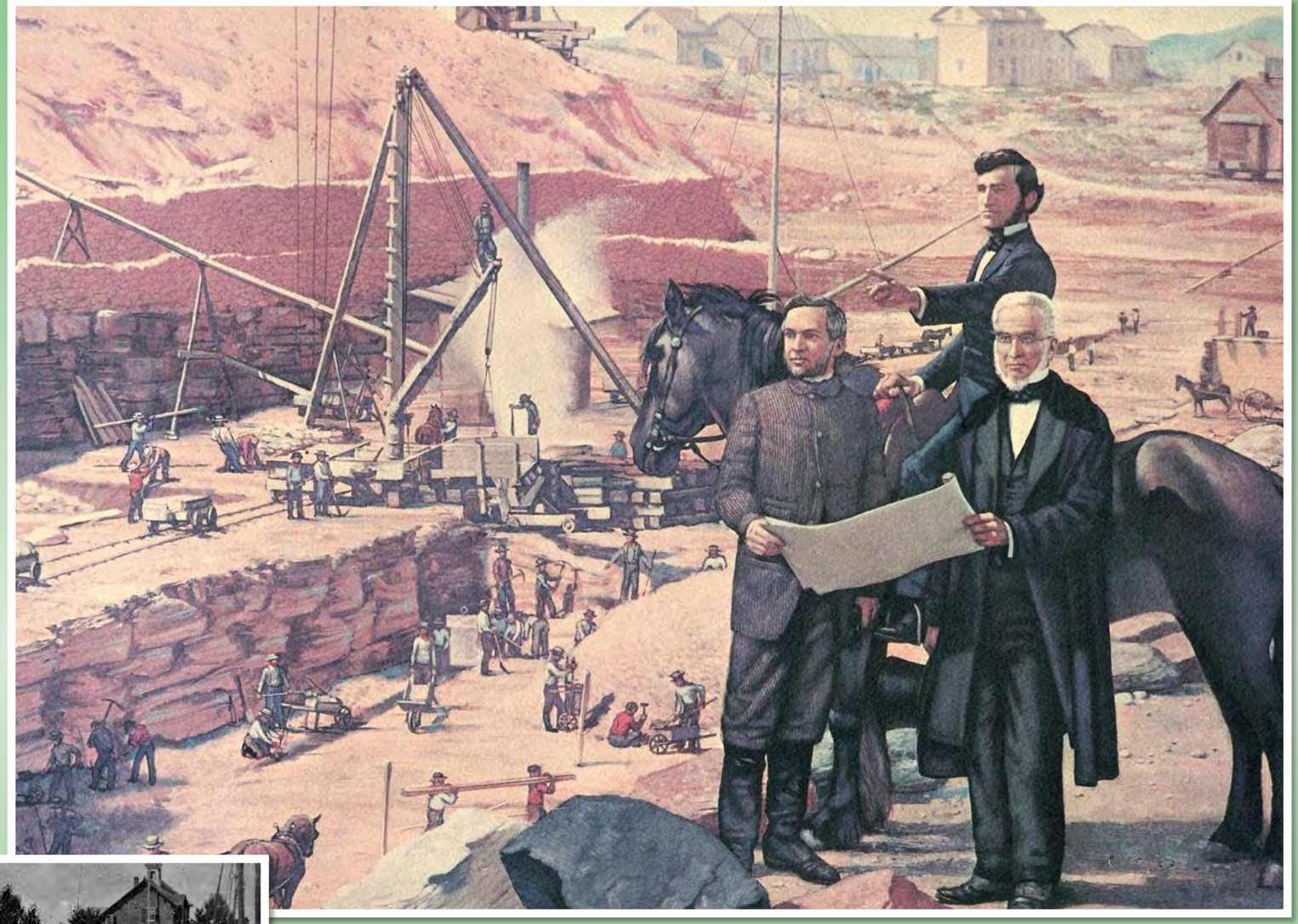


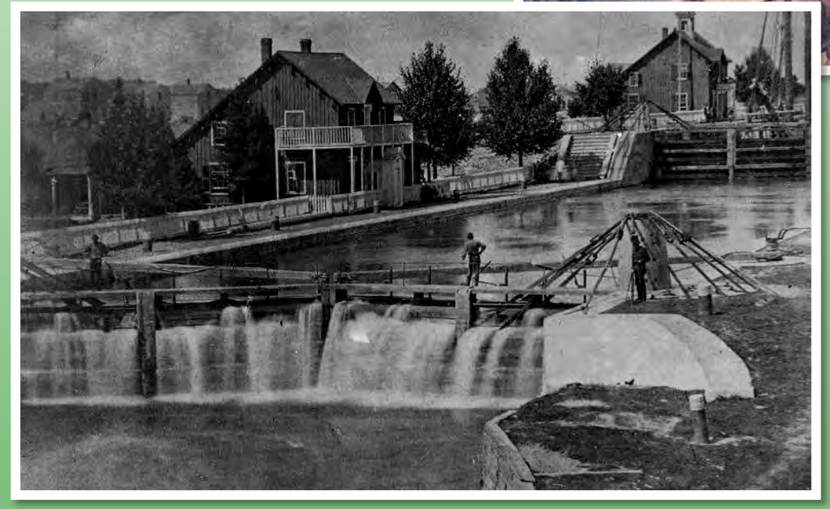
Heavy traffic on Portage Avenue

In 1814, during the War of 1812, American soldiers destroyed the lock to disrupt British trade. For the next 41 years, boats had to be unloaded and reloaded above and below the rapids and their cargos carried on a railway along Portage Avenue. Even boats had to be hauled around the rapids.

The State Lock

Discoveries of copper and iron ore along Lake Superior lead to interest in building a lock at the Soo. The U.S. Congress gave the state of Michigan 750,000 acres of land to fund the project. Work began in 1853 and the lock, 350-feet long, 60-feet wide and 12-feet deep was the largest shipping lock in North America when it opened. It had two, tandem locks, (one behind the other) each with a 9-foot lift and sluice valves in manually operated gates.





State Lock 1855-1888

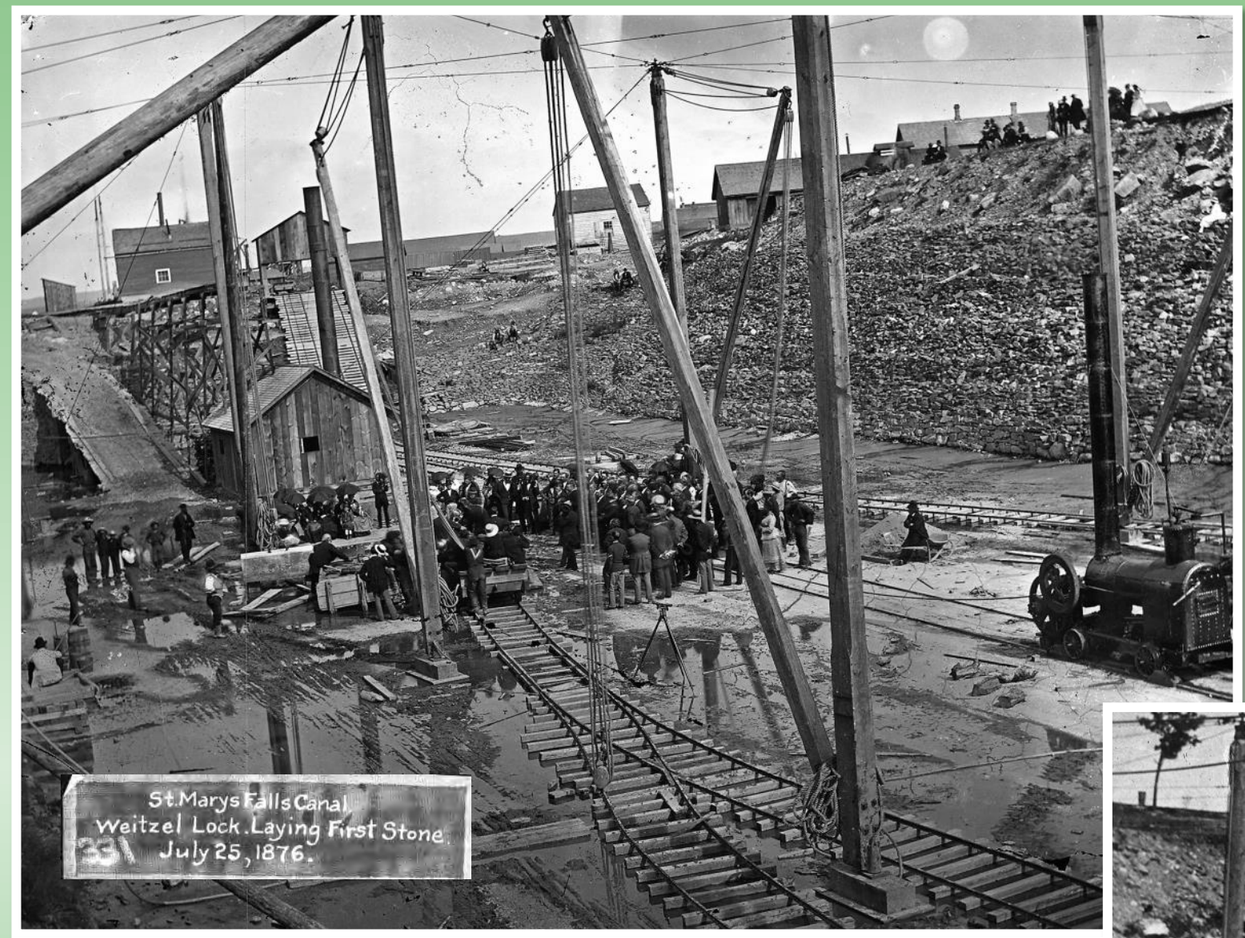
Tandem Lock

350’long, 60’wide, 12’deep

The year it opened, 14,503 tons of cargo went through the State Lock and tonnage increased each year with over 1 million tons passing through the lock in the 1876 season. Increased demand for raw materials and the number of vessels on the lakes caused long waits at the Soo showing the need for an additional lock.

In 1888 work began to replace the State Lock with a new, larger lock. This new lock, completed in 1896, became the original Poe Lock and stood in the same location as the current Poe Lock.

This photo from 1889 shows the original masonry walls and wooden gates of the State Lock, the first one built on the current Soo Locks facility.

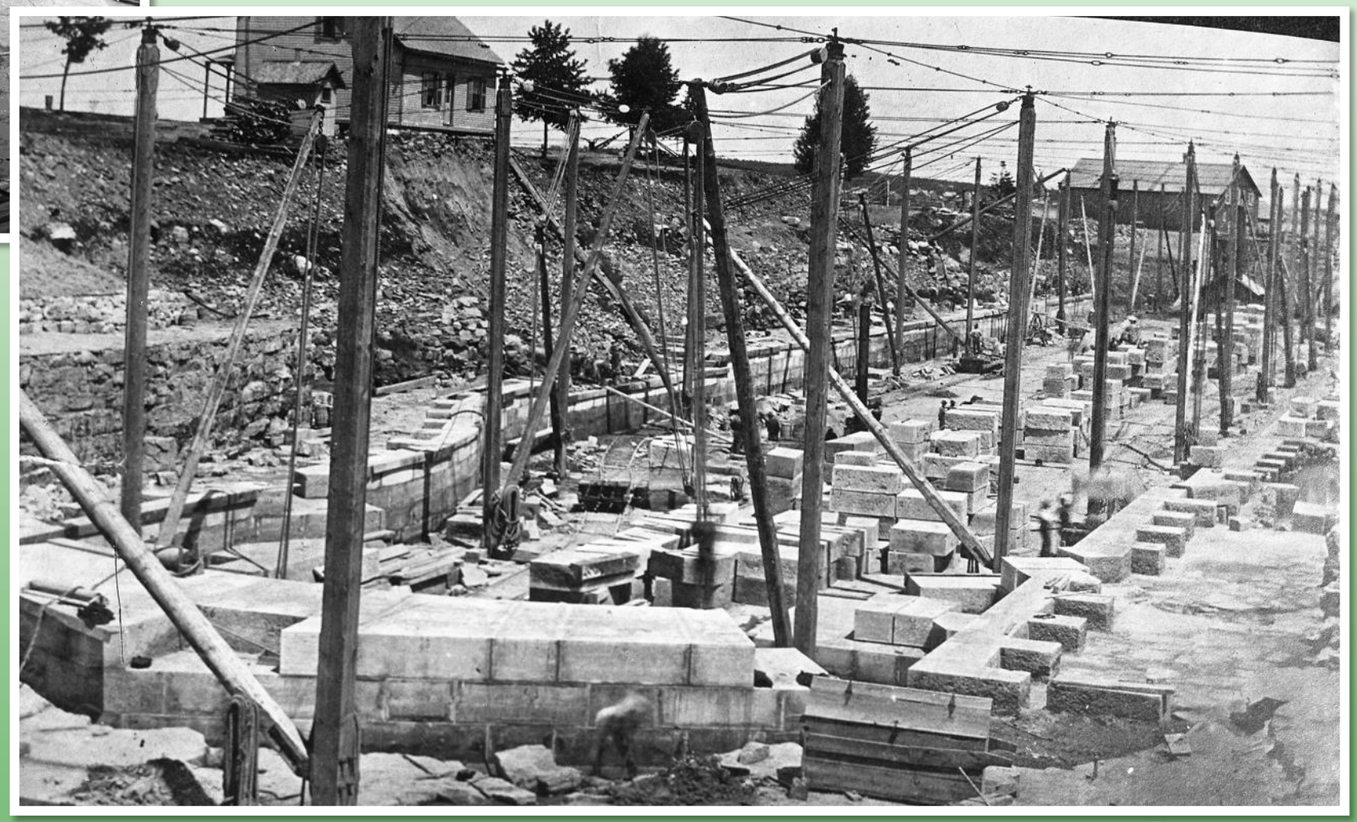


Weitzel Lock

Excavation for a new, larger lock began in 1873, just south of the State Lock, on the site of the current MacArthur Lock. At this time, the state of Michigan was financially unable to continue operating the facility and began the process to transfer it to the federal government.

Weitzel Lock 1881-1919

515'long, 80'wide, 17'deep

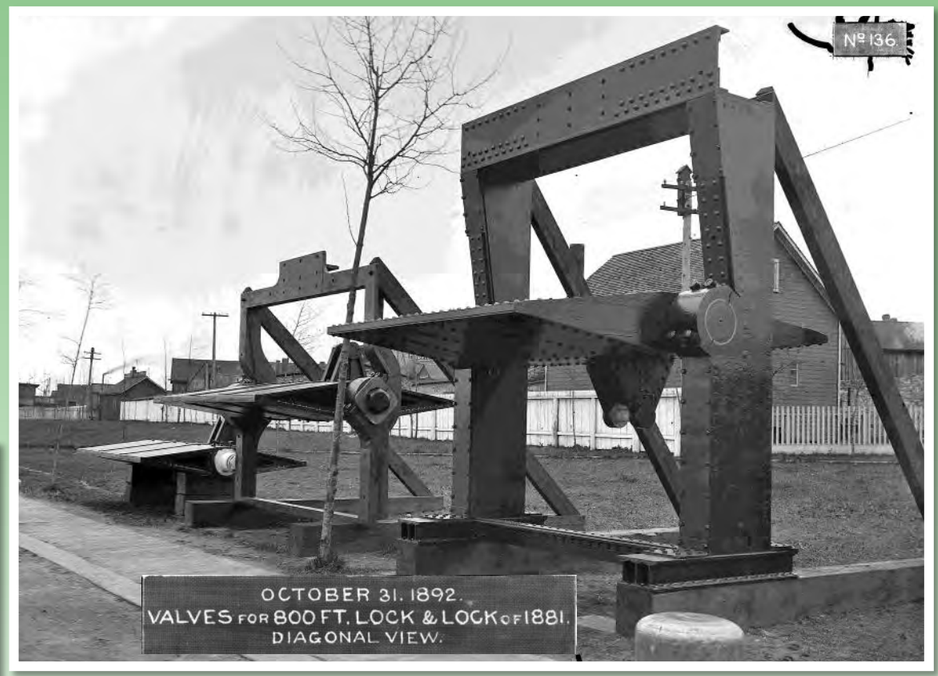


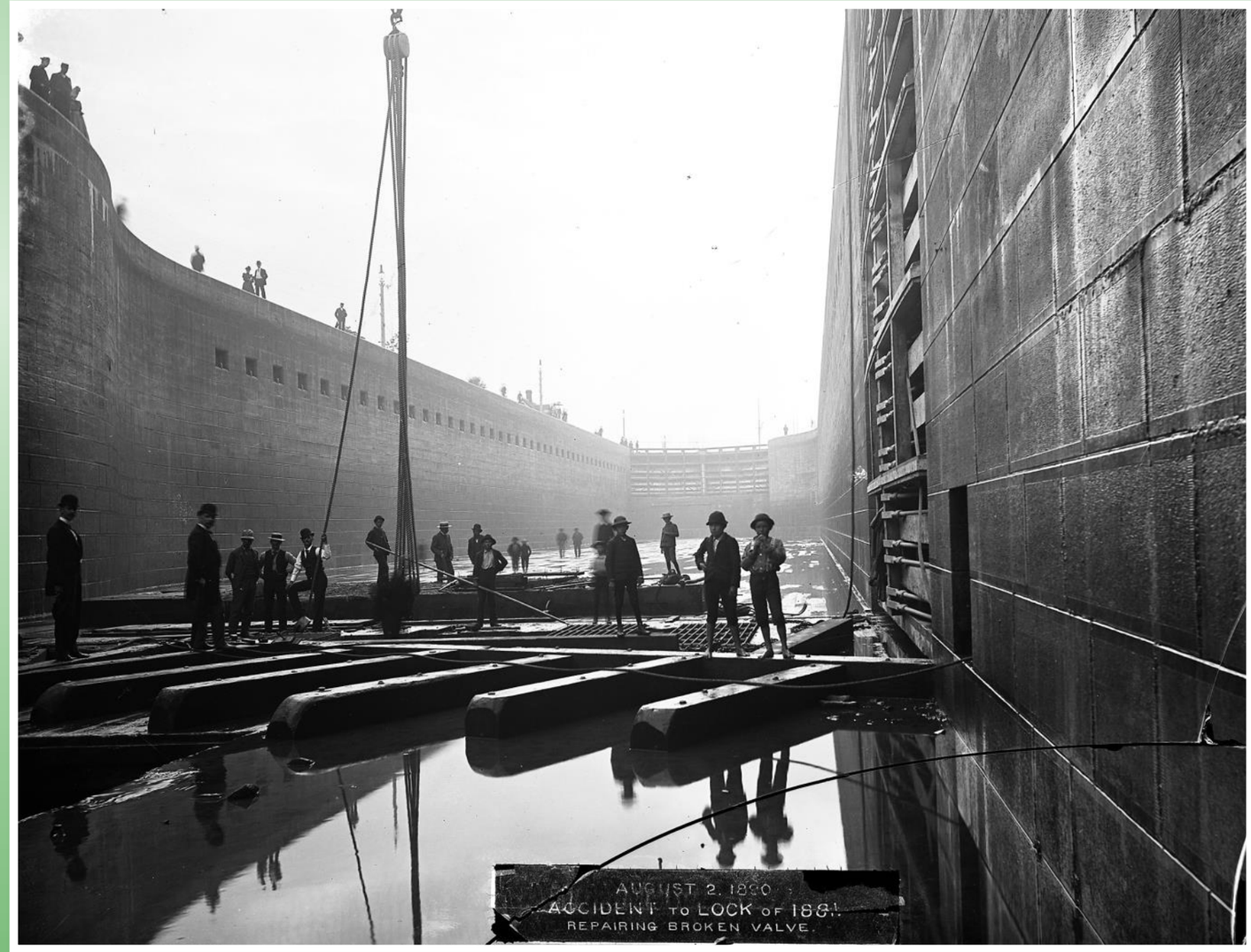
In 10 years, the Weitzel Lock went from handling 1 million tons of cargo each year to over 10 million tons annually. Even with two locks operating on the river, vessels waited an average of five hours for a lock. Although the longest lock in the world when it opened in 1881, the growing size and number of cargo vessels showed that the Soo needed a larger lock.

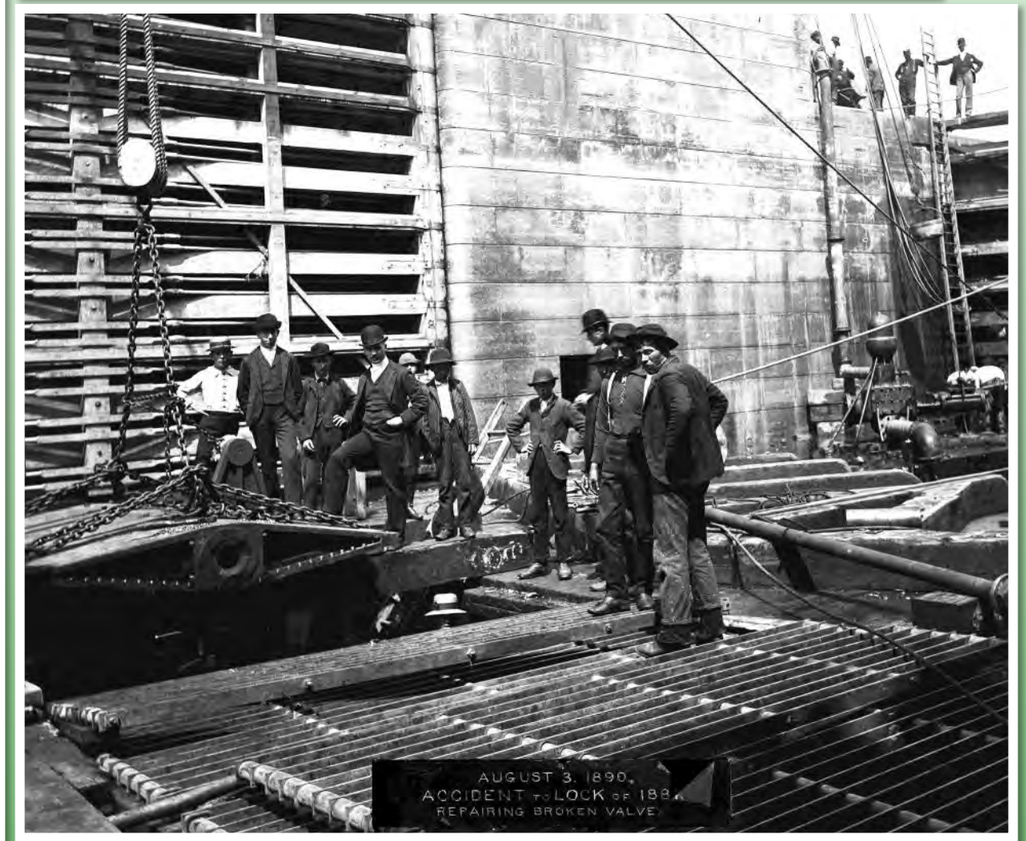
Very few construction photos of the Weitzel Lock exist, so some of the best views were captured during repairs like this one to repair a broken valve.

This lock was the first in the Soo to fill through the culverts (visible in the floor) rather than openings in the gates, reducing turbulence in the chamber. Every lock built here since then has used a version of this system.

In 1890, this lock was the only way around the rapids—the State Lock had been removed to make way for the original Poe Lock. Over 260 vessels waited for 4 days while crews scrambled to repair a damaged valve. The upper right photo shows the butterfly valves used in the Weitzel and original Poe Lock.



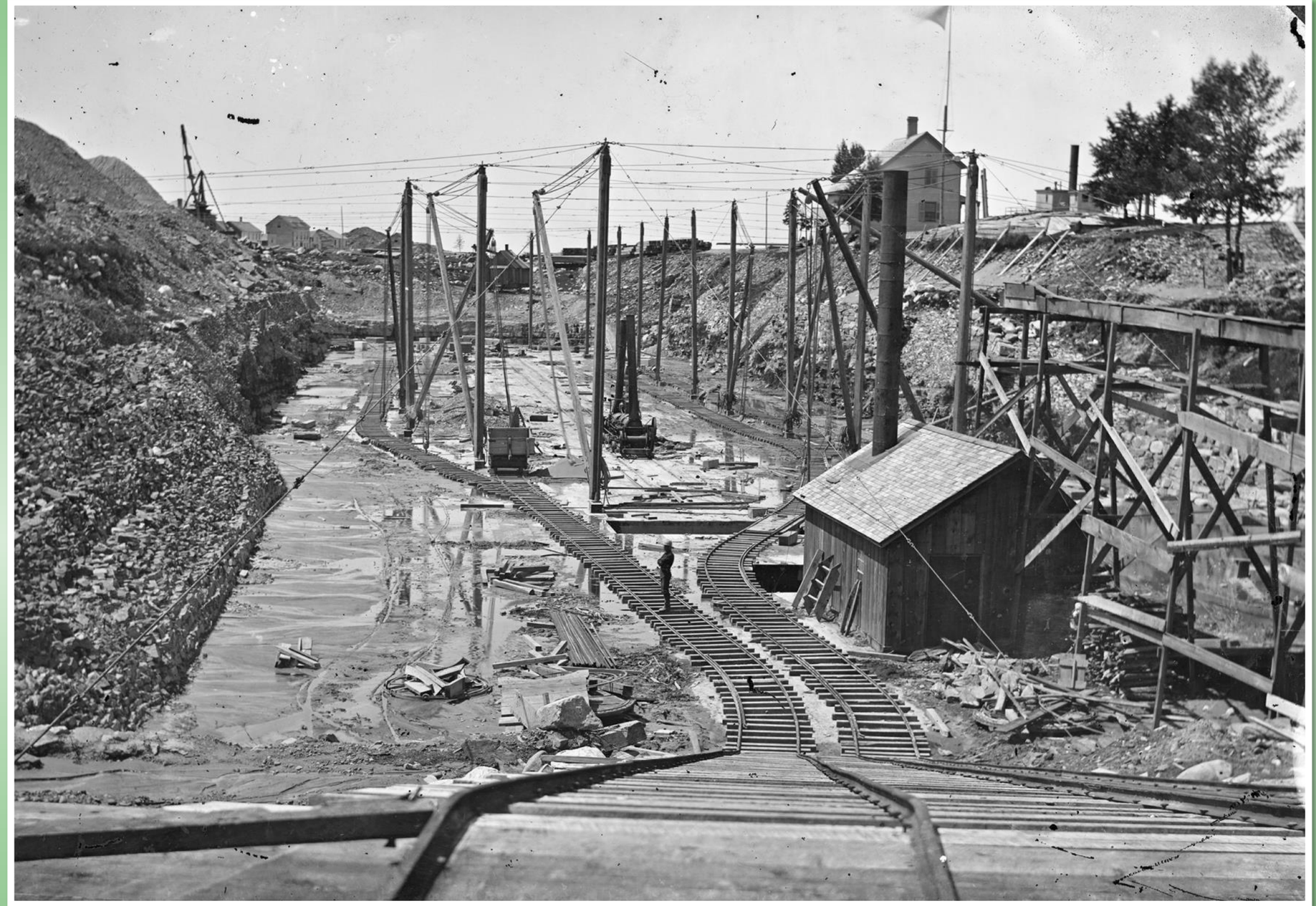




The early 1890s were the heyday for the Weitzel Lock. In 1892, the year of this photo, over 12,000 lockages moved more than 11 million tons of freight and almost 26,000 passengers through the lock. Two whalebacks, the *Samuel Mather* towing *Barge 110* are visible leaving the lock. Whalebacks were a vessel type unique to the Great Lakes, with more than 40 built from 1888-1896 — only one survives today—the *Meteor* now preserved as a museum in Superior, Wisconsin.

Original Poe Lock

With the State Lock cleared out of the way, excavation continued on what was then called simply the “800 Ft. Lock.”

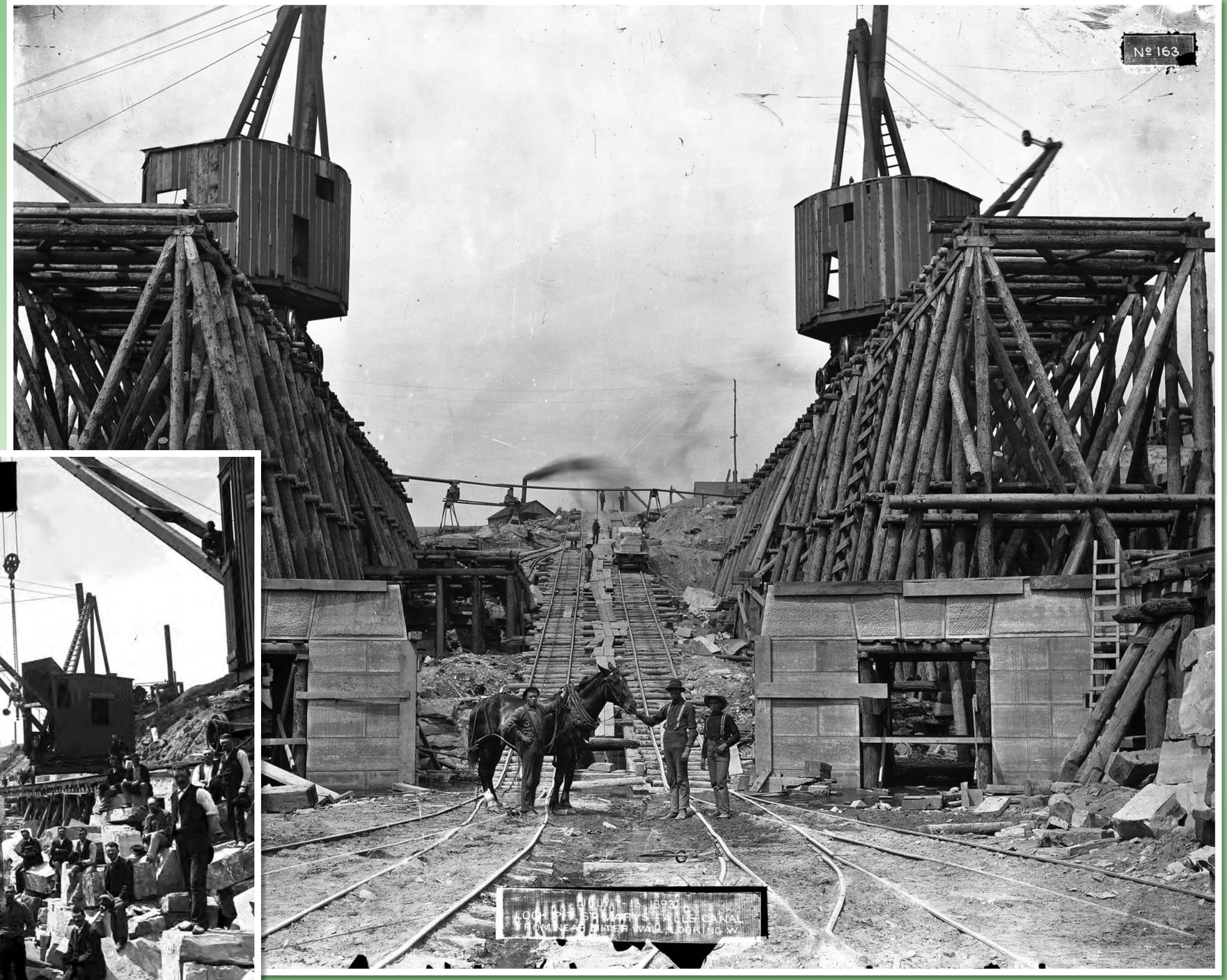


Original Poe Lock 1896-1955

800’ long, 100’ wide, 21’ deep

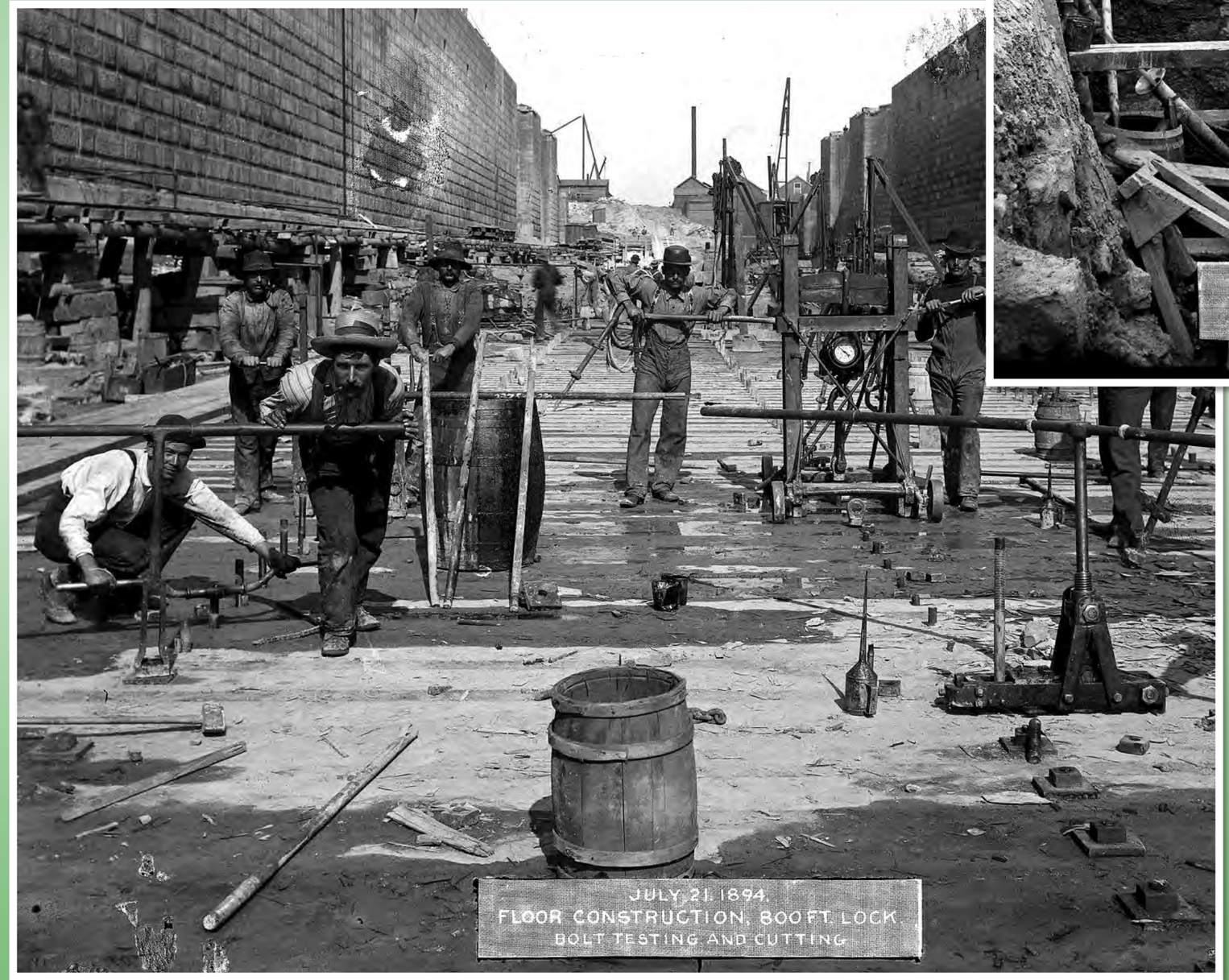
A crowd of men, women and children gathered on the lock floor for the laying of the first stone of the new lock. The lock opened for traffic August 3, 1896.

These 1890s photos capture the mix of steam power, horsepower and manpower used to build the original Poe Lock.



The original Poe Lock used traditional masonry construction. Boats delivered rough-cut blocks to a stone yard in the area now known as Brady Park where workers finished it. The prepared stone then went to the lock pit where mobile cranes on railroad tracks moved and placed the huge blocks.

Some of the most interesting construction photos feature the manual labor required of the workmen building the lock.



Unlike previous locks on site, the original Poe Lock had steel gates rather than wooden ones. It took more than 2 1/5 tons of steel to build the lock's five sets of gates.

The “Administration Building,” with its tower, built as part of the original Poe Lock project, housed a turbine power plant in the basement and offices on the first and second floors.

With great fanfare and a large crowd on hand, the original Poe Lock officially opened August 3, 1896. The *U.S. Hancock*, *U.S. Antelope* and *U.S. Revenue Cutter Andrew Jackson* shared the honors of completing the first official lockage.

ST. MARYS FALLS CANAL, MICHIGAN
UPBOUND LOCKAGE OF 500 CORD RAFT OF
PULPWOOD THROUGH POE LOCK
JULY 9, 1928

№1308

CONSTRUCTION OF NEW POE LOCK
ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICHIGAN, DETROIT DISTRICT
CLOSEUP VIEW LOOKING UPSTREAM
SHOWING OLD POE LOCK IN UNWATERED CONDITION PRIOR TO START OF CONSTRUCTION OF NEW POE LOCK AT SAME LOCATION
8 APRIL 1961

After 1945, with three larger locks on site and boats getting longer and longer, use of the original Poe Lock declined and officials decommissioned it in 1955.

This aerial view shows the original Poe Lock (between the MacArthur and Davis locks) before it was destroyed to make way for a new Poe Lock .

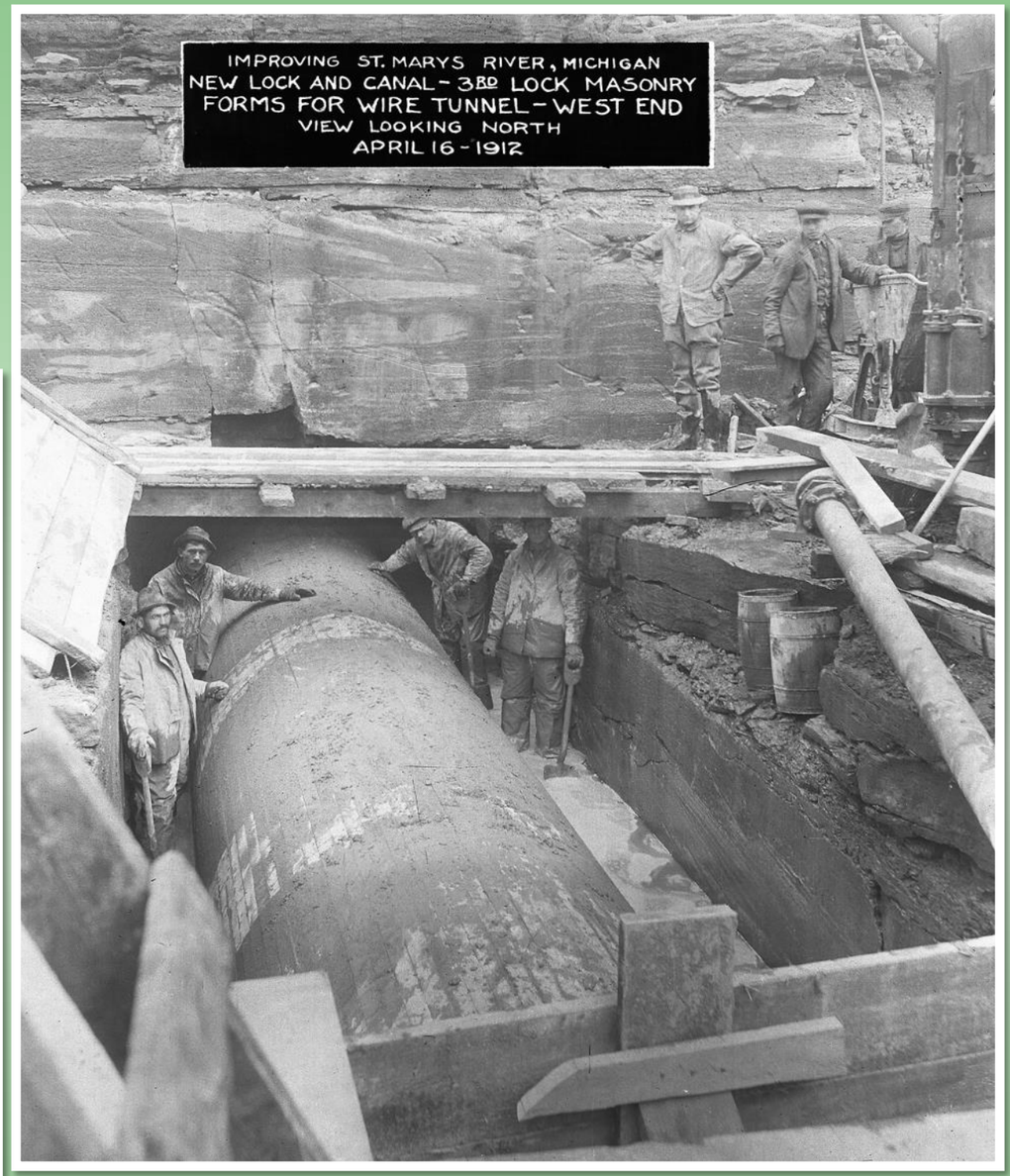
Davis Lock

Work on the "Third Lock" (now known as the Davis Lock) began in 1907 with the collection of core samples to document the rock throughout the site. Good old fashioned manual digging began early the next winter.

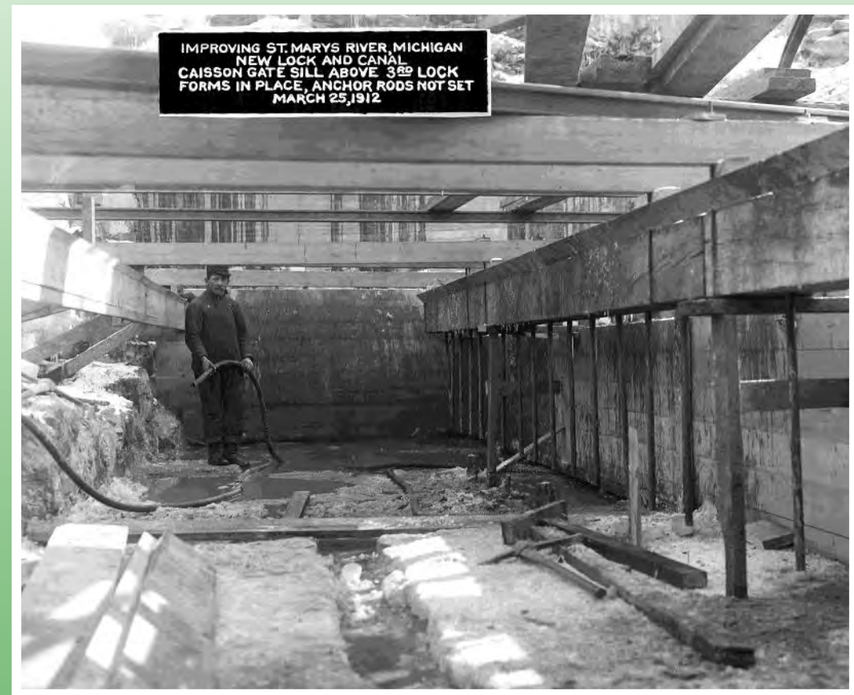
Davis Lock 1914-present

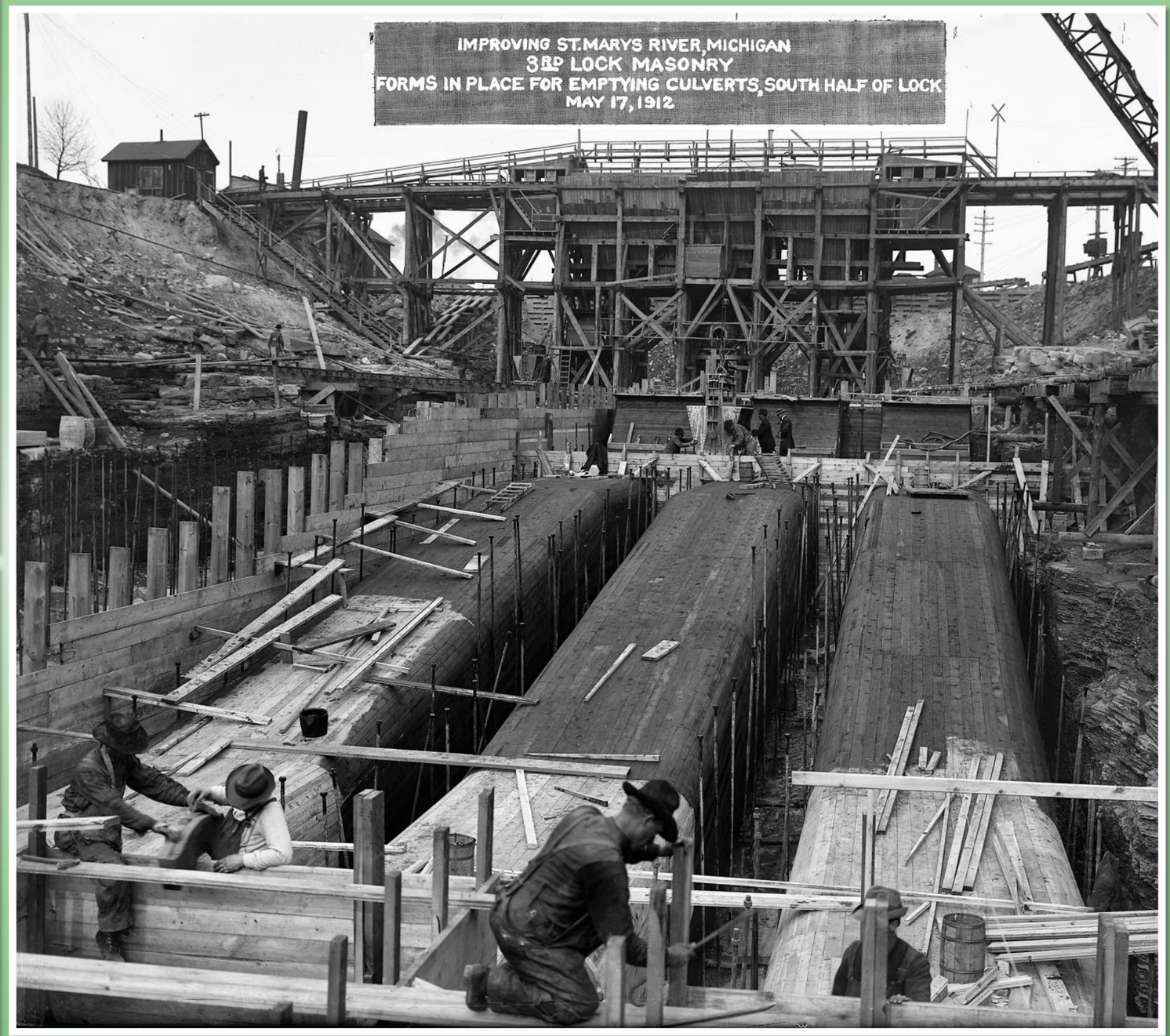
1350' long, 80' wide, 23' deep

Much of what makes a lock work is hidden from sight and encased within the lock's floors and walls. These photos show some of these hidden features.




IMPROVING ST. MARYS RIVER, MICHIGAN
NEW LOCK AND CANAL. 3RD LOCK MASONRY
GROUTING ANCHOR RODS FOR FLOOR
SECTION CULVERT FORM IN PLACE
MIXER PLANT IN BACKGROUND
MARCH 25, 1912

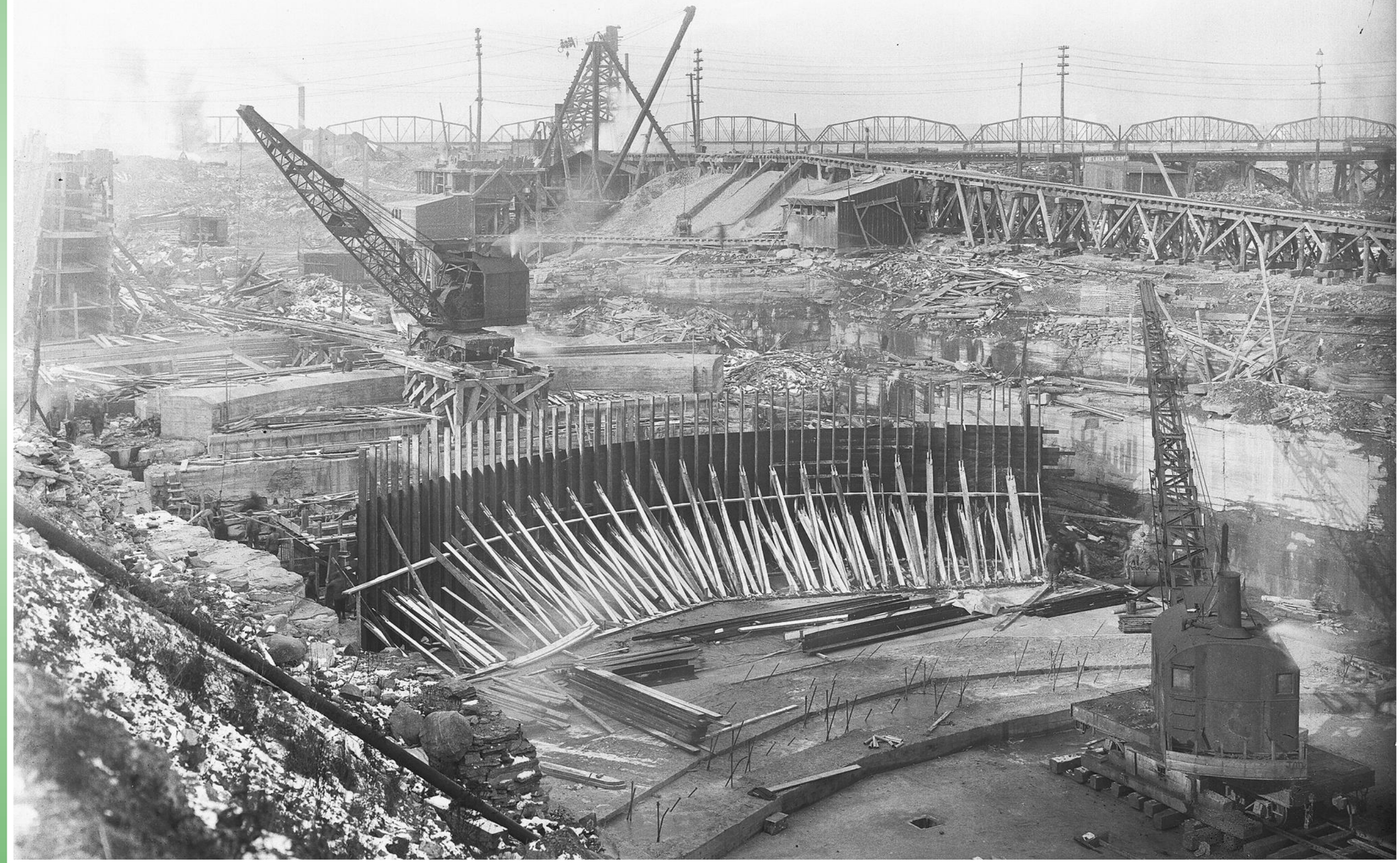

IMPROVING ST. MARYS RIVER, MICHIGAN
NEW LOCK AND CANAL
CAISSON GATE SILL ABOVE 3RD LOCK
FORMS IN PLACE, ANCHOR RODS NOT SET
MARCH 25, 1912


IMPROVING ST. MARYS RIVER, MICHIGAN
3RD LOCK MASONRY
FORMS IN PLACE FOR EMPTYING CULVERTS, SOUTH HALF OF LOCK
MAY 17, 1912


IMPROVING ST. MARYS RIVER, MICHIGAN
NEW LOCK AND CANAL. 3RD LOCK MACHINERY
UPPER FILLING VALVES AND ENGINES IN PLACE
VIEW LOOKING NORTHWEST COMPARE No 891
NOVEMBER 23, 1913

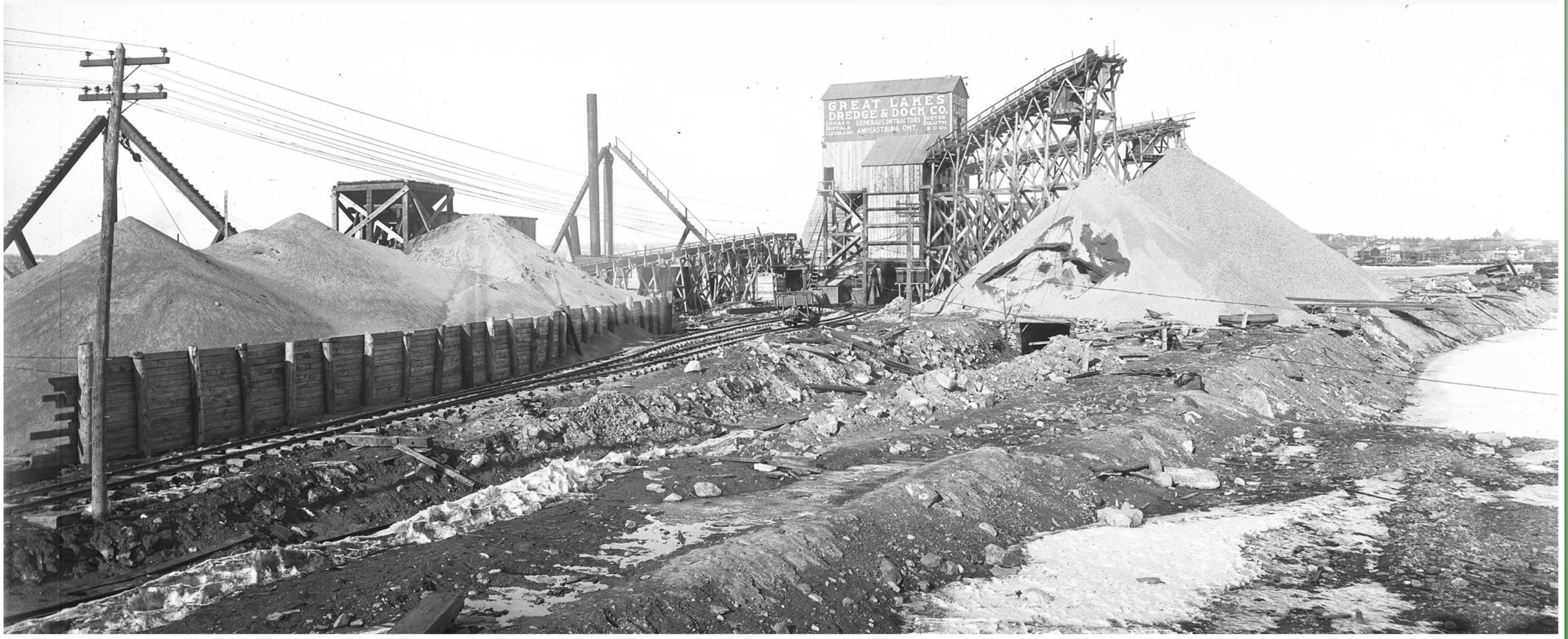
IMPROVING ST. MARYS RIVER, MICHIGAN
NEW LOCK AND CANAL. 3RD LOCK MASONRY
MITER WALL Nº 2. BACK OF FORMS
VIEW LOOKING NORTHWEST FROM 3100 EAST
NOVEMBER 15, 1912

Nº777

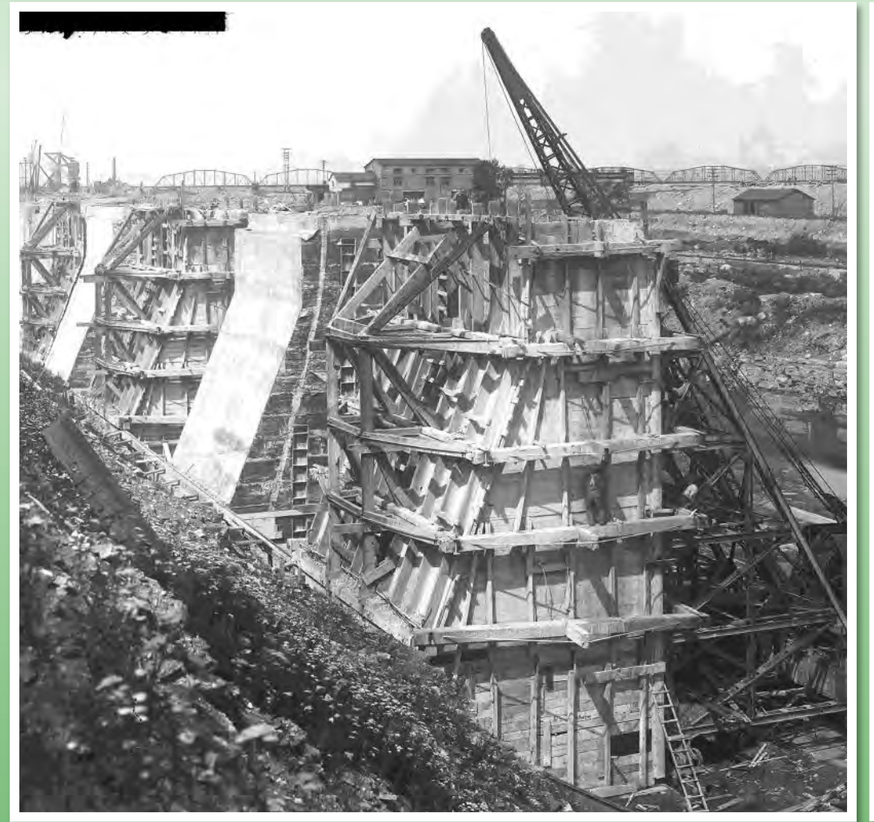


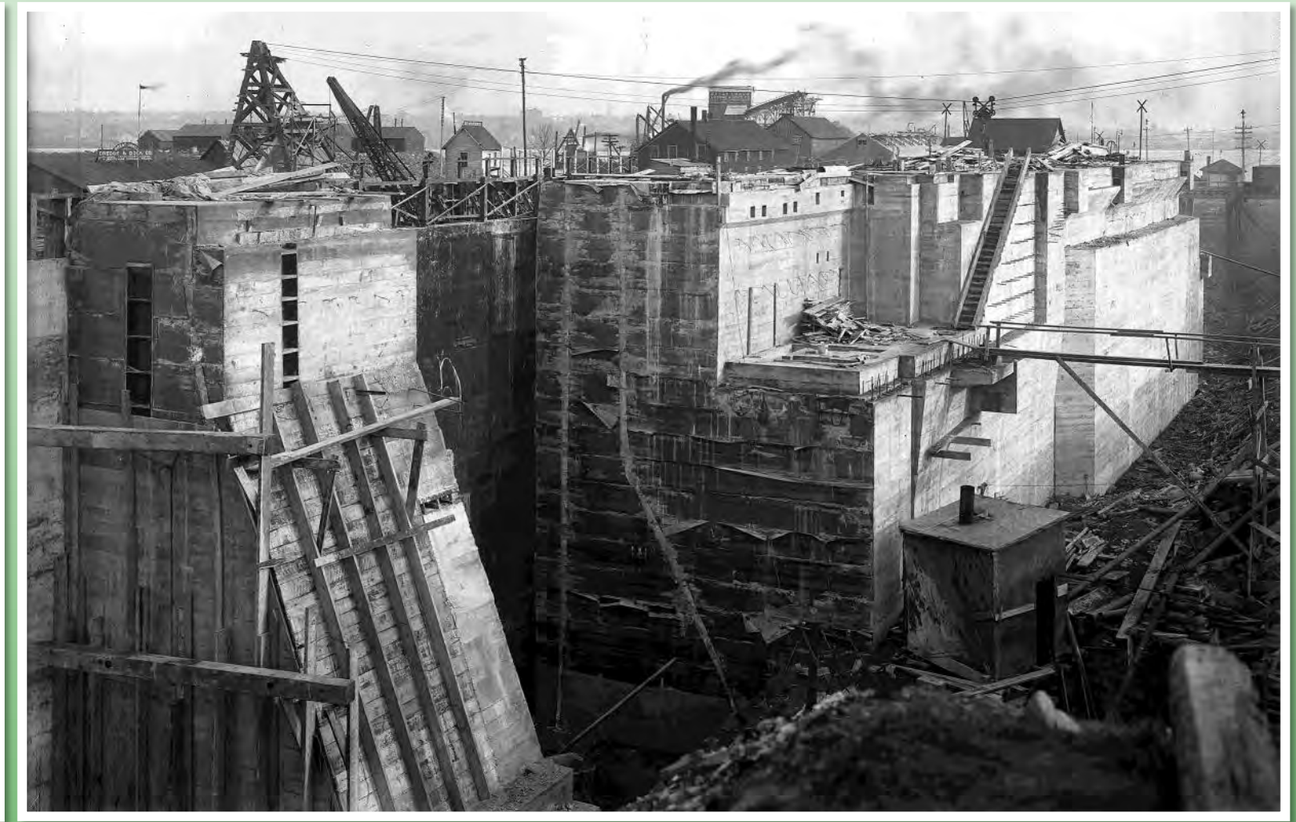
The Davis Lock was the first lock built here with poured concrete instead of cut stone. An on-site stone crusher and mixing plant operated to supply tons of concrete. The lock used enough concrete to pave from here to the Mackinac Bridge.

IMPROVING ST.MARYS RIVER, MICHIGAN
NEW LOCK AND CANAL. 3RD LOCK MASONRY
VIEW LOOKING EAST SHOWING
CRUSHER PLANT, BROKEN STONE AND SAND
APRIL 1, 1912

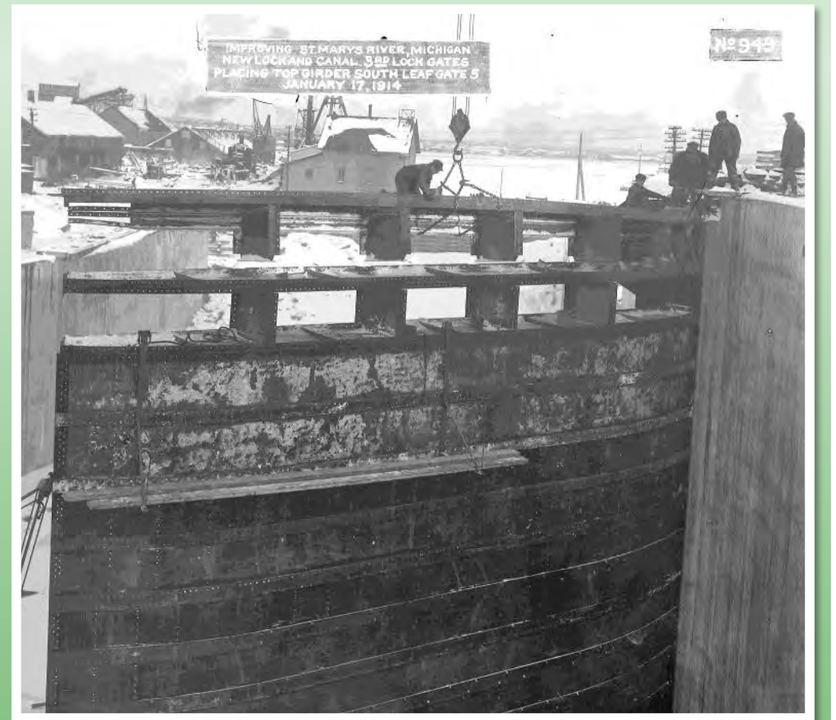


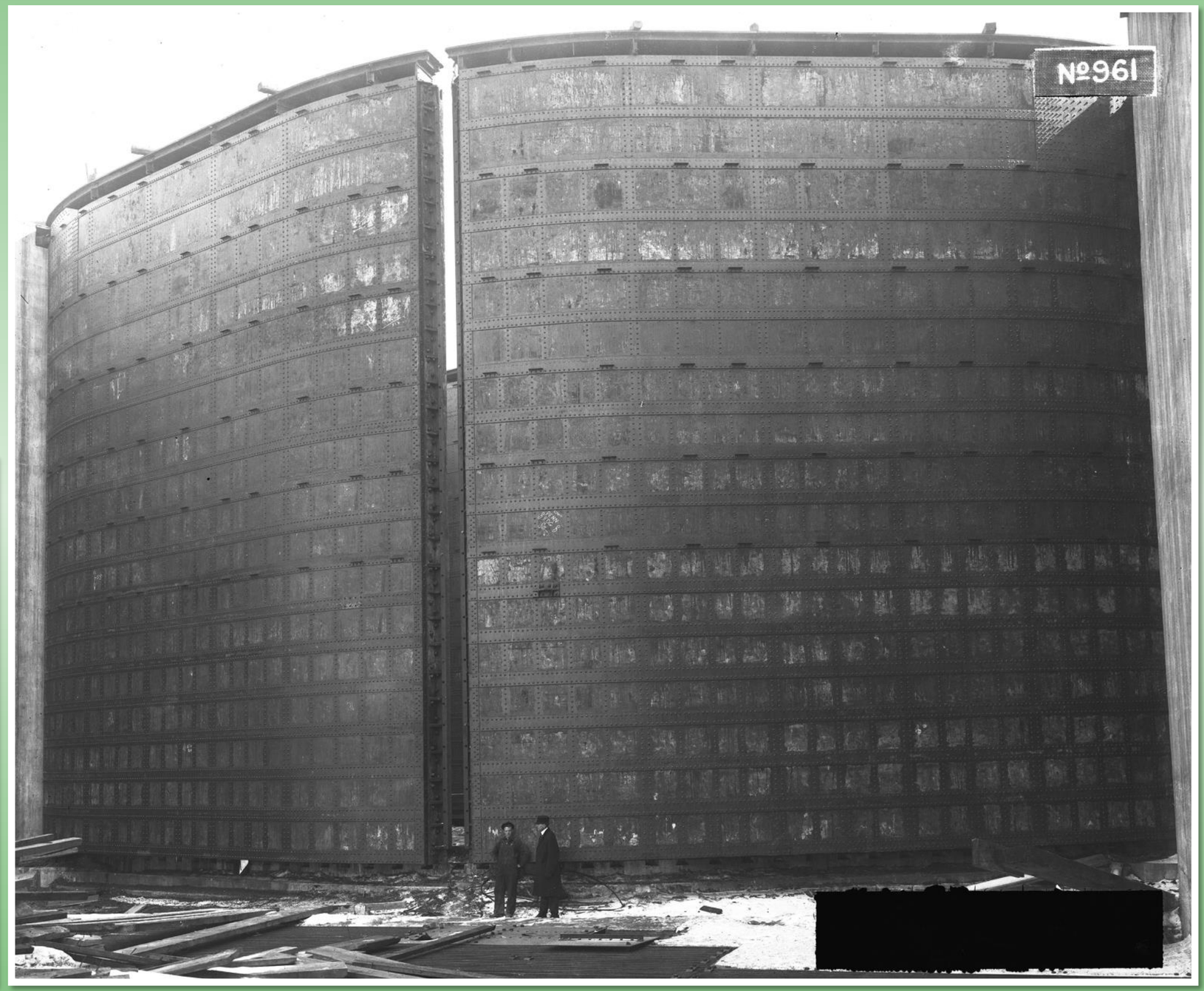
Monoliths of poured concrete make up the lock structure. Crews positioned movable forms on rail tracks to pour each section on the north and south sides of the chamber. The monoliths for the Davis Lock are 12 feet wide at the top and 26 feet wide at the base to withstand tons of water pressure when the lock is full.





These photos show crews building the lower gates for the Davis Lock. These gates stand 51-feet high and each leaf measures 45.5-feet across.





The Corps of Engineers vessels *U.S.S. Gladwin* and *Alfred Noble*, a small fleet of tugs and the 580-foot-long *Alva C. Dinkey* completed the first official lockage October 21, 1914; seven years after construction began.


WILLIAM H. WOLF
ST. MARYS FALLS CANAL, MICH.
DECK LOAD OF AUTOMOBILES
UPBOUND IN DAVIS LOCK
MAY 25, 1935

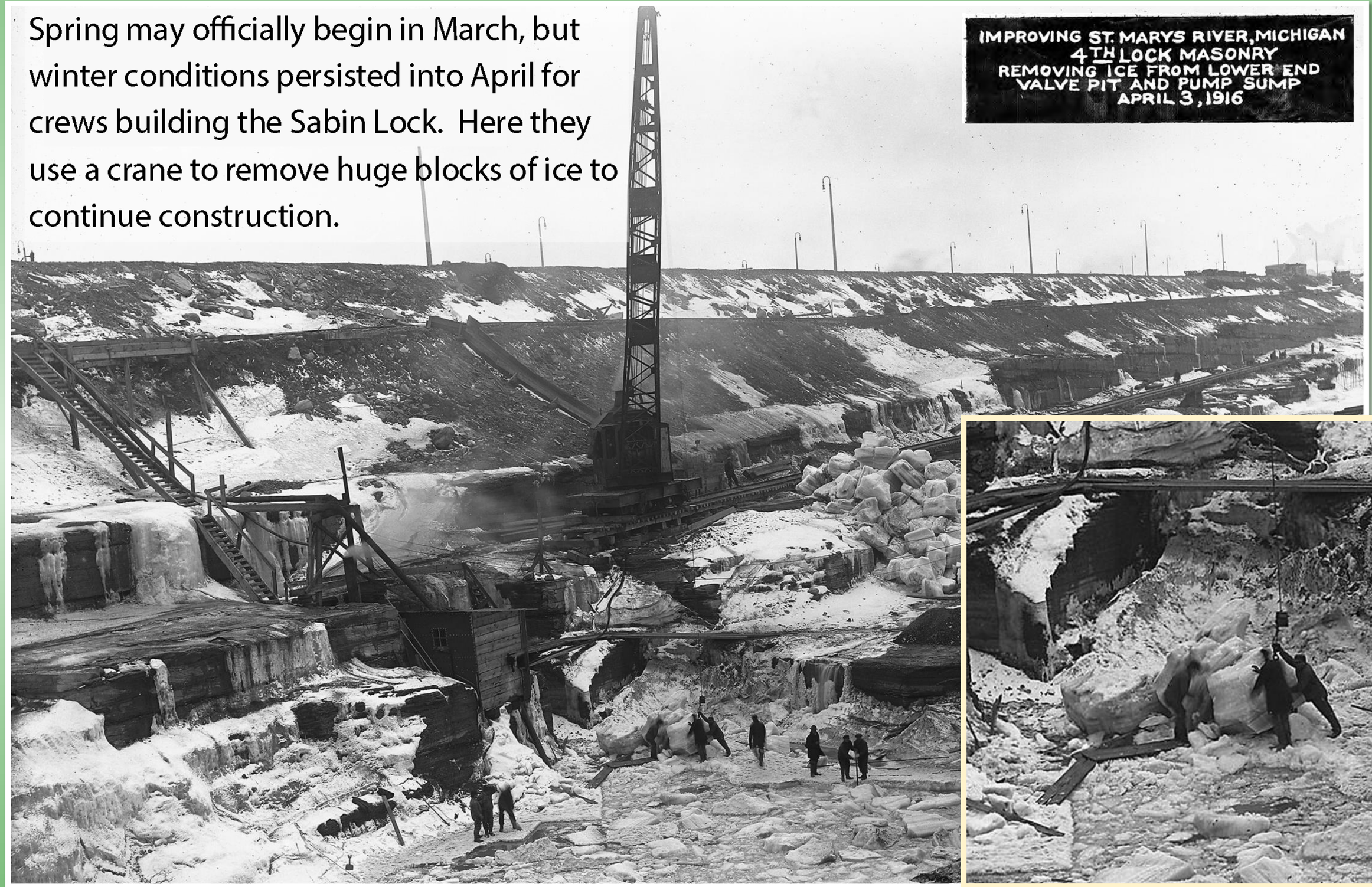
Sabin Lock

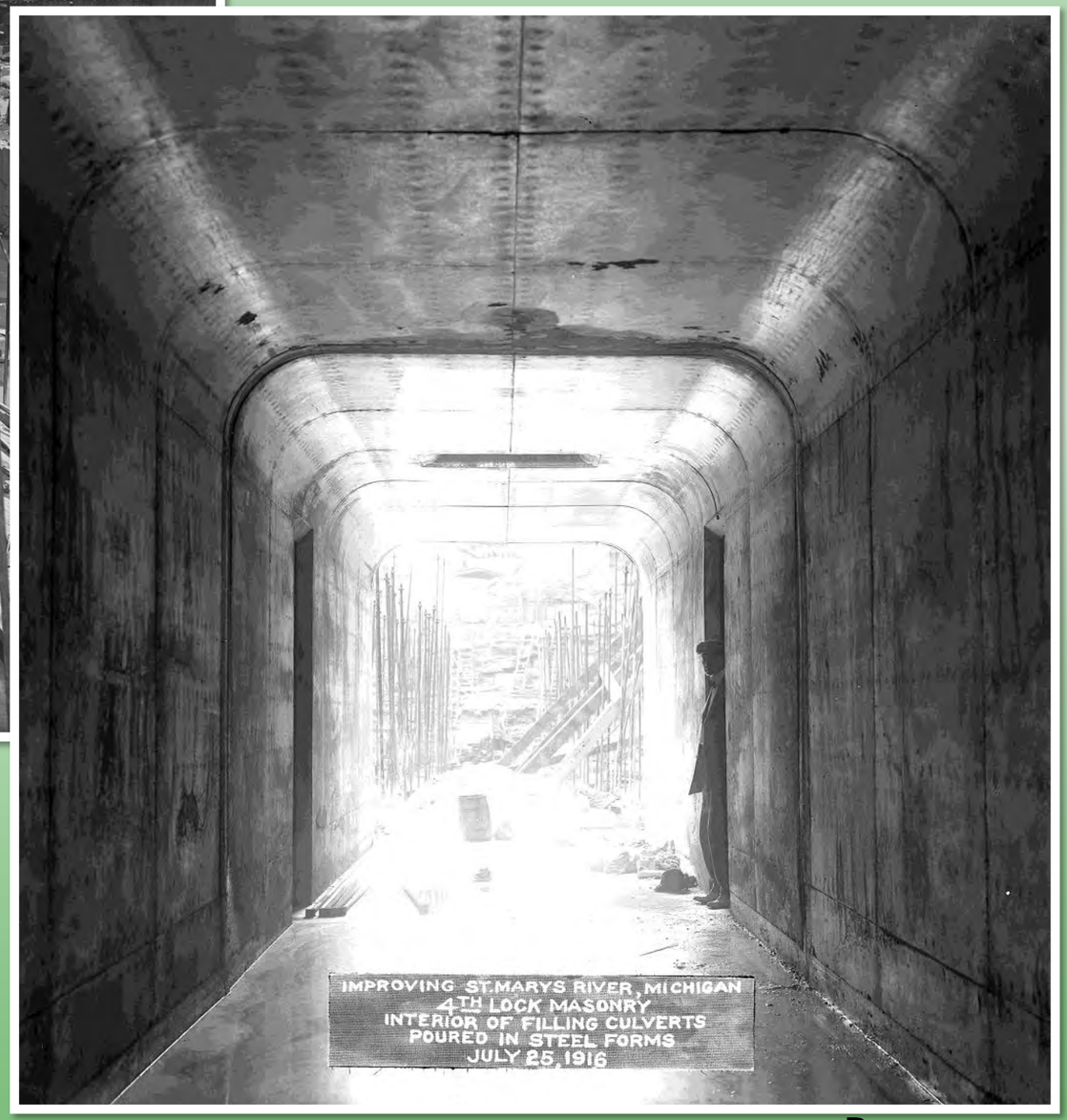
Sabin Lock 1919-1989

1350’ long, 80’ wide, 23’ deep

Construction of the 4th Lock, now called the Sabin Lock, began with a bang as explosives started the work of excavating. Eventually rock cutters carved out the bedrock to make room for the new lock.

Spring may officially begin in March, but winter conditions persisted into April for crews building the Sabin Lock. Here they use a crane to remove huge blocks of ice to continue construction.





Water enters and leaves the chamber through culverts below the floor for every lock built on-site since 1881. These photos of the Sabin Lock show these culverts, inside and out, during construction.

This ground-level view shows the steel forms for pouring concrete and a side view of a completed monolith section.

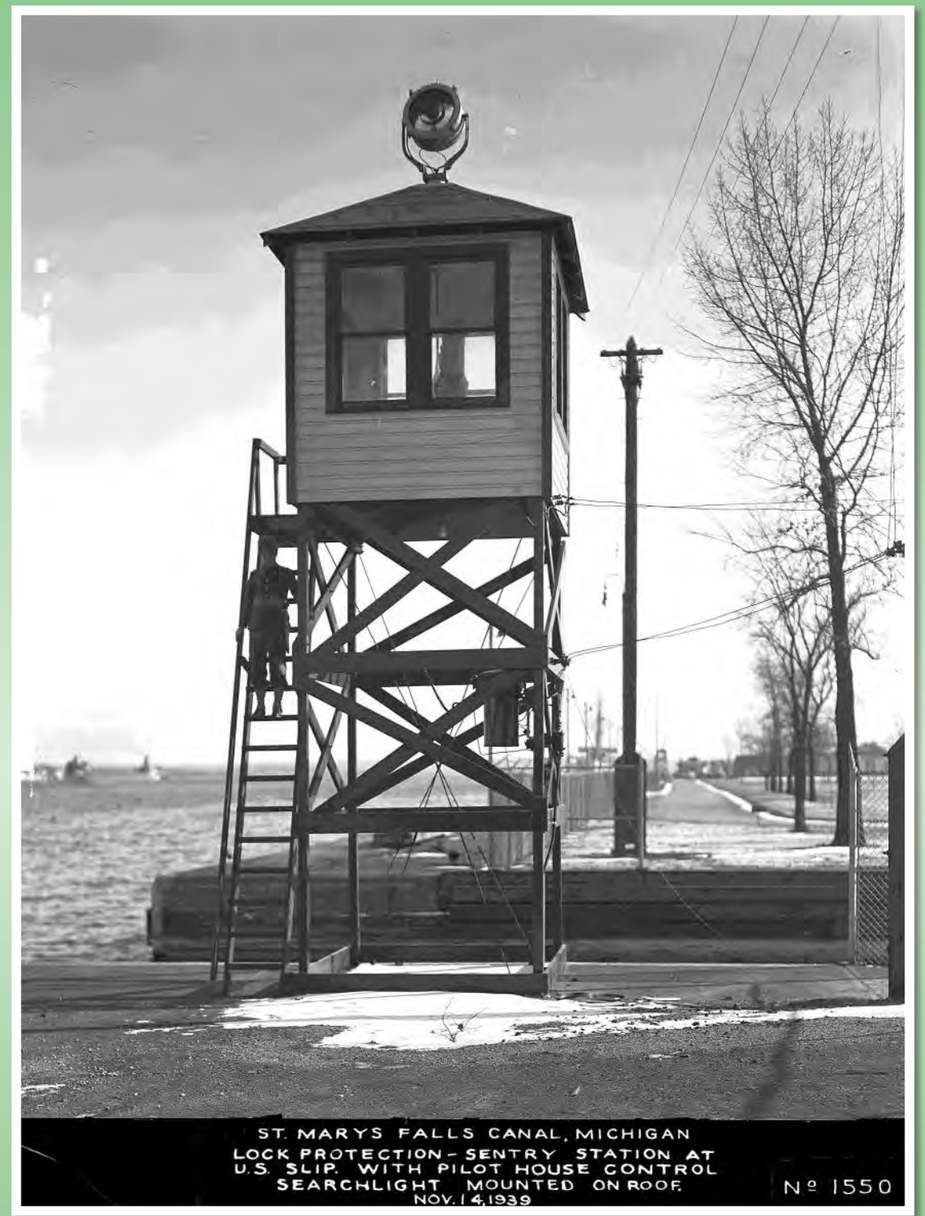

ST. MARYS RIVER, MICHIGAN
4TH LOCK MASONRY
GENERAL VIEW LOOKING EAST
FROM WEST COFFERDAM
DECEMBER 2, 1916

In 1917, crews relied on a mix of steam and horsepower.

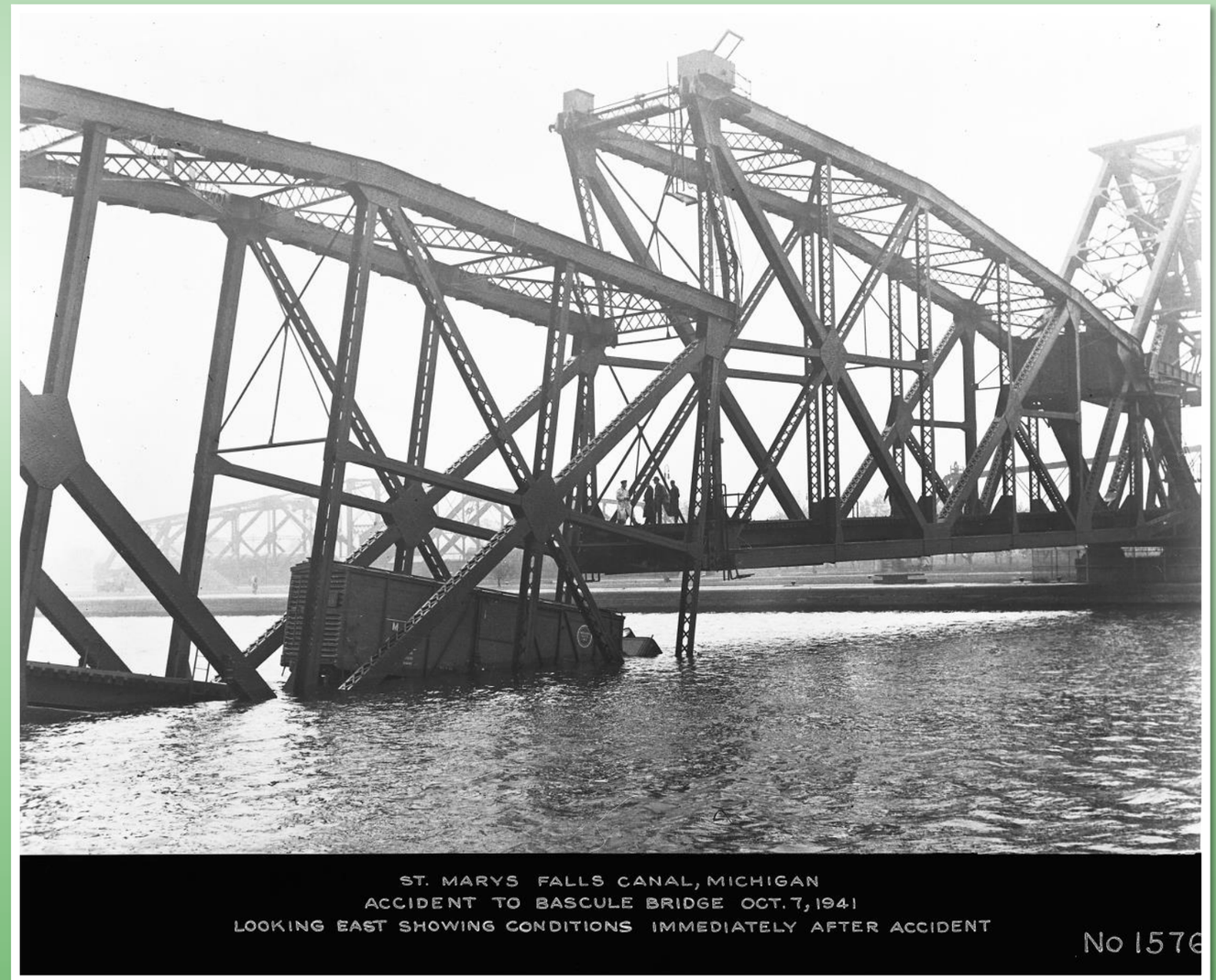

ST. MARYS RIVER, MICHIGAN
FOURTH LOCK GATES
ASSEMBLING GATE 5 S
RIVETING GATE 5 N
FEBRUARY 18, 1919
No 1179

The 532 foot-long *William Livingstone* had the honors as the first freighter to pass through the Sabin Lock in 1919.

More than two years before the U.S. entered World War II, public access to the locks was restricted and soldiers began protecting the facility from sabotage or enemy attack.



In October 1941 a malfunction of the railroad bridge sent a locomotive and its tender into the upper approach canal to the Sabin and Davis Locks. Within 24 hours, 80 vessels sat at anchor waiting for the canal to reopen.



MacArthur Lock

The entry of the US into Word War II accelerated the funding and construction of a "New First Lock" to replace the defunct Weitzel Lock. Removal of the original lock began in June 1942, and the lock opened for business just over a year later on July 11, 1943.

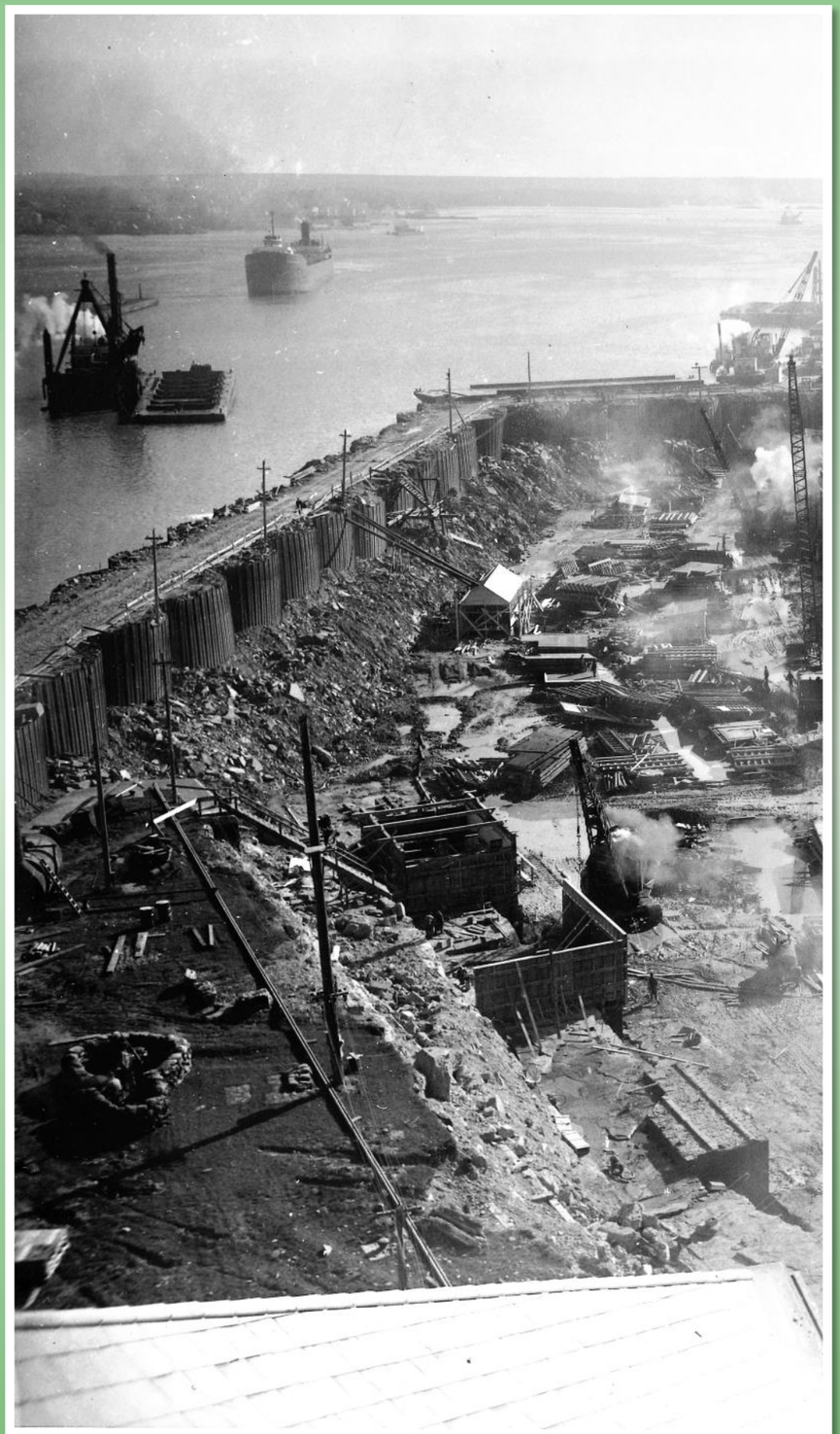
NEW FIRST LOCK
ST : MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
View of excavation looking East
June 8 , 1942
No. 16

MacArthur Lock 1943-present

800'long, 80'wide, 31'deep

Cofferdams are sectional dams built at each end of the approach canals to create a dry workspace so crews can remove the Weitzel Lock and build the new one.

NEW FIRST LOCK
ST . MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
Constructing lower cofferdam, view looking North
No. 37



NEW FIRST LOCK
ST . MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
View of excavation at time of blast , looking Northwest
June 15 , 1942

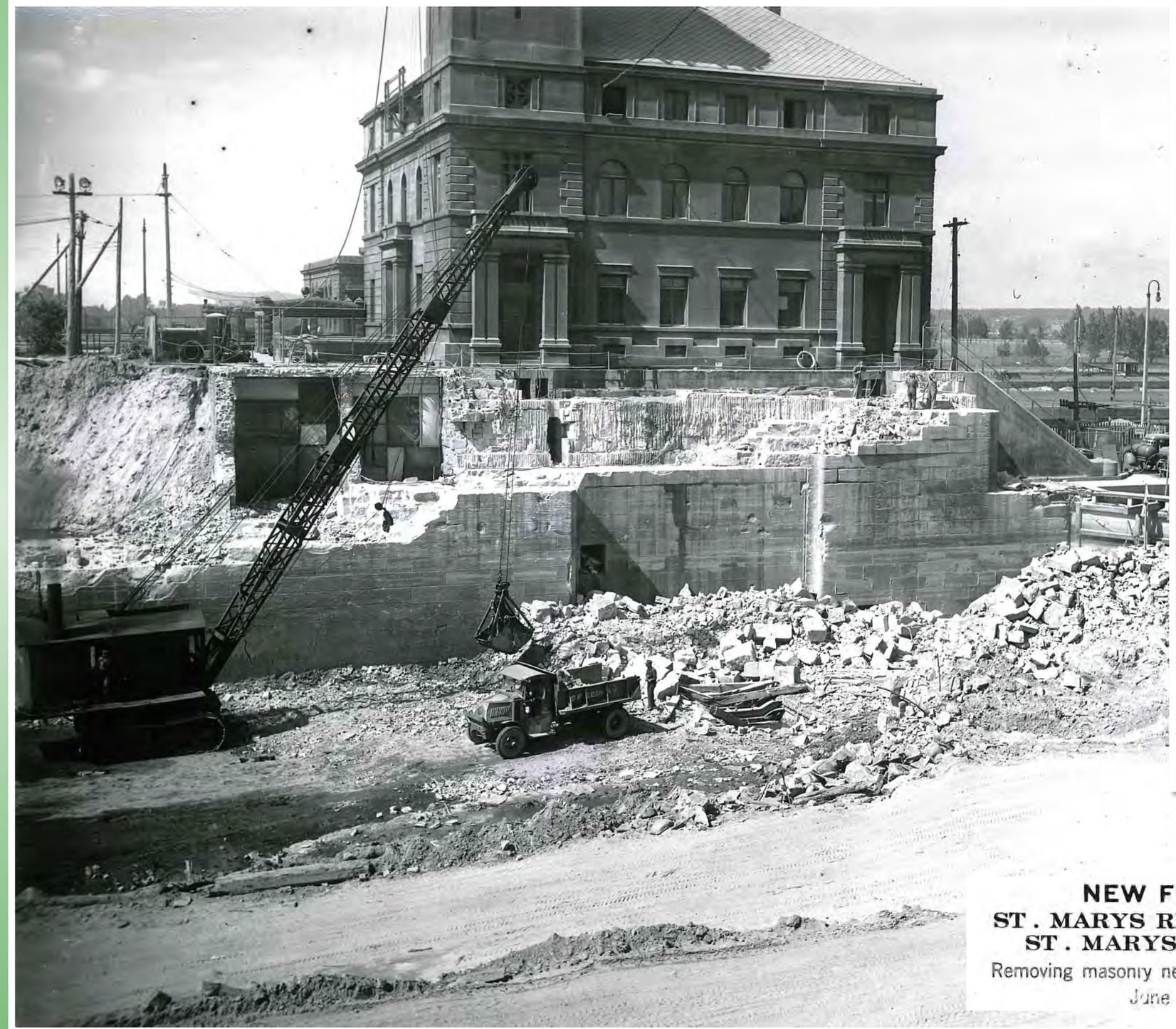
No. 33

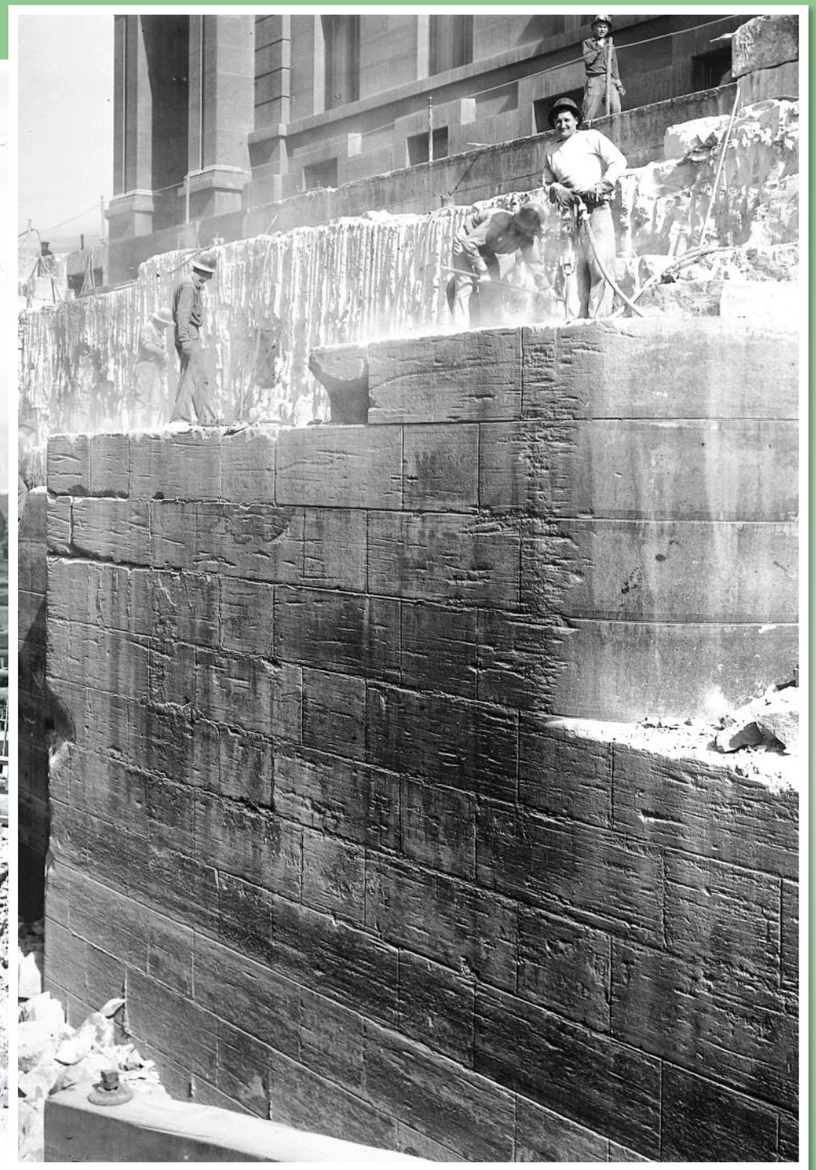
NEW FIRST LOCK
ST . MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
View of excavation at time of blast , looking Northwest
June 30 , 1942

No. 50

NEW FIRST LOCK
ST . MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
View of excavation looking Northwest
June 18 , 1942

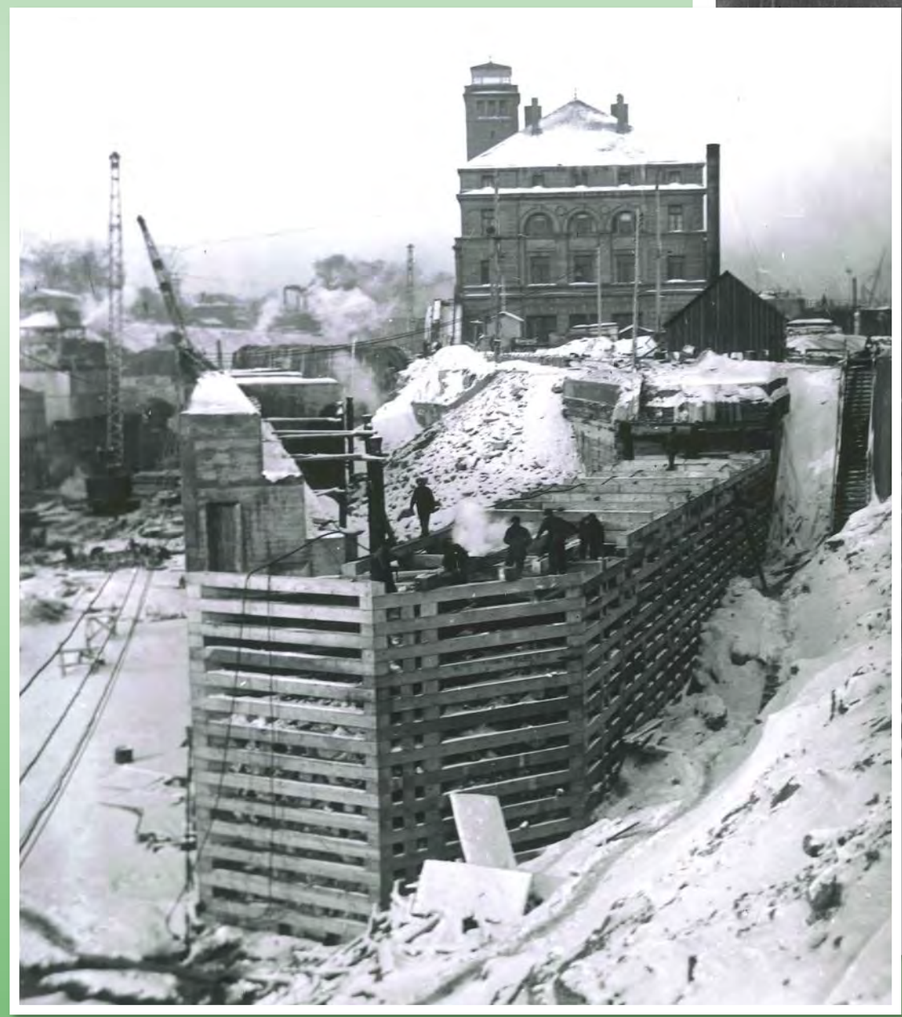
No. 36





NEW FIRST LOCK
ST . MARYS RIVER , MICHIGAN
ST . MARYS FALLS CANAL
Removing masonry near Administration Building
June 26 , 1942

Building a larger, deeper lock also meant deepening and improving the approach canals and piers.

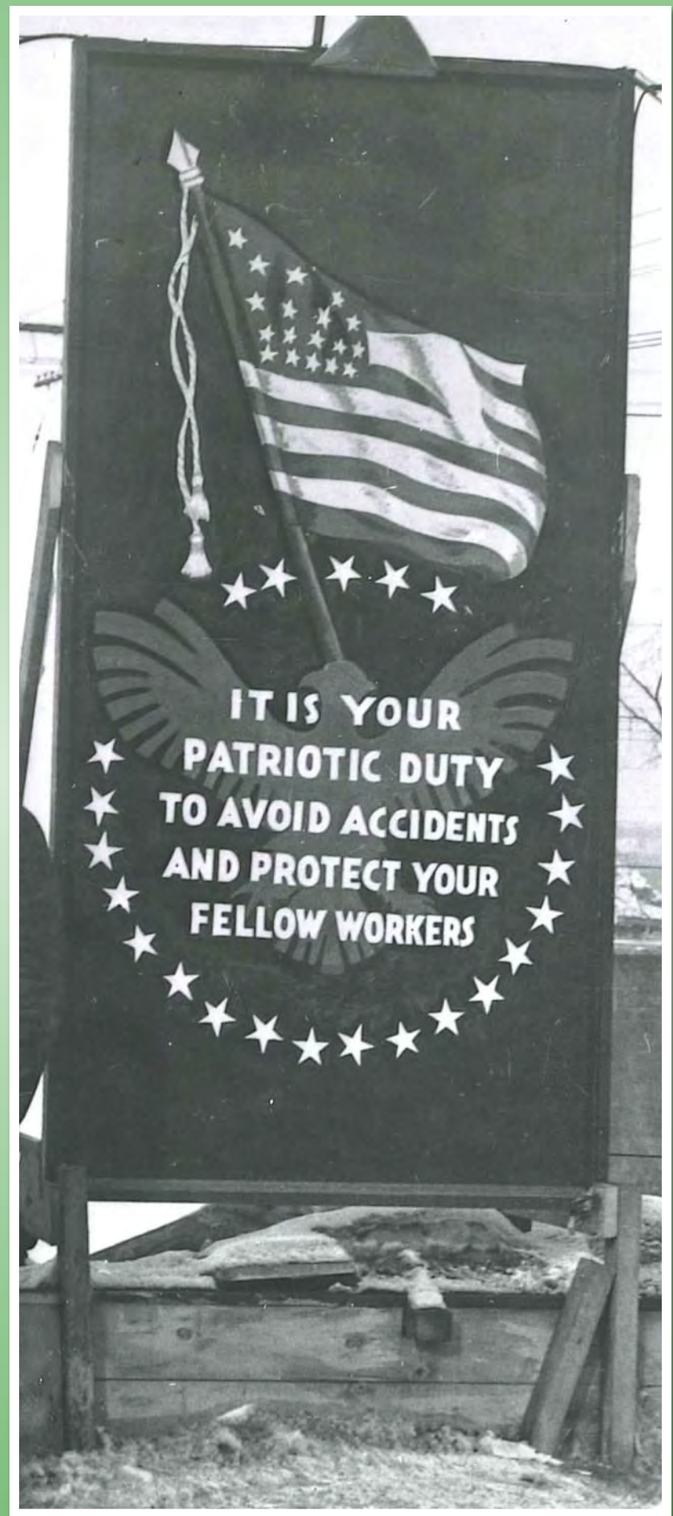


NEW FIRST LOCK
ST. MARYS RIVER, MICHIGAN
ST. MARYS FALLS CANAL
LOOKING WEST FROM LOWER COFFERDAM
APRIL 10, 1943
386

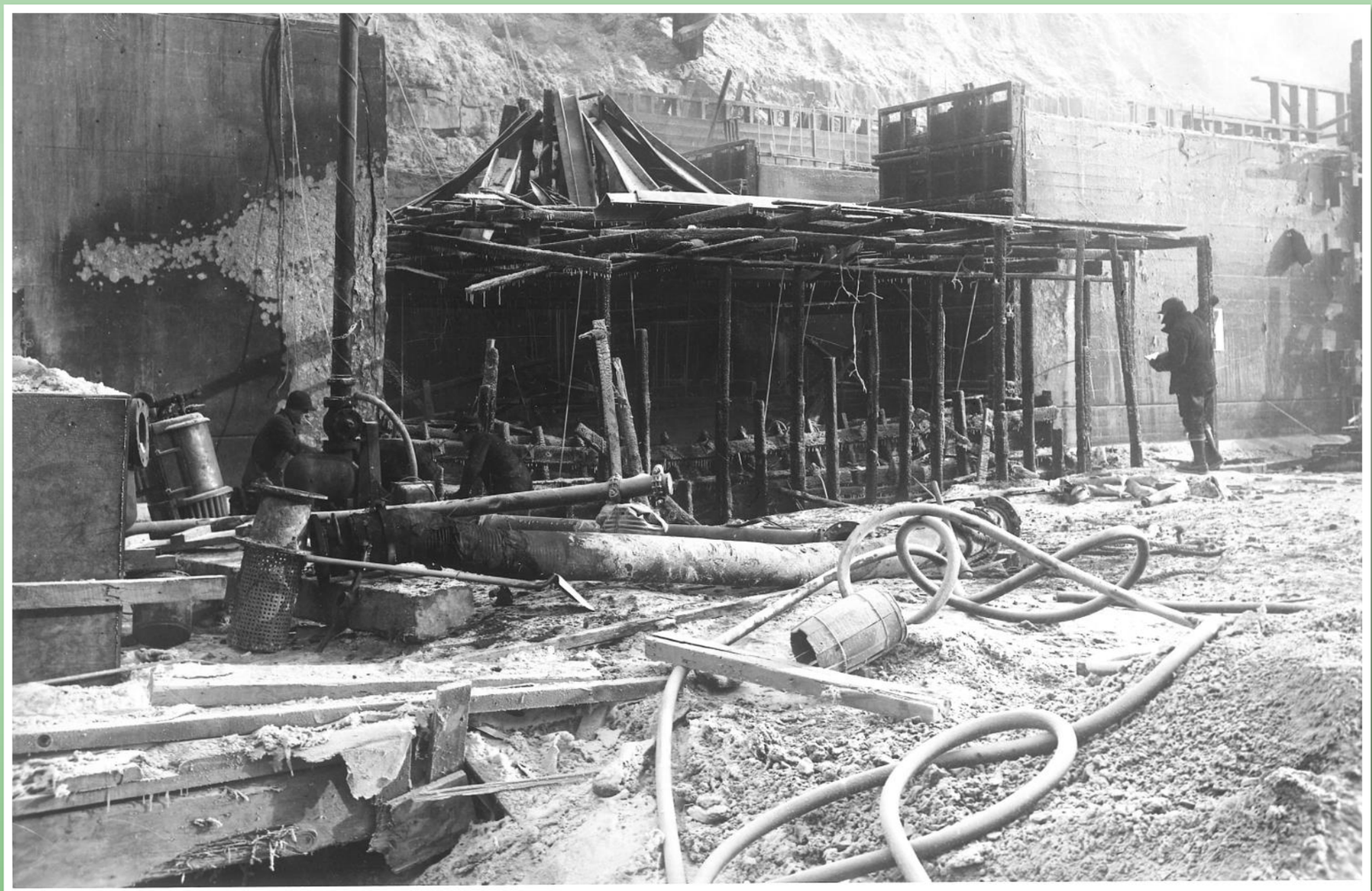
NEW FIRST LOCK
ST. MARYS RIVER, MICHIGAN
ST. MARYS FALLS CANAL
LOOKING WEST FROM DISPATCH TOWER
MAY 1, 1943

445

MacArthur Lock construction went on 24/7 regardless of the weather. During winter months, the monolith forms were sheltered and heated to allow the concrete to cure despite sub-zero temperatures.

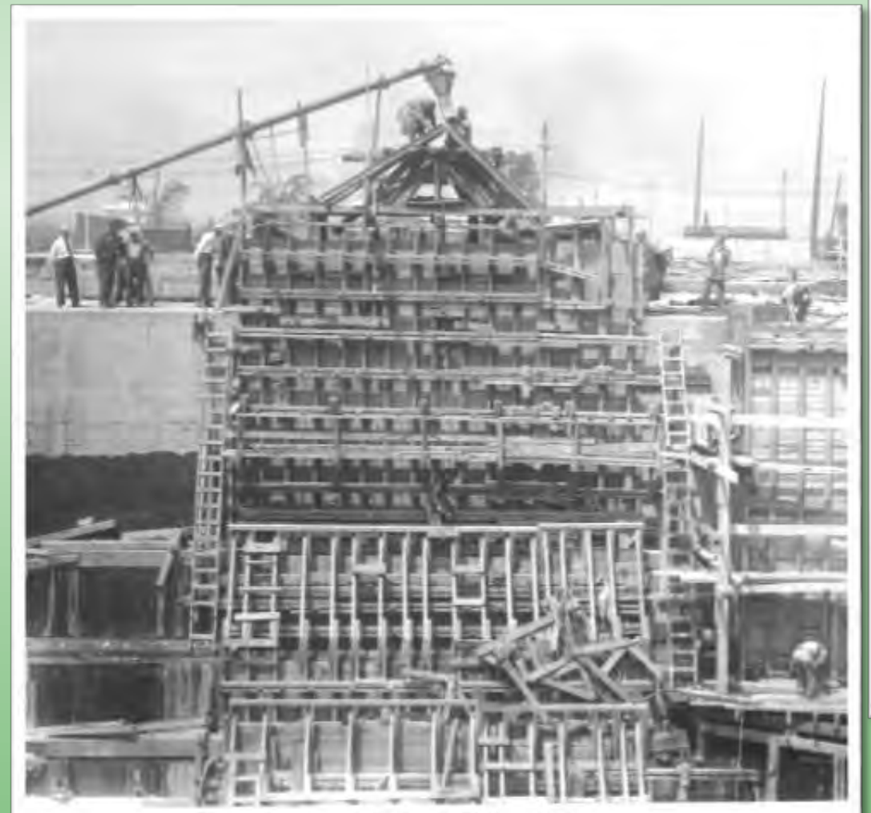


Safety is an important part of every job the Corps of Engineers takes on but during World War II it became a patriotic duty as well.



NEW FIRST LOCK
ST. MARYS RIVER, MICHIGAN
ST. MARYS FALLS CANAL
FIRE IN FORMS OF BLOCK NO. 16 NA, LOOKING N.E.
MARCH 8, 1943
299

Only 15 days before the lock opened for business, crews celebrated the delivery and pouring of the last load of concrete.



NEW FIRST LOCK
ST. MARYS RIVER, MICHIGAN
ST. MARYS FALLS CANAL
MAKING THE LAST POUR, MONOLITH 28S, LOOKING N.
JUNE 26 1943

NEW FIRST LOCK
ST. MARYS RIVER, MICHIGAN
ST. MARYS FALLS CANAL
THE LAST LOAD OF CONCRETE
JUNE 26 1943
529

The park closed to the public during the war, but a huge crowd attended the official opening of the "New First Lock" later named for WWII hero General Douglas MacArthur.

The *Carl D. Bradley* took the honors as the first boat through the lock on opening day in 1943. Tragically she sank in Northern Lake Michigan in 1958.

The MacArthur Lock is one of only two locks still in use at this facility. Although smaller than the Poe and only able to serve vessels up to 730 feet long, it remains critical to the national economy. Officials estimate that the unplanned 19-day outage in 2015 cost shipping companies over $800,000 due to delays.

New Poe Lock

After the opening of the MacArthur Lock, fewer and fewer boats used the original Poe Lock. The smallest and oldest lock on site at the time, it was decommissioned in 1955. Work to replace it with a larger, deeper lock, the current Poe Lock, began in 1961.

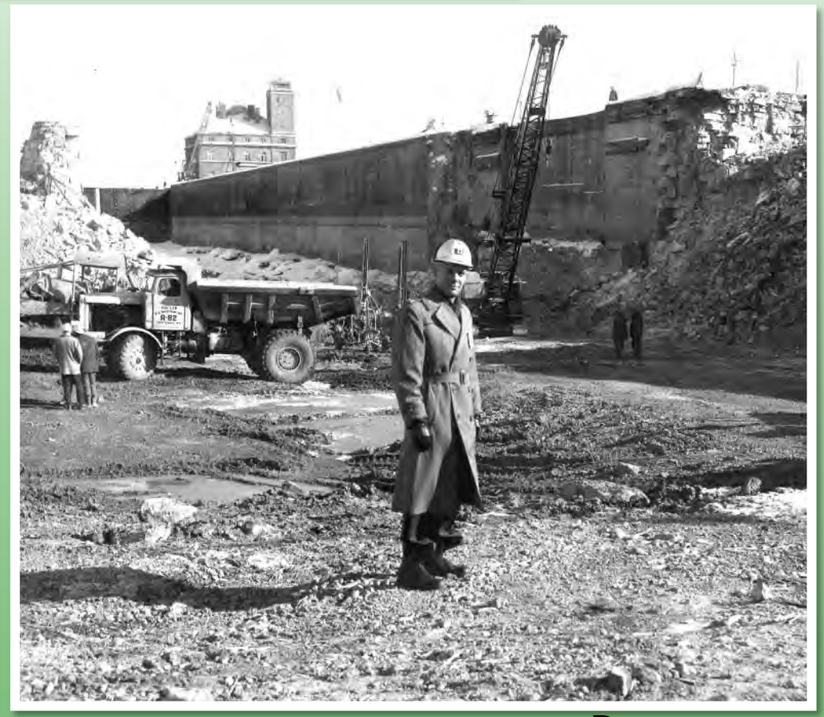
New Poe Lock 1969-present

1200' long, 105' wide, 32' deep

ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICH., DETROIT DISTRICT D2-5-274

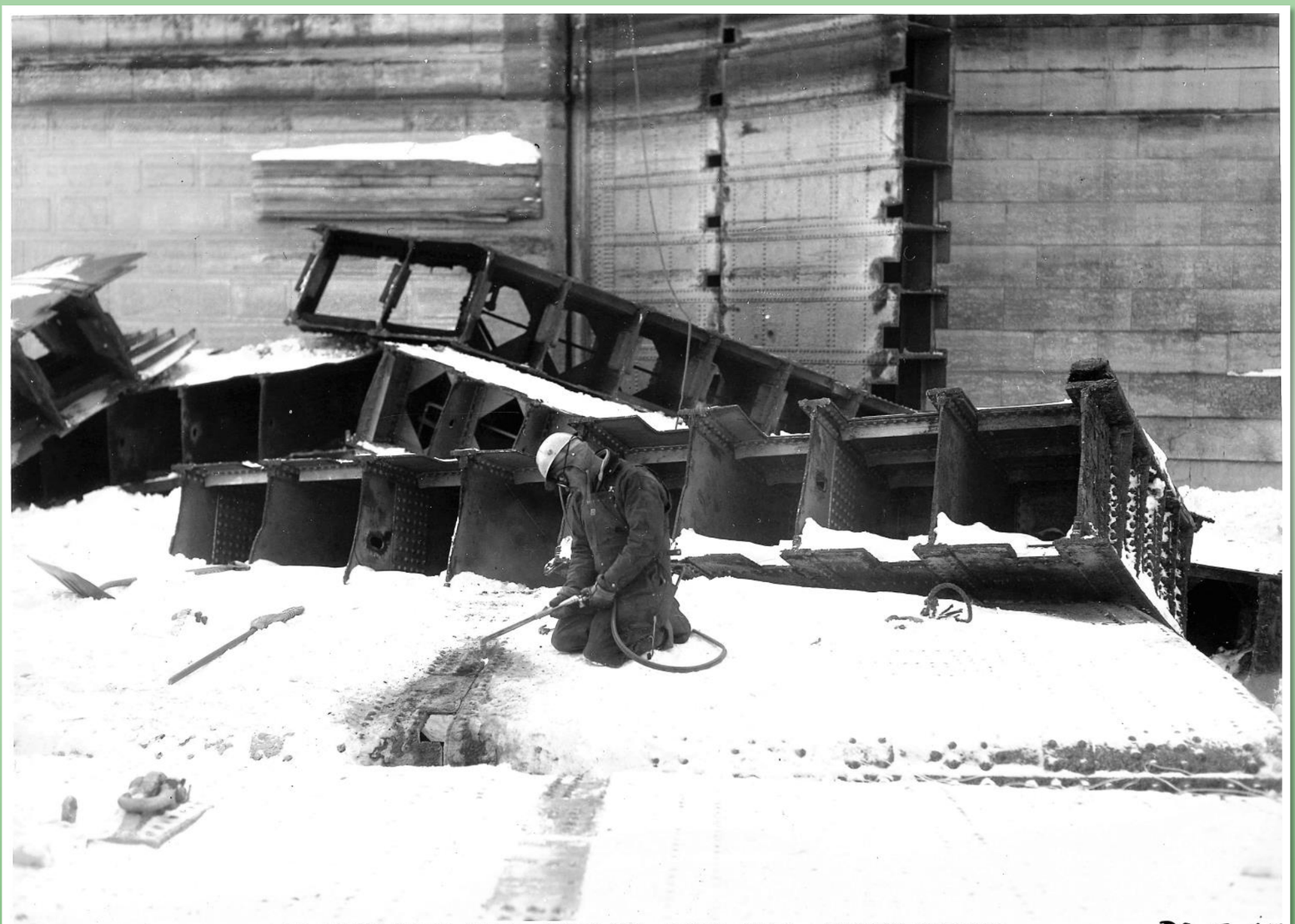
CONSTRUCTION OF NEW SECOND LOCK, CONTRACT NO. DA-20-064-CIVENG-64-140, MC NAMARA CONSTRUCTION COMPANY, CONTRACTOR
VIEW LOOKING EAST FROM CENTERLINE AT STATION -(1+00) SHOWING SHOVEL LOADING OUT EUCLIDS, DRAGLINE SLOPING N.BANK
BULLDOZERS NORTH BANK CUTTING BACK ON BENCH, BULLDOZER SOUTH SIDE SLOPING SOUTH BANK
1 OCTOBER 1964

Construction of the current Poe Lock required the removal of an old lock. Working between two functioning locks added another layer of difficulty to the project as the delivery and removal of equipment and materials had to move on boats and barges without interrupting freighter traffic.



ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICH., DETROIT DISTRICT
CONSTRUCTION OF NEW SECOND LOCK, CONTRACT NO. DA-20-064-CIVENG-61-41, A. S. WIKSTROM, INCORPORATED, CONTRACTOR
VIEW SHOWING METHOD OF CUTTING LOCK GATES INTO SMALL SECTIONS
9 FEBRUARY 1962
D2-5-66

Workers had to cut the original Poe Lock gates into smaller pieces to remove them.



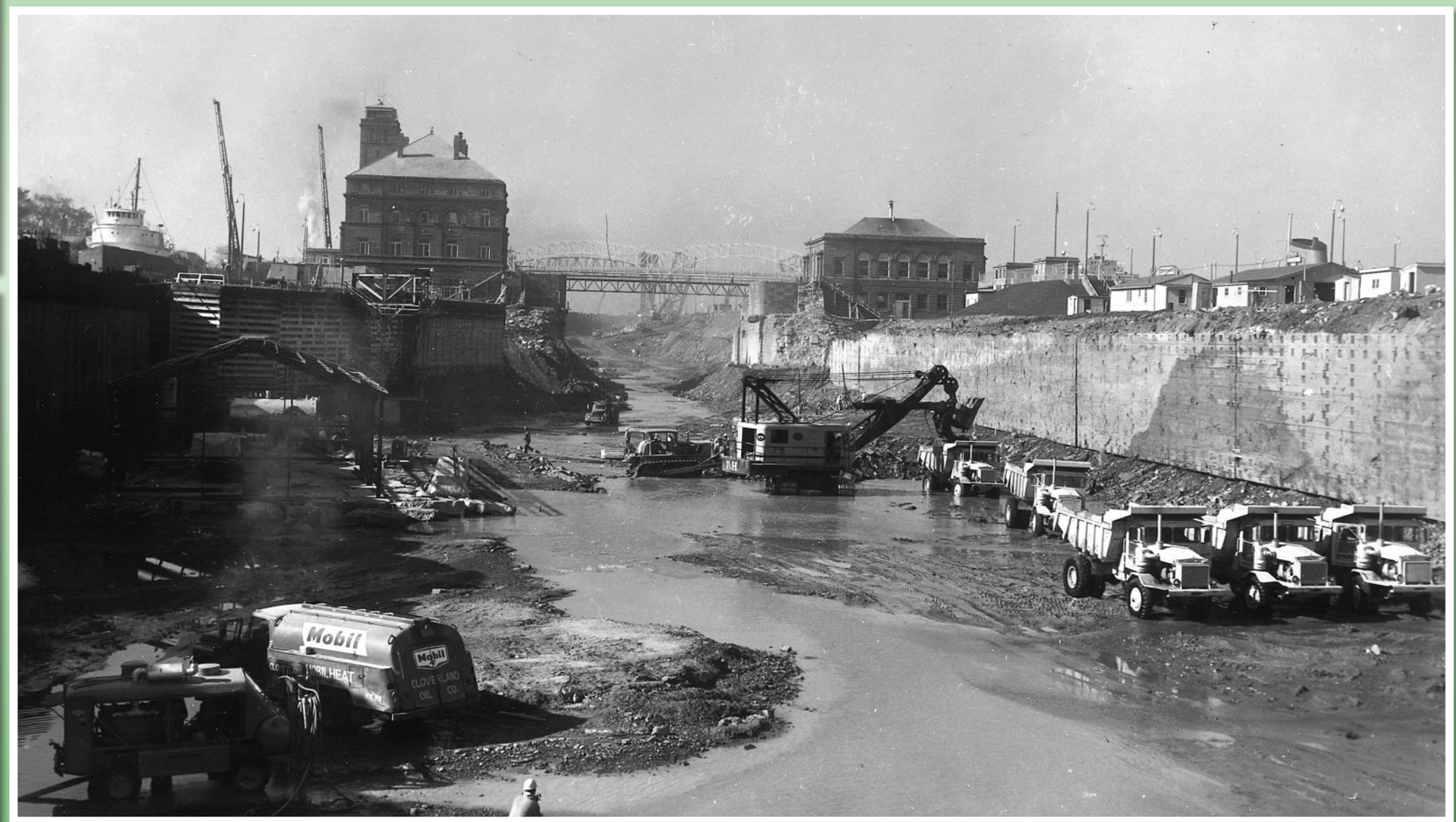
ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICH., DETROIT DISTRICT
CONSTRUCTION OF NEW SECOND LOCK, CONTRACT NO. DA-20-064-CIVENG-61-41, A. S. WIKSTROM, INC., CONTRACTOR
VIEW SHOWING METHOD OF CUTTING LOCK GATES INTO SECTIONS SMALL ENOUGH TO HANDLE
9 FEBRUARY 1962
D2-5-65

In 1962, all work on the lock stopped and the site filled with water while engineers redesigned the lock to fit the 1000-foot long boats planned for the Great Lakes.

ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICH., DETROIT DISTRICT
CONSTRUCTION OF NEW SECOND LOCK, CONTRACT NO. DA-20-064-CIVENG-64-140, McNAMARA CONSTRUCTION CO., CONTRACTOR
VIEW SHOWING COLONEL JEFF W. BOUCHER, DISTRICT ENGINEER, AND HAROLD S. McNAMARA, VICE PRESIDENT OF McNAMARA
CONSTRUCTION COMPANY PRESSING BUTTON TO START UNWATERING PUMPS AS A PART OF CEREMONY MARKING COMMENCEMENT OF
CONSTRUCTION OPERATIONS
7 AUGUST 1964

Work resumed in 1964 with new plans enlarging the lock to 1,200 feet long and 110 feet wide to fit the 1,000-foot long and 105-foot wide boats soon to launch on the Great Lakes.

Built between two locks, the area that became the current Poe Lock is an island that presented special challenges during construction. All the excavated material had to be loaded onto trucks, dumped into barges and hauled away.



This view of the lock walls under construction allows a glimpse into the culverts in the bottom of the lock walls used to move water in and out of the chamber. The openings near the top are the 'galleries' which carry air, steam, and hydraulic lines and allow workers to safely travel from one end of the lock to the other during bad weather.

The new Poe Lock had not one, but two "openings" the first in October 1968 when the down bound Philip R. Clarke made the first test passage and a grand opening the following June when the Clarke locked up bound before a large audience.

A new Poe-sized Lock?

In 1986 Congress authorized the construction of a new lock, the same size as the current Poe Lock. This project has not been funded yet, but when it is the U.S. Army Corps of Engineers is ready to get to work on the new lock. This lock, as shown in an artist's rendering, will replace the Davis and Sabin Locks and take about 10 years to build.