

GG 16.

IMPROVEMENT OF FAIRPORT HARBOR, OHIO.

The work of improvement at the mouth of Grand River, Ohio, was commenced in 1828, and carried on from time to time until 1852, when the harbor was completed.

The first project consisted of parallel piers starting from the shore at the mouth of the river and running out into the deep water of Lake Erie, the piers being 200 feet apart, the west pier extending about 400 feet further than the east and flaring toward the northwest.

The survey made under the direction of the Chief of the Corps of Topographical Engineers, in 1853, showed a depth of from 13 to 15 feet water between the piers, but that a bar had formed at the entrance to the harbor upon which there was only a depth of about 12 feet.

From 1853 to 1864 no work was done upon the harbor, and an examination made during the latter year showed the piers to be badly decayed and damaged, and a depth of only from 4 to 7 feet on the bar outside.

Operations were at once commenced for the improvement of the harbor, and were continued from time to time until 1872, when the piers were reported to be in very good condition, but the entrance to the harbor had shoaled considerably. While there was a depth of over 12 feet on the east side of the channel, a bar covered the west half, upon which there was only a depth of from 5 to 11 feet water.

In February, 1872, a Board of Engineers examined this harbor and recommended that the superstructure of the flaring portion of the west pier should be removed and the piers made parallel to each other, the west pier to be extended 600 linear feet and the east pier 300 feet. Work was commenced upon this new project in 1872, and carried on, together with various needed repairs to the piers, until 1877.

OPERATIONS DURING THE PRESENT FISCAL YEAR.

A survey of the harbor has been made during the year. The inner portions of the piers were found to be badly decayed, particularly the east pier, and proposals were invited for removing and renewing about 580 linear feet of superstructure. This work was awarded on June 26 to Mr. C. Schulz, of Cleveland, Ohio.

The channel between the piers was found to be in very good condition, presenting a depth of from 14 to 16 feet, but the same old trouble was seen near the outer end of the west pier, and a bar has formed around it, stretching about 400 feet into the lake and 50 feet to the eastward, upon which there is a depth of from 8 to 12 feet. There is still, however, a channel at the entrance to the piers 120 feet wide, with a depth of from 14 to 15 feet water.

During the present season it is proposed to renew about 580 linear feet of the superstructure of the east pier, and, if funds are available after this work is completed, to widen the channel at the entrance to the harbor.

The following appropriations have been made for this harbor since the inauguration of the work:

March 3, 1825.....	\$1,000 00	July 7, 1838.....	\$10,000 00
May 20, 1826.....	5,620 00	June 11, 1844.....	10,000 00
May 19, 1828.....	9,135 11	August 30, 1852.....	10,000 00
April 23, 1830.....	5,563 18	June 23, 1866.....	24,072 00
March 3, 1831.....	5,680 00	March 2, 1867.....	60,000 00
July 3, 1832.....	2,600 00	June 23, 1874.....	20,000 00
June 23, 1834.....	10,000 00	March 3, 1875.....	15,000 00
July 7, 1836.....	6,000 00	June 18, 1878.....	5,000 00

Total, \$199,670.29, of which amount \$194,820.79 has been expended up to the close of the present fiscal year constructing and repairing piers, dredging, &c.

During the fiscal year ending June 30, 1881, the sum of \$5,000 will be required to continue the repairs of the superstructure and to dredge the outer bar, and an annual appropriation of \$2,000 will be necessary thereafter for repairs and dredging.

Fairport Harbor is in the collection-district of Cuyahoga, Ohio. There is a fixed white light of the third order on shore and a beacon on the east pier. If a depth of 15 feet is maintained at the harbor it will afford excellent refuge during heavy gales to the commerce of the lakes.

The amount of revenue collected at the port during the fiscal year was \$46.60. Twenty-nine vessels, with an aggregate tonnage of 7,229 tons, entered, and 55 vessels, with an aggregate tonnage of 12,158 tons, cleared during the year.

Abstracts of proposals received during the year and a financial statement are transmitted herewith.

Money statement.

July 1, 1878, amount available.....	\$5,000 00
July 1, 1879, amount expended during fiscal year.....	150 50
July 1, 1879, amount available.....	4,849 50
Amount (estimated) required for completion of existing project.....	5,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.....	5,000 00
Amount required for annual repairs.....	2,000 00

Abstract of proposals for repairs of east pier at Fairport Harbor, Ohio, received and opened by Major John M. Wilson, Corps of Engineers, at United States Engineer Office, Cleveland, Ohio, at 12 o'clock, noon, Thursday, June 26, 1879, under advertisement of May 24, 1879.

Name of bidder.	Address of bidder.	Iron, approximate quantities.		Total.	Remarks.
		8,000 pounds, more or less, drift-bolts, per pound.	2,000 pounds, more or less, spikes, per pound.		
Samuel A. Sague.....	Cleveland, Ohio.....	\$0 02½	\$0 03	\$260 00	Contract awarded.

Abstract of proposals for repairs of east pier, at Fairport Harbor, Ohio, received and opened by Maj. John M. Wilson, Corps of Engineers, at United States Engineer Office, Cleveland, Ohio, at 12 o'clock noon, Thursday, June 26, 1879, under advertisement of May 24, 1879.

No.	Name of bidder.	Address of bidder.	For timber and stone, including workmanship, and for taking down and putting up again elevated walk.			Remarks.
			Approximate quantities.			
			108,180 feet, b. m., pine timber and plank, per M. feet, b. m.	100 cords of stone, more or less, per cord.	For taking down and rebuilding elevated walk, 300 linear feet, more or less, per linear foot.	
1	C. Schulz	Cleveland, Ohio...	\$2 75	\$4 25	\$0 25	\$2,961.09. Contract awarded lowest bidder.
2	Charles M. Hemmenway..	Painesville, Ohio..	24 50	4 25	30	\$3,165 41.

G G 17.

IMPROVEMENT OF ASHTABULA HARBOR, OHIO.

The attention of the general government was called to this harbor in the year 1826, and the first appropriation of \$12,000 was made by the act of May 20 of that year "for removing obstructions at the mouth of Ashtabula Creek, Ohio."

The plan proposed was that of piers 150 feet apart, starting from the shore on each side of the mouth of the creek, but narrowing the channel to 100 feet after running out about 500 feet, and then flaring again to 150 feet.

Work was commenced in 1827 and continued from time to time until 1852, when the project was completed and a good channel obtained between the piers.

No work was carried on from 1852 until 1865, when a careful survey showed the piers to be in a dilapidated condition, and that the channel had shoaled so as to present a depth of only about 8 feet between the piers, while the sand drifting around the outer end of the west pier had formed a bar outside, upon which there was a depth of only 8 feet.

Col. T. J. Cram, of the Corps of Engineers, made an elaborate report upon this harbor in 1865, and recommended the complete repair of both piers out to the place where they commenced to flare, the removal of the flaring portions, the prolongation of both piers out to 12 feet water, and the excavation of the channel to a depth of 12 feet.

Operations were commenced in 1866 and continued from time to time until 1872, when the project of Colonel Cram was completed, rock in the mean time having been discovered in the channel at the depth of 12 feet below the surface of the water.

In 1873 a new project was submitted, which provided for prolonging the west pier 500 feet further into the lake, and to excavate the channel so as to give a depth of at least 14 feet.

Work was commenced upon this project and continued from year to year until 1878, when the west pier had been extended 400 feet, and a

channel with a depth of at least 14 feet at low-water had been obtained between the piers.

The sand still, however, continues to drift around the west pier, and to form a bar at the entrance to the harbor.

OPERATIONS DURING THE FISCAL YEAR.

Operations were carried on during the months of September and October, 1878, with hired labor repairing the piers. A breach 40 feet wide in the west pier was rebuilt, and minor repairs made to the decking at various points. One hundred and seventy feet of the east pier was thoroughly repaired by leveling up, sheathing with 3-inch plank, putting in new ties and joist, filling with stone, and covering with new decking.

The inner portions of both piers are in bad condition, and the under-water work as well as the superstructure must be entirely renewed in a year or two more.

Proposals were invited, in August, 1878, for constructing 200 linear feet of crib-work upon the prolongation of the east pier, and in September the work was awarded to Mr. K. McKenzie, of Ashtabula, Ohio, and the iron to Messrs. Pratt & Co., of Buffalo, N. Y.

Mr. McKenzie commenced work early in April, and was rapidly pushing it forward when death ended his labors. He was a most estimable gentleman, a man of high sense of honor, of strict integrity, and a prominent citizen of Ashtabula. His son immediately took up the work, and by the close of the fiscal year had completed all the cribs and had sunk 80 feet of crib-work.

Soon after the opening of navigation I had a survey made of the harbor, which showed an excellent channel between the piers with a depth of from 14½ to 16 feet at low-water, but the sand had again been drifting around the outer end of the west pier, and there was a depth of only about 13½ feet on the outer bar.

By authority of the Chief of Engineers a dredge with tug and two scows, manned and equipped complete, was hired at the rate of \$7 an hour, payment to be made only for hours during which the dredge actually worked. Operations were commenced dredging through the bar about the middle of June, and by the close of the fiscal year 1,600 cubic yards of sand had been removed and a cut 40 feet wide and 17 feet deep had been made through it.

During the present season it is proposed to complete dredging a channel through the bar 120 feet wide and 17 feet deep, to make repairs absolutely necessary to the west pier, to complete the construction of 200 feet of the east pier now in progress, and, if the appropriation of March 3, 1879, is available in time, to add 200 additional feet to the east pier, which will carry it out as far as the end of the west pier, and it is hoped that the volume of water from Ashtabula Creek will be able to keep the channel open, at least within the limits of the piers. The drifting of the sand around the west pier still continues, and I found it referred to as a source of great trouble in the reports of my predecessors, it having been so great in 1874 that there was only 9 feet water outside at the opening of navigation.

I respectfully recommend that both piers be extended out to the curve of 16 feet water in the lake, and I am in hopes that we may thus escape further trouble, at least for a time; the sand seems, however, to move out as fast as the piers are extended.

To prolong them out to 16 feet water will necessitate the addition of

400 feet to the west pier and 600 feet to the east pier, or a total length of 1,000 linear feet of crib-work, at an estimated cost of \$50,000.

The following appropriations have been made for this work up to the close of the present fiscal year:

May 20, 1826.....	\$12,000 00	March 3, 1853.....	\$42 64
May 19, 1828.....	2,403 50	June 23, 1866.....	24,708 82
March 3, 1829.....	6,940 25	March 2, 1867.....	54,000 00
March 2, 1831.....	7,015 00	March 3, 1871.....	15,000 00
July 3, 1832.....	3,800 00	June 10, 1872.....	15,000 00
March 2, 1833.....	3,400 00	March 3, 1873.....	16,000 00
June 28, 1834.....	5,000 00	June 23, 1874.....	35,000 00
March 3, 1835.....	7,591 00	March 3, 1875.....	25,000 00
March 3, 1837.....	8,000 00	August 14, 1876.....	5,000 00
July 7, 1838.....	8,000 00	June 18, 1878.....	12,000 00
June 11, 1844.....	5,000 00	March 3, 1879.....	9,000 00
August 30, 1852.....	10,000 00		

Making a total of \$289,901.21, of which amount \$272,217.91 has been expended up to the close of the present fiscal year.

The estimated cost of the present project is \$50,000, the whole of which can be profitably expended during the fiscal year ending June 30, 1881, and if appropriated will be applied to prolonging both piers out to the 16-foot curve in the lake.

The commerce of Ashtabula Harbor is rapidly increasing; there is now a large trade in coal, iron, limestone, lumber, &c., and the Lake Shore and Michigan Southern Railroad Company are making extensive improvements, constructing docks, slips, &c., anticipating a still greater increase of the commerce.

Ashtabula Harbor is in the collection district of Cuyahoga; there is a fixed white light, varied by flashes, of the fifth order, on the west pier.

Port Porter, 120 miles to the eastward, is the nearest work of defense. The amount of revenue collected during the fiscal year ending June 30, 1879, was \$805.85.

The value of the imports was \$850,827. The value of the exports was \$427,547.90. Entered during the year 343 vessels, aggregate tonnage 168,765 tons. Cleared during the year 336 vessels, aggregate tonnage 167,927 tons.

Abstracts of proposal and contracts and a financial statement are transmitted herewith.

Money statement.

July 1, 1878, amount available.....	\$13,987 15	
Amount appropriated by act approved March 3, 1879.....	9,000 00	
		\$22,987 15
July 1, 1879, amount expended during fiscal year.....	3,911 74	
July 1, 1879, outstanding liabilities.....	1,392 10	
		5,303 84
July 1, 1879, amount available.....		17,683 31
Amount (estimated) required for completion of existing project.....	50,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.....	50,000 00	

Abstract of proposals for the extension of east pier, at Ashtabula, Ohio, received and opened at United States Engineer Office, Cleveland, Ohio, at 11 o'clock a. m. September 17, 1878, under advertisement of August 8, 1878.

No.	Name of bidder.	Address of bidder.	White pine (approximate quantity 60,560 feet b. m.) per M ft., b. m.	Hemlock (approximate quantity, 125,760 feet, b. m.) per M ft., b. m.	Stone-filling (approximate quantity 400 cords), per cord.	Totals.	Remarks.
1	Kenneth McKenzie.....	Ashtabula, Ohio.....	\$17 50	\$14 50	\$4 60	\$4,723 32	Contract awarded; lowest bidder. Bid thrown out because, first, not given in duplicate; second, guaranty not filled; third, guarantors not certified to.
2	Courland D. Merry.....	Burg Hill, Ohio.....	19 75	16 95	4 70	5,207 69	
3	Farris & Garfield.....	Painesville, Ohio.....	20 00	17 00	4 75	5,249 12	
4	Franklin B. Colton.....	Philadelphia, Pa.....	21 50	18 80	4 90	5,408 16	
5	John A. Nichols.....	Syracuse, N. Y.....	20 00	18 00	5 25	5,574 88	
6	Charles H. Strong.....	Cleveland, Ohio.....	21 00	18 00	5 50	5,835 44	
7	Hemenway & Hayes.....	Painesville, Ohio.....	23 00	18 00	6 00	5,856 56	
8	Patrick Smith.....	Cleveland, Ohio.....	23 00	21 00	6 00	6,433 84	
9	Charles H. Raynor.....	Syracuse, N. Y.....	26 00	20 00	8 00	6,796 00	
10	Archibald McArthur and Orville J. Jennings.....	Chicago, Ill.; Duakirk, N. Y.....	22 00	18 00	3 50	4,371 84	
11	John Cummings and D. Van Gorder.....	Edenburg, Pa.; Cleveland, Ohio.....	20 00	14 00	3 50		

Abstract of proposals for the extension of east pier, at Ashtabula, Ohio, received and opened at United States Engineer Office, Cleveland, Ohio, at 11 o'clock a. m. September 17, 1878, under advertisement of August 8, 1878.

No.	Name of bidder.	Address of bidder.	Iron.				Total.	Remarks.	
1	Pratt & Co.	Buffalo, N. Y.	Bolts, screw and washer (approximate quantity 125 pounds), per pound.	\$0 02 1/2	Bolts, drift (approximate quantity 17,000 lbs.), per pound.	\$0 01 3/4	Spike (approximate quantity 1,500 pounds), per pound.	\$372 16	Contract awarded; lowest bidder.
2	McIntosh, Good & Co.	Cleveland, Ohio	02 65	01 95	02 7	404 20			
3	William C. Schofield	do.	03 2	01 9	02 85	404 63			
4	Cleveland Brown & Co.	do.	02 99	02 29	02 89	408 98			

Abstract of contracts for improving harbor at Ashtabula, Ohio, in force during fiscal year ending June 30, 1879.

Names and residences of contractors.	Date of contract.	Subject of contract.	Remarks.
Kenneth McKenzie, Ashtabula, Ohio. Pratt & Co., Buffalo, N. Y.	October 16, 1878. October 18, 1878.	Timber and workmanship. Iron.	Contract completed and closed December 9, 1878.
		White pine timber and plank, per M feet, b. m.	\$17 50
		Hemlock timber and plank per M feet, b. m.	\$14 50
		Stone filling per cord of 128 cubic feet.	\$4 60
		Screw-bolts, per pound.	\$0 02 1/2
		Drift-bolts, per pound.	\$0 01 1/2
		Spikes, per pound.	\$0 02 1/2

G G 18.

IMPROVEMENT OF CONNEAUT HARBOR, OHIO.

The harbor of Conneaut is formed by parallel piers extending into Lake Erie at the mouth of Conneaut River, Ohio.

Prior to the commencement of this work in 1829, under Captain Maurice, of the Corps of Engineers, Conneaut River, although deep enough inside to float the largest vessels navigating the lakes, was inaccessible on account of a sand bar across its mouth, upon which there was never more than 2 feet water, and which in summer was often dry. Captain Maurice proposed to contract the channel across the bar by parallel piers about 100 feet apart, extending out to a depth of 8 feet in the lake, and to rely upon the velocity of the current to open the channel through the bar.

These plans were afterwards greatly modified, the width of the channel being increased and other changes made.

Operations were carried on under the direction of Captain Maurice until the year 1834, when a channel 9 feet deep was obtained out into the lake; the piers were 120 feet apart until within 120 feet of their outer ends, when they flared so as to increase the width to 176 feet at the entrance.

From 1834 to 1853 operations were continued from time to time, dredging when necessary, repairing and extending the piers.

From 1853 until 1866 no work was carried on, and in the mean time the piers became badly decayed.

In June, 1866, an appropriation of \$20,513.74 was made for this harbor, and Colonel Cram, of the Corps of Engineers, who was then in charge, proposed to repair the old piers, extend the west one out to 12 feet water, and to dredge between the piers and on the outer bar to a depth of 12 feet. In the spring of 1868 a heavy freshet occurred in Conneaut River, and the water-way between the piers being obstructed by ice, the current cut through the beach at the south end of the east pier and formed a new channel 150 feet wide.

Operations were continued from time to time until the fall of 1871, closing the new channel just referred to, extending the piers, and dredging, and in October, 1871, the harbor was completed and in good order. At this time the east pier was 1,071 feet long, the west pier 791 feet long, the channel between them presenting a depth of not less than 9 feet.

Minor repairs have been made from time to time since the completion of the project up to the present date.

OPERATIONS DURING THE FISCAL YEAR.

At the opening of the fiscal year the piers were in tolerably good condition, and there was a depth of not less than 8 feet water in the channel.

In September, 1878, a severe freshet occurred in the Conneaut River; a strong current struck the east pier and undermined a large portion of it, which was broken up and ultimately washed out into the lake.

Upon assuming charge of the district, December 27, 1878, I was informed of these facts and had an immediate examination made of the harbor.

It was found that the freshet had made a breach 330 feet long in the east pier and had damaged about 150 feet more of the pier so as to neces-

sitate its entire rebuilding; the superstructure upon the west pier and upon 381 feet of the east pier was found to be badly decayed and to require renewal.

Soundings were taken through the ice along the middle line of the channel and the least depth obtained was 10½ feet at the outer end, increasing to 17 feet near the inner end of the piers.

PRESENT PROJECT.

To prevent the channel at the entrance to the harbor from being filled up by sand and gravel coming in through the breach in the east pier, and by the materials brought down by the river and deposited on account of the reduced velocity of the current at the new opening, and to restore the harbor to its former state of usefulness, the following estimate is submitted:

FOR THE EAST PIER.	
480 linear feet of pier, at \$25 per foot.....	\$12,000 00
381 linear feet of superstructure, at \$10 per foot.....	3,810 00
FOR THE WEST PIER.	
791 linear feet of superstructure, at \$10 per foot.....	7,910 00
Contingencies, 10 per cent.....	2,372 00
Total.....	26,092 00

Of this amount \$12,000 can be most profitably expended during the next fiscal year, which amount, if appropriated, will be applied to closing the breach in the east pier; a less amount than \$12,000 will do but little good, as, in order to save the harbor, the whole breach should be closed as soon as possible.

From 1829, when this work was commenced, up to the close of the present fiscal year, the sum of \$113,629.39 has been appropriated for this harbor, the whole of which has been expended. The appropriations were as follows:

March 2, 1829.....	\$7,500 00	August 30, 1852.....	\$10,000 00
April 23, 1830.....	6,135 65	June 23, 1866.....	27,513 74
March 2, 1831.....	6,370 00	March 2, 1867.....	10,000 00
July 3, 1832.....	7,800 00	April 10, 1869.....	8,910 00
June 2, 1836.....	2,500 00	July 11, 1870.....	6,000 00
March 3, 1837.....	5,000 00	March 3, 1873.....	400 00
July 7, 1838.....	8,000 00	June 23, 1874.....	1,500 00
June 11, 1844.....	5,000 00	March 3, 1875.....	1,000 00

After the harbor is again put in order it will require an annual appropriation of \$1,000 to keep it in good order.

Conneaut is in the collection-district of Cuyahoga, Ohio. There is a fixed white light of the sixth order situated on the end of the west pier.

Fort Porter, N. Y., 105 miles distant, is the nearest work of defense.

The amount of commerce and navigation to be benefited by the completion of this work is judged from the custom-house record to be very limited.

The amount of revenue collected at this port during the fiscal year was \$61.15.

There were no foreign imports or exports during the year.

Eleven vessels, with an aggregate tonnage of 1,446 tons, entered, and 13 vessels, with an aggregate tonnage of 2,017 tons, cleared during the year.

A financial estimate is transmitted herewith:

Money statement.

July 1, 1878, amount available.....	\$53 50
July 1, 1879, amount expended during fiscal year.....	53 50
Amount (estimated) required for completion of existing project.....	26,092 00
Amount that can be profitably expended in fiscal year ending June 30, 1881..	12,000 00

G G 19.

IMPROVEMENT OF ERIE HARBOR, PENNSYLVANIA.

The attention of the general government was called to this magnificent harbor on Lake Erie shortly after the close of the war of 1812, from the fact that it was here that Commodore Perry anchored his fleet after his memorable battle.

In 1819 a survey of the harbor was made and a chart prepared by Maj. John Anderson, of the Corps of Engineers. This survey developed a long low sand bar stretching across the present entrance to the channel, the entrance at that time being narrow and tortuous, with a depth of only 6 feet in the channel. Major Anderson reported this bar as "shifting in shape with very little difference in the depth of water in the channel"; he also referred to the strong currents running out of the harbor during easterly winds, and the reverse during westerly winds.

By the act of March 3, 1823, an appropriation of \$150 was made for a survey and a project for the improvement of the entrance to the harbor.

This work was placed in charge of Capt. T. W. Maurice, of the Corps of Engineers, who submitted a project for breakwaters starting from the main shore and the outer end of the peninsula at the eastern end of the harbor, approaching to within 400 feet of each other, and parallel piers running from their ends into the lake and across the bar at right angles to the breakwaters.

Work was commenced upon the project in 1824, and continued from time to time until 1852. A survey made in 1830, under Captain Williams, showed that the north breakwater was about 3,000 feet long, the south breakwater about 2,600 feet long, the north pier about 1,250 feet long, the south pier about 800 feet long, and that there was a depth of at least 16 feet on the outer bar, but only 9 feet on the bar inside. A breach had occurred on the west side of the peninsula, through which there was a channel with a least depth of about 5 feet, and piers were projected for another entrance on that side.

This westerly entrance was afterwards entirely closed, leaving the only channel the one now in use on the east side.

This work was done between the years 1852 and 1854.

In September, 1864, Colonel Cram, of the Engineers, made a careful examination of the harbor. He found the piers in a very dilapidated condition, and that the accretion of sand back of the north pier had been progressing at the rate of about 14 feet per annum since the construction of the pier, and that, having reached its outer end, the sand was being carried around it and lodged on the bar just outside the piers, pushing the channel farther to the southward and causing a shoaling in the direct line of the old channel, so that where in 1844 there was 19 feet water, in 1864 there was only 9 feet; the channel at this time was very crooked and narrow and presented a depth of only 12 feet.

Colonel Cram recommended the repair of the breakwater and piers, and the prolongation of the north pier 500 feet, the dredging of the channel to a depth of 14 feet, and the protection of the neck of the peninsula.

This recommendation was approved, and operations were commenced in 1865 and have continued from time to time up to the present season, repairing and prolonging piers, dredging channel, and strengthening and revetting the peninsula of Presqu'isle.

The harbor of Erie, the best natural one on the American side of