

Condensed table of gauge-readings kept at the light-house, Erie Harbor, Pennsylvania, from June, 1875, to June, 1879.

Year and month.	Aggregate rise or fall.	Greatest rate per hour.		Year and month.	Aggregate rise or fall.	Greatest rate per hour.	
		Rise.	Fall.			Rise.	Fall.
1875.				1877.			
June	8.65	0.14	0.18	June	5.00	0.05	0.07
July	5.70	.08	.09	July	5.45	.09	.08
August	7.50	.12	.06	August	6.45	.15	.10
September	8.30	.10	.06	September	7.20	.10	.08
October	8.70	.15	.08	October	10.75	.17	.10
November	11.45	.31	.10	November	9.15	.16	.08
December	7.30	.12	.10	December	8.85	.16	.10
1876.				1878.			
January	9.35	.07	.06	January	7.00	.06	.13
February	11.75	.33	.18	February	5.30	.13	.10
March	10.35	.11	.08	March	7.62	.08	.08
April	10.85	.26	.16	April	5.00	.08	.06
May	13.90	.32	.29	May	5.45	.05	.05
June	10.45	.19	.19	June	4.20	.09	.06
July	8.45	.27	.17	July	4.75	.09	.05
August	5.92	.09	0.45	August	6.45	.08	.05
September	9.52	.16	.15	September	6.50	.13	.12
October	13.78	.22	.18	October	8.10	.16	.08
November	9.15	.09	.21	November	8.85	.09	.08
December	8.47	.09	.09	December	12.06	.18	.10
1877.				1879.			
January	3.20	.03	.02	January	7.53	.09	.09
February	3.80	.06	.04	February	5.87	.08	.08
March	7.27	.13	.05	March	6.33	.13	.05
April	7.22	.11	.11	April	5.45	.12	.08
May	5.25	.04	.08	May	5.37	.11	.05

APPENDIX H H.

ANNUAL REPORT OF MAJOR WALTER MCFARLAND, CORPS OF ENGINEERS, FOR THE FISCAL YEAR ENDING JUNE 30, 1879.

UNITED STATES ENGINEER OFFICE,
Oscego, N. Y., September 5, 1879.

GENERAL: I have the honor to transmit herewith my annual reports for the fiscal year ending June 30, 1879, upon the river and harbor works in my charge.

Very respectfully, your obedient servant,

WALTER MCFARLAND,
Major of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A.

H H I.

IMPROVEMENT OF DUNKIRK HARBOR, NEW YORK.

Under the contract with O. J. Jennings for extending the breakwater, entered into July 5, 1877, work upon it was to have closed June 30, 1878. At that date, however, the work, though nearly through, was not quite finished, and upon Mr. Jennings's application and my recommendation, the time for its completion was extended to the 15th of July, 1878, at which date the work was finished.

After the closing of this contract and the payment of all claims arising under it, there remained a balance of \$2,500.56, which I recommended should be applied to the repair of the west pier, which was in a dilapidated condition, and this recommendation was approved by letter from the Chief of Engineers dated August 7, 1878. This work, which was begun at once and completed October 5, consisted in taking up the old plank and deck-joists, replacing them with new material, and leveling the superstructure for a distance of 993 feet shoreward from the beacon, which is at its outer and eastern extremity.

In this operation the following material was used:

Pine timber and plank	feet, b. m.	52, 125
Stone cords ..	34
Drift bolts pounds ..	334
Spike do ..	7, 626

The pier and breakwater are now in good condition.

No money has been appropriated for the improvement of this harbor

since the passage of the act of Congress approved August 14, 1876, which gave \$18,000 for this purpose.

On the 30th of October, 1878, just before the close of lake navigation, the schooner Correspondent, of Cleveland, of 500 tons, owned by John Grening, laden with about 480 tons of limestone belonging to A. H. Abell & Co., of Dunkirk, ran aground and was wrecked between the breakwater and the west pier at Dunkirk, almost entirely closing the channel of entrance to the harbor, which is only about 160 feet wide.

Under instructions from the Chief of Engineers, the owners of the vessel and the cargo were notified that it was necessary that the wreck should be removed or abandoned, and I was informed in return that both vessel and cargo were abandoned. Capt. E. P. Dorr, of Buffalo, agent of the underwriters, informed me also that there was no insurance on either.

Estimates of cost having been made for the removal of the wreck and cargo, and proposals having been called for by letter from various well-known contractors, I was authorized by letter of May 8 from the Chief of Engineers to enter into an agreement with C. F. Dunbar for the removal of the obstruction, and this was accordingly done, Mr. Dunbar agreeing to remove the wreck, cargo, and about 2,000 cubic yards of sand which had accumulated in the channel, for the sum of \$2,500 and the wreck and cargo.

This work was begun late in May and finished about the middle of June in a satisfactory manner, the channel being left in a very good condition.

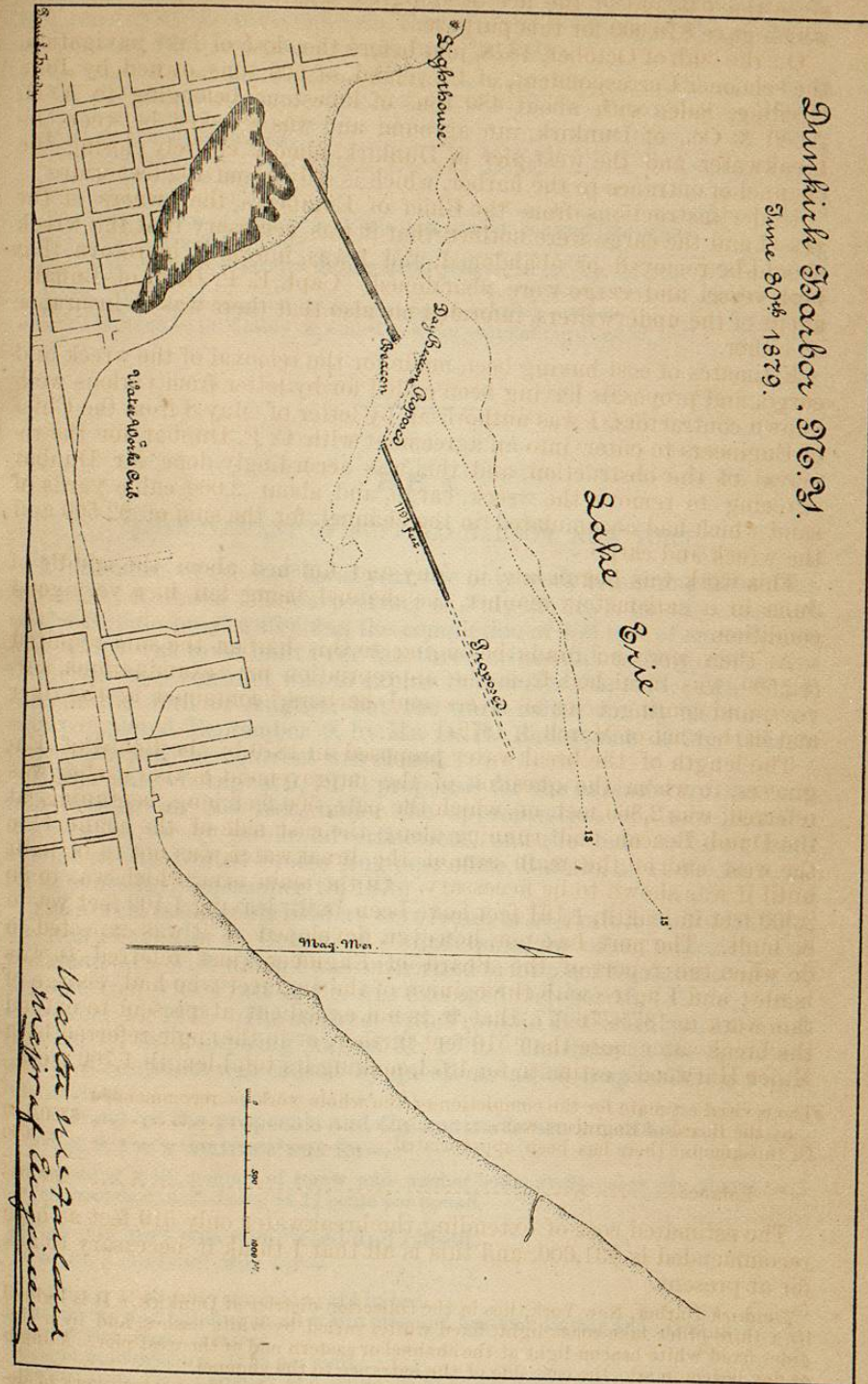
As there were no funds belonging to this harbor, the sum required (\$2,500) was furnished from the appropriation for "examinations, surveys, and contingencies of rivers and harbors," contained in the river and harbor act of March 3, 1879.

The length of the breakwater proposed in 1870 by the Board of Engineers, to whom the question of the improvement of this harbor was referred, was 2,860 feet, of which the part, 560 feet long, beginning at the Dumb Beacon and running along the east side of the channel to the west end of the main arm of the breakwater, was not to be built until it was shown to be necessary. Of the main arm, which was to be 2,300 feet in length, 1,191 feet have been built, leaving 1,109 feet yet to be built. The port has not, however, developed as it was expected to do when the report of the Board of Engineers just referred to was made; and I agree with the opinion of the engineer who had charge of this work in 1875-76-77, that it is not expedient at present to extend the breakwater more than 510 feet further, or to the angle referred to in Major Harwood's estimate for 1873, making its total length 1,700 feet.

The revised estimate for the completion of the whole work as recommended by the Board of Engineers was.....	\$350,000
Of this amount there has been appropriated.....	88,000
Balance.....	262,000

The estimated cost of extending the breakwater only 510 feet as here recommended is \$31,000, and this is all that I think it necessary to ask for at present.

Dunkirk Harbor, New York, lies in the collection-district of Dunkirk. It is lighted by a third-order lake-coast light, fixed white, varied by white flashes, and by a six-order fixed white beacon-light at the channel or eastern end of the west pier. A dumb or day beacon marks the east side of the entrance to the channel. Fort Porter, at Buffalo, N. Y., 40 miles to the eastward, is the nearest work of defense.



Dunkirk Harbor, N.Y.
June 30th 1879.

The following statement of the commerce of the port is furnished from the records of the custom-house, through the courtesy of the collector of customs, for fiscal year ending June 30, 1879:

1. Revenue collected from customs	\$8 35
2. Value of imports	\$320 31
3. Value of exports	\$4 00
4. Number of vessels cleared	53
5. Their tonnage	tons.. 12,521
6. Number of vessels entered	54
7. Their tonnage	tons.. 12,740
8. The chief articles of commerce at this port are lumber and lime stone.	
July 1, 1878, amount available	\$2,500 56
July 1, 1879, amount expended during fiscal year	2,500 56
Amount (estimated) required for completion of existing project	262,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	31,000 00

H H 2.

IMPROVEMENT OF BUFFALO HARBOR, NEW YORK.

At the close of the last fiscal year the only work remaining to be done under Mr. Ambrose Clark's contract of July 25, 1877, for the extension of the Buffalo breakwater was the completion of 150 feet of superstructure, which was to be built over the three cribs sunk in May, 1877. By its terms this contract was to expire September 30, 1878. Mr. Clark died on the 10th of August; but the work called for by his contract was completed September 9, by Mr. D. E. Bailey, one of Mr. Clark's executors, and the contract was closed.

Under date of August 9, 1878, proposals for the extension of the Buffalo breakwater 350 feet, under the appropriation of June 18, 1878, were called for by public advertisement, and the bids received were opened at the United States Engineer office, Buffalo, at 11 o'clock a. m. on Wednesday, September 18, 1878.

The lowest responsible bidders were found to be Pratt & Co., of Buffalo, for iron; Franklin B. Colton, of Philadelphia, for other materials and workmanship, with whom I was authorized to for mcontracts accordingly. The contract with Pratt & Co. was executed October 18, 1878, expiring December 15, 1878. The contract with Franklin B. Colton was executed October 29, 1878, expiring August 31, 1879. The delay in the execution of these contracts was caused by questions as to responsibility which had arisen.

Abstracts of the proposals and the contracts are herewith.

Pratt & Co.'s contract was for—

Furnishing 9,400 pounds of screw and washer bolts, at 2½ cents per pound, and 214,000 pounds of drift-bolts, at 1½ cents per pound.

This contract was completed and closed.

Colton's contract was for—

Dredging, at 40 cents per cubic yard in bed.
Furnishing and building in all white pine and hemlock timber and plank, at \$15.60 per 1,000 feet, board measure.
Gravel in foundation, at \$5 per cord.
Broken stone for foundation and filling, at \$4.10 per cord.
Riprap stone, at \$1.17 per ton.

This contract is still in course of execution.

Owing to the lateness of the season when the contract was entered into it was impossible to excavate and fill in the trench for the foundation before winter set in, as had been designed, and this work had, therefore, to be deferred until spring.

The quarrying of stone for foundation and filling and the framing of the timber cribs was, however, carried on during the winter and spring as well as the circumstances would allow, and at the close of the fiscal year 160 feet in length of the trench had been excavated, and the seven 50-foot cribs of which the under-water work is to be composed were nearly completed, four of them being ready for sinking.

An additional difficulty has been encountered in the unexpected depth to which the dredging has to be carried. The depth of water in which the cribs have to be sunk averages 30 feet; and below this preparations had been made for the removal of 10 feet of mud and soft material overlying the hard bottom upon which the foundation is to be placed, but it is found that the depth of this soft material has increased to 19 feet, which requires the use of a very long dipper-handle, and subjects the dredging-machine to very great strains and delays work.

For these two reasons it is probable that an extension of the time for the completion of the contract will be needed and ought to be allowed.

The total length of breakwater now completed is 3,076 feet, and by the close of this working season this will be increased 350 feet.

In my last annual report it was erroneously stated that the total length of this breakwater was to be 4,000 feet. This is the length which it was originally designed to give it under General Cram's scheme, which in this respect was recommended by a Board of Engineers in their report upon the improvement of Buffalo Harbor, dated January 23, 1868, which was approved by the Chief of Engineers April 3, 1868.

Subsequently, however, another Board of Engineers, convened for the further discussion of the improvement of this harbor, recommended, in a report dated August 6, 1874, to be found at page 569, Part II, Annual Report of the Chief of Engineers for the fiscal year ending June 30, 1876—

	Feet.
That this breakwater be extended to a length of	7,600
That a pile-pier 10 feet wide be run from a point in the shore line opposite the head of the Blackwell Canal perpendicularly to the shore until it reached the 16-foot curve, a distance of about	1,000
And that from its outer end a crib-work structure be built towards the proposed south end of the outer breakwater, a distance of about	3,100
Leaving a channel between its outer end and the south end of the breakwater of about	150

The pile-work is designated as the south pile-pier, to distinguish it from the south pier, which lies on the south side of the mouth of Buffalo Creek.

The estimated cost of the work proposed by this Board was \$2,000,000 This scheme was approved by the Secretary of War October 3, 1874

	Feet.
Length of breakwater ordered	7,600
Now built	3,076
Remaining to be built	4,524
Length of south pile-pier ordered	1,000
Now built	870
Remaining to be built	130
Length of crib-work continuation ordered—none built	3,100

The total estimated cost of this work	\$2,000,000
Of this, there was appropriated—	
By act of March 3, 1875	\$100,000
By act of August 14, 1876	85,000
By act of June 18, 1878	80,000
By act of March 3, 1879	100,000
Total	365,000
Balance yet to be appropriated	1,635,000

The estimated average cost of the construction of the breakwater per linear foot was \$230.

Prices have so fallen, however, since this estimate was made that the cost of the addition of 150 feet, made under the contract with Ambrose Clark, completed this year, was but \$148 per linear foot.

Though lower rates yet have been secured in the contract last made, the rate per linear foot will probably be increased by reason of the greatly-increased depth to which we have to go before finding hard bottom.

In the fall of last year, a letter, written by the master of a lake vessel, was referred to me from the Office of Chief of Engineers, in which the writer expressed his dissatisfaction with the Buffalo breakwater, stating that it was so low that the waves rolled over it in stormy weather so as to make a heavy sea inside it, rendering it unsafe for a heavily-laden vessel to lie there, and recommending that the breakwater be raised higher, and that a long riprap slope be built outside of it to break the waves and prevent this action.

In order to get the views of the lake sailors as to the efficiency and usefulness of the breakwater, I directed Assistant Engineer George U. Mayo, inspector of harbor works at Buffalo, to go among them and to endeavor to ascertain what are their real and unbiased opinions on this subject.

I subjoin a copy of his letter, giving the results of his inquiry, from which it will be seen that the general opinion seems to be that the breakwater is high enough, but not long enough, and this is in accordance with my own opinion.

The heavy sea behind the breakwater, which was complained of, was probably caused by the outside swell working around the ends of the breakwater, for it is incredible that it could have been caused by the comparatively small quantity of water that passes over its top.

LETTER OF MR. GEORGE U. MAYO, INSPECTOR.

UNITED STATES ENGINEER OFFICE,
Buffalo, July 4, 1879.

MAJOR: In accordance with instructions given me by you, I have asked casually the opinion of nautical men named below concerning the efficiency of the new United States breakwater here.

Without exception they spoke in terms of commendation of it. They say it is sufficiently high, and gives safe protection to vessels under its lee, the water being never rough there, though they will not like to come to anchor in great gales lest they drag ashore; but no practicable height of structure can be made to provide against defective holding-ground. They think it is not long enough.

Capt. Owen Doyle, schooner La Frierier; been 21 years on the lakes, 18 a master.
Capt. James Drake, steamer Buffalo, Western Transportation Company; tonnage, 1,730; 29 years on the lakes as seaman and master.

Capt. J. W. Fairwell, barge Orontes, 551 tons; has been sailing on the lakes for many years as seaman and master.

Capt. Daniel Robertson, master of brigantine C. C. Breed; has been seaman, officer, and master on the lakes and on ocean voyages to all quarters since 1852.

William Bryben, schooner Helen Pratt, and mate of that vessel; has been 30 years^s on the lakes, and on extended foreign ocean voyages.

Captain Cowles, Steam Tug Association here; has been on the lakes for years.

Captain Bryant, Steam Tug Association here; has been at this and other ports on the lakes for years.

These men all say the breakwater gives ample protection at its present height. Seas break over it and disperse themselves on its top. The tug captains see more of this work, perhaps, than other persons; are taking advantage of its lee in all kinds of weather, at all seasons, and at all hours, night and day, and have a business interest in seeing it well built and complete.

Captain McKenzie, of the United States light-house tender Haze, says it is safe in all particulars for marine.

Independent of what professional knowledge may be mine about such works, I may be permitted to say that at no time during 16 months of service here, whenever heavy gales were blowing, has the sea been too rough under the breakwater for even a good weatherly boat. I have been much at sea and have laid at anchor safely in places far more exposed (under coral reefs).

Of several artificial harbors seen by me in European countries, this one compares favorably with them, though less expensively constructed.

All the above persons say the work should be extended.

Very respectfully, major, your obedient servant,

GEO. U. MAYO.

Maj. WALTER MCFARLAND,
Corps of Engineers, U. S. A.

I judge from this that the writer of the complaint must have tied his vessel up against the breakwater where he ought not to have been, and where he could not expect to find a comfortable berth.

In the early part of last year I was informed by Mr. Mayo, the inspector of harbor work at Buffalo, that the Delaware, Lackawanna and Western Company were encroaching upon the north United States pier at Buffalo, and filling in behind it in such a way as to render useless the government structures there, viz, the boat-house belonging to the light-house service, the life-saving station, and the engineer boat-house, on the ground that the United States possessed no title to the site, and that title was their own through purchase.

This matter was reported to the Chief of Engineers on the 17th of August, 1878, and on the 3d of September I was informed that the Acting Attorney-General of the United States had "instructed the United States district attorney for the northern district of New York to take such action in the matter as he may deem necessary."

No action, however, appearing to have been taken, and the encroachment continuing and increasing, on the 29th of March, 1879, under instructions from the Chief of Engineers, I wrote to the United States district attorney for the northern district of New York, informing him of the condition of affairs, and, in answer, was informed by the newly-appointed district attorney that the correspondence with his predecessor regarding the matter was before him, and that it would receive his attention as soon as possible.

Under date of May 20, he wrote me to the effect that he was making every effort to investigate the title, but with little success so far; and, in response, I gave him all the information that I had about it, which amounted to this, that the United States had been in undisputed possession of the site for over 50 years—ever since 1826, when the first appropriation for this harbor was made, and had built on, extended, and repaired this pier ever since as the interests of the harbor and of the government seemed to require.

This is the last of the correspondence on the subject.

In the mean while, the Delaware, Lackawanna and Western Company have gone on filling in behind the pier; have rendered useless the boat-house belonging to the light-house service and the life-saving station,

which, at great expense, are to be moved across the creek to the light-house reservation, and threaten to drive us out of our engineer boat-house at the end of the pier, which we can now reach only by passing through a fence which they have erected to shut off the pier and the space behind it from the public street.

The pier itself is in daily use as a wharf for the shipment of coal which they have stored on the filled ground behind it, while the contractor for the breakwater extension has been forbidden to use it for the storing and framing of timber, as has always been allowed by the United States ever since the work first began.

This condition of affairs is not creditable to the government, which ought to enforce at least as much respect for its rights as would be claimed by an individual. The United States east pier at Cleveland, Ohio, was seized in the same way by a coal corporation some years ago, so that the government itself could not have the use of it at a time when it needed it. There is no doubt that as a city grows and its wants increase, a public work that has been maintained by the government until it has served its purpose, and is no longer needed, should be abandoned to the city's use; but this should be done legally and decently, and not in the unscrupulous way in which these two corporations have gained possession. It is probable that many such questions may arise in future concerning titles to lands under water which have been occupied in the public interest by government piers and breakwaters at a time when the sites were absolutely valueless, and which would have remained without value but for these works of protection undertaken by the government. I think therefore that attempts should be made at once to secure titles to such sites as have already been so occupied, and that none of the public money should be applied to the repair or extension of such works until the titles are so secured.

The laws of the United States now forbid the expenditure of the public money upon new structures until titles are secured to the sites upon which they are to be erected, and it would be an act of wisdom to make the prohibition apply to any works already begun, no matter how old, the titles to whose sites have not been already secured to the United States.

Buffalo Harbor is situated within the collection-district of Buffalo Creek. It is lighted by a third-order fixed white light at the outer end of the south pier; a fixed red fourth-order light at the north end of the breakwater; and a fixed white light of the fourth order varied with white flashes on Horse-Shoe Reef, at the entrance to the Niagara River.

Fort Porter is within the city limits, on the Niagara River.

The following statement of the commerce of the port for the fiscal year ending June 30, 1879, is, by the courtesy of the collector of customs, furnished from the records of the custom-house:

1. Revenue from customs	\$401,731 01
2. Value of imports	\$3,117,767 00
3. Value of exports	\$222,665 00
4. Number of vessels cleared	3,947
5. Their tonnage	tons.. 2,108,902
6. Number of vessels entered	3,796
7. Their tonnage	tons.. 2,094,323
8. Probable number of arrivals and departures of vessels which do not enter and clear	200
9. Chief articles of commerce, grain and lumber.	

It is expected that before the passage of the next river and harbor appropriation bill nearly the whole amount now available will be expended.

Money statement.

July 1, 1878, amount available.....	\$92, 113 01
Amount appropriated by act approved March 3, 1879.....	100, 000 00
	\$192, 113 01
July 1, 1879, amount expended during fiscal year.....	13, 220 45
	178, 892 56
July 1, 1879, amount available.....	1, 635, 000 00
Amount (estimated) required for completion of existing project.....	300, 000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881	

Abstract of proposals for the extension of Buffalo Breakwater received and opened at United States Engineer Office, Buffalo, N. Y., at 11 o'clock a. m., September 18, 1878, under advertisement of August 9, 1878.

Number.	Name and address of bidder.	White pine, approximate quantity, 335,720 feet, b. m.	Hemlock, approximate quantity, 838,200 feet, b. m.	Gravel, approximate quantity, 1,000 cords.
1	Pratt & Co., Buffalo, N. Y. Guarantors: F. L. Danforth, Buffalo, N. Y., David E. Brown, Buffalo, N. Y.			
2	McIntosh, Good & Co., Cleveland, Ohio. No guarantors given.			
3	Cleveland, Brown & Co., Cleveland, Ohio. Guarantors: Frank Wilson, Cleveland, Ohio, William M. Maxon, Cleveland, Ohio.			
4	J. W. Cummings and M. W. Cummings, Edensburg, Pa. Guarantors: Michael Brennan, Edensburg, Pa., E. M. Brown, Edensburg, Pa.	At \$19 per 1,000 ft., b. m., \$6,378.68.	At \$14 per 1,000 ft., b. m., \$11,734.80.	At \$1.25 per cord, \$1,250.
5	Franklin B. Colton, Philadelphia, Pa. Guarantors: John O. Evans, Washington, D. C., John G. Moore, New York City.	At \$15.60 per 1,000 ft., b. m., \$5,237.23.	At \$15.60 per 1,000 ft., b. m., \$13,075.92.	At \$5 per cord, \$5,000.
6	S. Gibson, Buffalo, N. Y. Guarantors: John H. Montgomery, Buffalo, N. Y., Samuel McCutcheon, Buffalo, N. Y.	At \$18 per 1,000 ft., b. m., \$6,042.96.	At \$14.25 per 1,000 ft., b. m., \$11,944.35.	At \$3.50 per cord, \$3,500.
7	Archibald McArthur, Chicago, Ill., and Orville J. Jennings, Dunkirk, N. Y. Guarantors: George M. Case, Fulton, N. Y., Willard Johnson, Fulton, N. Y.	At \$19 per 1,000 ft., b. m., \$6,378.68.	At \$16 per 1,000 ft., b. m., \$13,411.20.	At \$5 per cord, \$5,000.
8	D. E. Bailey, Buffalo, N. Y. Guarantors: George Talbot, Buffalo, N. Y., George D. Briggs, Buffalo, N. Y.	At \$18 per 1,000 ft., b. m., \$6,042.96.	At \$15 per 1,000 ft., b. m., \$12,573.	At \$5 per cord, \$5,000.
9	Hickler & Arnoldt, Buffalo, N. Y. Guarantors: Isaac Holloway, Buffalo, N. Y., C. J. Wells, Buffalo, N. Y.	At \$22 per 1,000 ft., b. m., \$7,385.84.	At \$15 per 1,000 ft., b. m., \$12,573.	At \$2.75 per cord, \$2,750.
10	J. A. Nichols, Syracuse, N. Y. Guarantors: Cephas C. Barker, Syracuse, N. Y., Nelson L. Williams, De Witt, N. Y.	At \$19.75 per 1,000 ft., b. m., \$6,630.47.	At \$16.50 per 1,000 ft., b. m., \$13,830.30.	At \$5 per cord, \$5,000.
11	Farris & Garfield, Painesville, Ohio. Guarantors: Daniel Warner, Jr., Painesville, Ohio, Julius E. French, Cleveland, Ohio.	At \$18 per 1,000 ft., b. m., \$6,042.96.	At \$16 per 1,000 ft., b. m., \$13,411.20.	At \$3.50 per cord, \$3,500.
12	C. E. Williams, Buffalo, N. Y. Guarantors: William J. Williams, Buffalo, N. Y., D. McNaughton, Buffalo, N. Y.	At \$20 per 1,000 ft., b. m., \$6,714.40.	At \$18 per 1,000 ft., b. m., \$15,087.60.	At \$7 per cord, \$7,000.
13	A. F. Bennett, Buffalo, N. Y. Guarantors: Andrew Spalding, Buffalo, N. Y., Lewis J. Bennett, Buffalo, N. Y.	At \$21 per 1,000 ft., b. m., \$7,050.12.	At \$17 per 1,000 ft., b. m., \$14,249.40.	At \$3 per cord, \$3,000.
14	E. F. DeGraw, Fulton, N. Y. Guarantors: Willard Johnson, Fulton, N. Y., S. B. Whitaker, Fulton, N. Y.	At \$22 per 1,000 ft., b. m., \$7,385.84.	At \$18 per 1,000 ft., b. m., \$15,087.60.	At \$4 per cord, \$4,000.
15	Walter Doty, Fort Edward, N. Y. Guarantors: Anson Bangs, Brooklyn, N. Y., John Doty, New York City.	At \$23 per 1,000 ft., b. m., \$7,721.56.	At \$21 per 1,000 ft., b. m., \$17,602.20.	At \$4.41 per cord, \$4,410.
16	Charles H. Raynor, Syracuse, N. Y. Guarantors: Henry D. Denison, Syracuse, N. Y., A. Cadwell Belden, Syracuse, N. Y.	At \$26 per 1,000 ft., b. m., \$8,728.72.	At \$20 per 1,000 ft., b. m., \$16,764.	At \$6 per cord, \$6,000.

Abstract of proposals for the extension of Buffalo Breakwater, &c.—Continued.

Number.	Name and address of bidder.	Stone, broken and filling, approximate quantity, 3,700 cords.	Stone, riprap, approximate quantity, 1,500 tons.	Dredging, approximate quantity, 7,000 cubic yards.
1	Pratt & Co., Buffalo, N. Y. Guarantors: F. L. Danforth, Buffalo, N. Y., David E. Brown, Buffalo, N. Y.			
2	McIntosh, Good & Co., Cleveland, Ohio. No guarantors given.			
3	Cleveland, Brown & Co., Cleveland, Ohio. Guarantors: Frank Wilson, Cleveland, Ohio, William M. Maxon, Cleveland, Ohio.			
4	J. W. Cummings and M. W. Cummings, Edensburg, Pa. Guarantors: Michael Brennan, Edensburg, Pa., E. M. Brown, Edensburg, Pa.	At \$3.85 per cord, \$14.245.	At 90 cents per ton, 2,240 lbs., \$1,350.	At 75 cents per cubic yard, \$5,250.
5	Franklin B. Colton, Philadelphia, Pa. Guarantors: John O. Evans, Washington, D. C., John G. Moore, New York City.	At \$4.10 per cord, \$15,170.	At \$1.17 per ton, 2,240 lbs., \$1,755.	At 40 cents per cubic yard, \$2,800.
6	S. Gibson, Buffalo, N. Y. Guarantors: John H. Montgomery, Buffalo, N. Y., Samuel McCutcheon, Buffalo, N. Y.	At \$4.45 per cord, \$16,465.	At 90 cents per ton, 2,240 lbs., \$1,350.	At 60 cents per cubic yard, \$4,200.
7	Archibald McArthur, Chicago, Ill., and Orville J. Jennings, Dunkirk, N. Y. Guarantors: George M. Case, Fulton, N. Y., Willard Johnson, Fulton, N. Y.	At \$3.75 per cord, \$13,875.	At \$1.10 per ton, 2,240 lbs., \$1,650.	At \$1 per cubic yard, \$7,000.
8	D. E. Bailey, Buffalo, N. Y. Guarantors: George Talbot, Buffalo, N. Y., George D. Briggs, Buffalo, N. Y.	At \$4.50 per cord, \$16,650.	At \$1.50 per ton, 2,240 lbs., \$2,250.	At 70 cents per cubic yard, \$4,900.
9	Hickler & Arnoldt, Buffalo, N. Y. Guarantors: Isaac Holloway, Buffalo, N. Y., C. J. Wells, Buffalo, N. Y.	At \$5.35 per cord, \$19,795.	At \$1.50 per ton, 2,240 lbs., \$2,250.	At 50 cents per cubic yard, \$3,500.
10	J. A. Nichols, Syracuse, N. Y. Guarantors: Cephas C. Barker, Syracuse, N. Y., Nelson L. Williams, De Witt, N. Y.	At \$5.50 per cord, \$20,350.	At \$1.15 per ton, 2,240 lbs., \$1,725.	At 20 cents per cubic yard, \$1,400.
11	Farris & Garfield, Painesville, Ohio. Guarantors: Daniel Warner, Jr., Painesville, Ohio, Julius E. French, Cleveland, Ohio.	At \$5 per cord, \$18,500.	At \$1.50 per ton, 2,240 lbs., \$2,250.	At 75 cents per cubic yard, \$5,250.
12	C. E. Williams, Buffalo, N. Y. Guarantors: William J. Williams, Buffalo, N. Y., D. McNaughton, Buffalo, N. Y.	At \$4.25 per cord, \$15,725.	At \$1.75 per ton, 2,240 lbs., \$2,625.	At 30 cents per cubic yard, \$2,100.
13	A. F. Bennett, Buffalo, N. Y. Guarantors: Andrew Spalding, Buffalo, N. Y., Lewis J. Bennett, Buffalo, N. Y.	At \$5.50 per cord, \$20,350.	At \$1 per ton, 2,240 lbs., \$1,500.	At 45 cents per cubic yard, \$3,150.
14	E. F. DeGraw, Fulton, N. Y. Guarantors: Willard Johnson, Fulton, N. Y., S. B. Whitaker, Fulton, N. Y.	At \$5 per cord, \$18,500.	At 80 cents per ton, 2,240 lbs., \$1,200.	At 60 cents per cubic yard, \$4,200.
15	Walter Doty, Fort Edward, N. Y. Guarantors: Anson Bangs, Brooklyn, N. Y., John Doty, New York City.	At \$6.73 per cord, \$24,901.	At \$1.71 per ton, 2,240 lbs., \$2,565.	At 47 cents per cubic yard, \$3,290.
16	Charles H. Raynor, Syracuse, N. Y. Guarantors: Henry D. Denison, Syracuse, N. Y., A. Cadwell Belden, Syracuse, N. Y.	At \$6 per cord, \$22,200.	At \$1.35 per ton, 2,240 lbs., \$2,025.	At \$1 per cubic yard, \$7,000.