

There were about 6,000 cords of bark, 700 cords of wood, 16,000 railroad ties, some cedar, and the balance lumber. I am satisfied that some day there will be a harbor here, and if it could be done soon it would save to the people several times its cost.

Taking it from 16 feet of water inside to the same outside, I should think the distance from 700 to 900 feet, and each way then goes into deep water; so there would be no sand to be brought down from the bed of a river higher than the channel and deposited at its mouth, as in many of the harbors, but a connecting link between the big lake and a bay. The neck of land between the lakes is very high and timbered, and the lake completely land-locked. In regard to its value for outside vessels in a storm, I am told by vessel captains, especially those who come from the other lakes, that a good harbor here would be a great relief; for, as they pass Point Betsey, they are afraid to keep this shore, even though the wind may be such that it would be still water, as it is a sort of bay (see map), and should the wind shift into the west they could not work off, while if there was a channel here they could run in. I am told that several vessels have been lost trying this experiment; even enough between Frankfort and Manistee to build several harbors; and should you think it would be advantageous I would get statistics, and also the statements of vessel-men in regard to it.

Feeling, as I do, that it is a much-needed improvement, and that it will ultimately be accomplished, I wish fairly to put the matter in shape and try to have it done while it will do the most good; and I sincerely hope that before reporting—at least unfavorably—you will endeavor to come here and see it yourself.

Were it some hole in which to put public money that would do no good, or to only a few, I could not conscientiously take part in it, and shall be ready at any time to assist all I can in giving you correct information in regard to it. Anything which I may have omitted or blindly represented, I shall take pleasure in explaining.

We find that our log piers are not sand-proof, and occasionally one goes out and nearly fills the channel up; but when we can keep them in shape the water keeps pretty good channel.

Very truly, yours,

Maj. S. M. MANSFIELD,
Corps of Engineers

A. W. FARR.

APPENDIX E E.

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

(Letter of transmittal under Appendix U.)

E E I.

IMPROVEMENT OF SAINT MARY'S RIVER AND SAINT MARY'S FALLS CANAL, MICHIGAN.

The progress of this work during the past fiscal year is given in the appended report of Mr. Alfred Noble, assistant engineer, who has been from its commencement in immediate charge of this work.

A full history of this improvement was given in my annual report for the fiscal year ending June 30, 1877, and appears in the Report of the Chief of Engineers, 1877, Part II, pages 922-924. In the appended report of Mr. Noble the history is brought up to date.

With regard to the transfer of this work, to the general government, I have to report that on January 11, 1879, I addressed a communication to the Chief of Engineers, of which the following is a copy:

UNITED STATES ENGINEER OFFICE,
Detroit, Mich., January 11, 1879.

GENERAL: I have the honor to state that in the annual report of the improvement of the Saint Mary's Falls Canal, Michigan, for the fiscal year ending June 30, 1878, my assistant, Capt. A. Mackenzie, Corps of Engineers, at my suggestion, referred to the transfer of this canal in the following language:

"The time has arrived when it is desirable for the good of the improvement that the management and control of the present canal should pass into the hands of the government. To ascertain the present amount of the canal debt, which, in accordance with act of the Michigan legislature, is to be assumed by the United States as the only condition of transfer, a correspondence, of which the following is a copy, was entered into with his excellency Governor Croswell, of Michigan:

"UNITED STATES ENGINEER OFFICE,
"Detroit, Mich., April 30, 1878.

"SIR: With a view of recommending in my next annual report the acceptance of the Saint Mary's Falls Canal in accordance with the joint resolution of the Michigan State legislature, approved April 3, 1869, I would respectfully ask for information as to the terms upon which the transfer will now be made and the amount of the indebtedness to be assumed by the government.

"Very respectfully, your obedient servant,

"G. WEITZEL,
"Major of Engineers.

"His Excellency CHAS. M. CROSWELL,
"Governor of Michigan.

"STATE OF MICHIGAN,
"EXECUTIVE OFFICE,
"Adrian, May 1, 1878.

"SIR: I have yours of the 30th ultimo, asking information as to the terms upon which the Saint Mary's Falls Canal will be transferred to the United States, together with

the amount of the indebtedness to be assumed by the general government. I will call the attention of the Canal Board at its next meeting to the subject and advise you of the action taken in reference thereto.

"Yours, very respectfully,

"CHAS. M. CROSWELL.

"General. G. WEITZEL,
"Major of Engineers, U. S. A."

As no further information has been furnished, it is probable the Board of Control has not yet taken action in the matter. In his annual message to the legislature of this State at its thirtieth regular session, January 2, 1879, Governor Croswell says the following, viz:

"The 23d of June last marks a quarter of a century since ground was broken for the construction of the Saint Mary's Falls Ship-Canal. The tonnage passing through it has increased from 106,296 tons in 1855 to 1,439,215 tons in 1877, and 1,637,136 tons in 1878. Its gross yearly revenues during the same time have multiplied by ten, being \$44,351.43 in 1877, and \$49,437 in 1878. More than 5,000 vessels, many of them of large tonnage, passed its locks in the two seasons referred to, making an average passage of one boat every two hours and ten minutes during the time of navigation. The general government is now building additional locks for the purpose of enlarging and increasing the capacity of the canal, and such progress is being made that the work promises to be fully completed within the next two years. The legislature of 1869, by joint resolution, authorized the board of control to transfer the canal to the United States, on the payment of all outstanding indebtedness incurred by the State in the construction or management thereof. The indebtedness of the canal, which the State treasury is pledged to pay, is \$46,000, and the amount standing to its credit on the books of the treasurer is \$74,532.12. The canal debt is thus fully provided for, and will be extinguished as rapidly as it falls due, and before if the bonds can be purchased. Its financial condition, therefore, is such that it may at any time be transferred to the United States."

On January 9, 1879, the following joint resolution was introduced in the legislature:

"JOINT RESOLUTION authorizing the Board of Control of the Saint Mary's Fall Ship-Canal to transfer said canal to the United States.

"Whereas the advances heretofore made by the State of Michigan to aid in the construction of the Saint Mary's Falls Ship-Canal have been fully repaid by the receipt of tolls; and whereas the work is of great national importance, and upon which several millions of dollars have been expended by the United States; and whereas it is deemed that the best interests not only of this State, but of the entire commerce of the lakes, will be promoted by having this great public improvement under the immediate supervision of the general government, thereby rendering it free to all American vessels: Therefore,

"Resolved by the Senate and House of Representatives of the State of Michigan, That the board of control of the Saint Mary's Falls Ship-Canal be, and it is hereby, authorized and directed to transfer the said canal with all its appurtenances, and all the right and title in and to the same to the United States.

"Resolved, That our Senators be instructed and our Representatives be requested to use their influence to secure such action upon the part of the general government as may be necessary to effect the transfer."

I am informed that this resolution will pass. I therefore deem it my duty to call the attention of Congress to this matter, and to urge that such action may be taken that the transfer may be speedily made.

I have no especial desire to operate the canal, but it is very important that the government should have exclusive control of it at the earliest possible moment, so that we can open or close it for some work still to be done at the proper time, and without, as heretofore, being subject to the directions of the Governor of the State or the Board of Control.

Very respectfully, your obedient servant,

G. WEITZEL,
Major of Engineers.

Brig. Gen. A. A. HUMPHREYS,
Chief of Engineers, U. S. A.

I regret to report that the act for the transfer was not passed by the Michigan legislature, nor did Congress take any action thereon.

It will be seen from Mr. Noble's report that progress on the work was very satisfactory during the working season of last year. But nearly

one-half of the working season of this year has been lost because the appropriation made by Congress at its last session could not be made available until July 1, 1879. This has thrown the construction of the gates, machinery for operating them, and the excavation necessary to unite the new lock with the main prism of the canal back one whole season, and will delay the opening of this necessary aid to commerce just that long.

The lock walls will be completed during this season.

In order to complete this work according to the project, there remains to be appropriated \$195,000.

For the sake of an economical and rapid prosecution of the work the entire sum should be appropriated for the fiscal year ending June 30, 1881.

The gates and machinery for operating them will be constructed by hired labor and purchase of material in open market. The south pier at the head of the canal will be built by hired labor, and the purchase of material partly in open market and partly by contract.

The operations contemplated in the fiscal year 1879-'80 are to complete the masonry of the new locks, build the gates and machinery for operating them, complete the pump-house, complete the excavation at the head for straightening the canal, and to continue work on the new south pier at the head of the canal.

The whole amount appropriated since this improvement was begun is as follows, viz:

1870	\$150,000	1876	\$130,000
1871	350,000	1878	175,000
1872	300,000	1879	300,000
1873	200,000		
1874	200,000	Total	2,005,000
1875	200,000		

Of this amount about \$615,000 was expended before and during the excavation of the pit for the new locks, in widening and deepening the canal proper, revetting the sides of the enlarged canal, purchase of additional lands, straightening the canal, and building new south pier at the head, and improving Saint Mary's River.

Of the other \$1,390,000, about \$855,000 have been expended on the lock; about \$135,000 were on hand at the end of the fiscal year, and the \$300,000 appropriated by Congress at its last session was made available July 1, 1879.

Of the amount on hand at the end of the fiscal year, the sum of \$135,000 is covered by liabilities under contracts and is therefore not available for work which still remains to be done.

Of the amount appropriated for this work by Congress at its last session, \$100,000 was set apart for the survey and improvement of the Saint Mary's River. I was authorized to proceed with the survey in June, and it is now progressing well. I hope to be able to start the work on the improvement of that portion of the river which lies above the canal during the present season.

This work is located in the Superior collection-district, Michigan, at the Sault Ste. Marie, subport of entry, and a short distance from Fort Brady. The nearest light-house is at Round Island, and the nearest port of entry is Marquette, Mich. The amount of money collected in the Superior district the last fiscal year was \$10,331.95.

The whole commerce of the great chain of northern and northwestern lakes will be benefited by the completion of this work.

Money statement.

July 1, 1878, amount available.....	\$344,667 62
Amount appropriated by act approved March 3, 1879.....	300,000 00
	\$644,667 62
July 1, 1879, amount expended during fiscal year.....	208,886 31
	435,781 31
July 1, 1879, amount available	435,781 31
Amount (estimated) required for completion of existing project	195,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	195,000 00

REPORT OF MR. ALFRED NOBLE, ASSISTANT ENGINEER.

SAULT STE. MARIE, MICH., July 1, 1879.

MAJOR: I have the honor to submit the following report of operations at the Saint Mary's Falls Canal and on the Saint Mary's River during the year ending June 30, 1879.

At the beginning of the year there were three contracts existing, one with Henry Van Vleck for furnishing face stone for the new lock, one with Boyle & Roach for furnishing backing and laying masonry for the same and for earth filling behind the walls, and one with C. S. Barker for dredging for the enlargement at the head of the canal from the line of the new south pier to the present channel. The construction of the new south pier was continued with hired labor.

Two contracts were made for timber for continuing the pier work, one with Larkin & Patrick, November 8, 1878, and one with E. A. Wetmore & Co., November 11, 1878.

The amounts of work performed and materials delivered during the year was as follows:

Under the contract dated May 29, 1875, 9,779.14 cubic yards of masonry have been laid, and 4,417 cubic yards of earth filling placed behind the walls of the new lock.

Under the contract dated May 11, 1876, 79,766.98 cubic feet of face stone have been delivered.

Under the contract dated July 9, 1877, 28,417 cubic yards of earth and bowlders have been dredged.

Under the contract dated November 11, 1878, 16,557 cubic feet of timber have been delivered.

Under the contract dated November 8, 1878, no timber has been delivered, the contractors being in default.

For the new south pier at the head of the canal 255 linear feet of crib-work has been built, and 375 linear feet placed. The superstructure has been commenced.

The cement for the walls of the new lock has been purchased in open market; 5,567 barrels have been received.

At the head of Rain's Island the navigable channel of the Saint Mary's River has been enlarged and dredged to 13 feet of water.

The party for the survey of the channel of the Saint Mary's River now navigated has been organized and the work commenced.

The improvement of the canal was commenced in 1870. During the next four years, under contracts with Barker, Williams & Bangs, and Barker & Williams, the slope walls were removed, the canal revetted with timber and deepened from 12½ to 16 feet from the head of the canal eastward to within 1,000 feet of the locks, and the guard gates and masonry removed and replaced 700 feet west of their original position.

From 1873 to the present time Boyle & Roach have been employed excavating the lock-pit, laying the foundation for and building the masonry of the new lock, the face stone therefor having been furnished by Henry Van Vleck. The lock will be completed during the present season.

From November, 1874, to May, 1876, C. C. Barker & Son made the necessary excavation and completed the revetment of the north side of the canal and built 530 linear feet of pier for the south side at the east end of the canal.

Since the 1st of August, 1877, C. S. Barker has been employed making the excavation for the enlargement of the canal at the head.

During the season of 1877 and 1878 the construction of a new south pier at the head of the canal has been carried on by hired labor; 1,444 linear feet of crib-work has been placed and the superstructure commenced.

With the funds available for the canal during the year ending June 30, 1880, it is proposed to build gates, operating machinery and machine-house, and excavate and revet the approaches to the new lock, and complete existing contracts. With the funds available for the survey and improvement of the river it is proposed to complete the survey and to let contracts for the improvement of the channel as rapidly as practicable.

With the funds to be asked for for the improvement of the canal during the fiscal

year ending June 30, 1881, it is proposed to complete the enlargement at the upper end of the canal, and build a movable dam near the head of the canal and guard gates at the head of the old locks.

A tracing of the map of the canal and a diagram showing the stage of water during the last year are inclosed.

Very respectfully, your obedient servant,

ALFRED NOBLE,
Assistant Engineer.

Maj. G. WEITZEL,
Corps of Engineers, U. S. A.

Abstract of bids for furnishing timber for Saint Mary's Falls Canal, received and opened by Maj. G. Weitzel, Corps of Engineers, on October 21, 1878.

Number.	Names.	Residence.	Lot 1, per cubic foot.	Lot 2, per cubic foot.	Lot 3, per cubic foot.	Lot 4, per cubic foot.
1	E. A. Wetmore, & Co	Marquette, Mich	\$0 14½	\$0 14½	\$0 15½	\$0 14½
2	Larkin & Patrick	Midland City, Mich	14½	14½	14½	14½
3	John L. Woods	Cleveland, Ohio	17½	16½	15	17
4	William McArthur	Cheboygan, Mich	17½	16½	16	17
5	Frank Perry	Sault Ste. Marie, Mich	20½	15½	14½	16½
6	Hursley & Powell	Marquette, Mich	18	18	15	15
7	Joel Gillett	do	18	18	18	18
8	Oscoda Salt and Lumber Co	Oscoda, Mich	18	19	18	20

Abstract of contracts entered into during fiscal year ending June 30, 1879, for work on Saint Mary's Falls Canal.

Number.	Names of contractors.	Kind of work.	Price per cubic foot.
1	E. A. Wetmore & Co	Furnishing timber	\$0 14½
2	Larkin & Patrick	do	14½

E E 2.

CONSTRUCTION OF HARBOR OF REFUGE, LAKE HURON, MICHIGAN.

The progress on this work during the last fiscal year and its history from the beginning are given in the appended report of Mr. C. P. Gilbert, assistant engineer, in local charge.

We began keeping the counts of vessels using this harbor during the fiscal year 1875-76. During that year 411 vessels used the harbor; the next year, 515; the next, 637, and last year, 695. The year before last 201 passages were made through the opening in the shore arm, and last year 232. From these figures it will be seen that it is quite important to retain the opening in the shore arm, and that the usefulness of the harbor is constantly on the increase.

The harbor would have been used by more vessels if they had not feared accidents in entering it, on account of the irregular manner in which other vessels were lying in it. The absolute necessity of having a master, armed with sufficient authority, to regulate and control vessels in the harbor, becomes more and more apparent each successive season, and I must, therefore, again respectfully call attention to my annual report of this work for the fiscal year ending June 30, 1877, and especially to the concluding portions of it, beginning near the foot of page 927, Part II, Report of the Chief of Engineers, 1877.

The estimated cost of this work, according to the original project, was

\$1,452,550, but, as explained in my annual report for the fiscal year ending June 30, 1877, it will probably cost not to exceed \$855,000. Of this amount the following sums have been appropriated:

1871.....	\$100,000	1875.....	100,000
1872.....	100,000	1876.....	75,000
1873.....	75,000	1878.....	100,000
1874.....	75,000	1879.....	75,000
Total.....		700,000	

The \$75,000 appropriated by Congress at its last session has not yet been made available. I respectfully recommend that \$155,000 be appropriated for this work for the fiscal year ending June 30, 1881.

The work is located in the collection-district of Port Huron, Mich.; the nearest port of entry is Port Huron; a light-house stands on the angle-crib of the breakwater. The amount of revenue collected in this district during the last fiscal year was, in coin, \$72,117.64; in currency, \$28,096.75.

The whole commerce of the great chain of northern and northwestern lakes will be benefited by this work.

A sketch showing the location of this work is hereto appended.

Money statement.

July 1, 1878, amount available.....	\$103,665 35
Amount appropriated by act approved March 3, 1879.....	75,000 00
July 1, 1879, amount expended during fiscal year.....	\$178,665 35
July 1, 1879, amount available.....	27,874 24
July 1, 1879, amount available.....	150,791 11
Amount (estimated) required for completion of existing project.....	155,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.....	155,000 00

Abstract of bids for furnishing timber for crib-work at Harbor of Refuge, Lake Huron, Mich., received and opened by Maj. G. Weitzel, Corps of Engineers, on December 4, 1878.

No.	Name.	Residence.	Lot 1, per M feet.	Lot 2, per M feet.	Lot 3, per M feet.
1	Farris & Garfield.....	Painesville, Ohio.....	\$11 20	\$11 20	\$11 20
2	Hemenway & Hayes.....	do.....	11 35	11 35	11 35
3	Hervey S. Dale.....	Chicago, Ill.....	13 30	13 30	13 30
4	John L. Woods.....	Cleveland, Ohio.....	14 00	14 00	14 00
5	John W. McGinn.....	Cheboygan, Mich.....	14 50	14 00	14 00

Abstract of bids for furnishing stone for crib-filling at Harbor of Refuge, Lake Huron, Mich., received and opened by Maj. G. Weitzel, Corps of Engineers, on May 5, 1879.

No.	Name.	Residence.	Price per cord.	
			Delivered in cribs.	Delivered alongside breakwater.
1	Orville J. Jennings.....	Dunkirk, N. Y.....	\$4 34	\$3 74
2	Norman Kelly.....	Kelly's Island, Ohio.....	4 70	4 25
3	Frederick Roesling.....	Point Marblehead, Ohio.....	5 00	4 60
4	Hemenway & Hayes.....	Painesville, Ohio.....	5 20	4 85
5	Farris & Garfield.....	do.....	5 00	5 50
6	W. S. Grant Lynn.....	Rochester, N. Y.....	15 40	15 00

Abstract of contracts entered into during fiscal year ending June 30, 1879, for work at Harbor of Refuge, Lake Huron.

No.	Names.	Kind of work.	Price.
1	Farris & Garfield.....	Furnishing timber.....	\$11.20 per M feet.
2	Orville J. Jennings.....	Furnishing stone.....	\$3.74 per cord.

REPORT OF MR. C. P. GILBERT, ASSISTANT ENGINEER.

SAND BEACH, MICH., July 1, 1879.

GENERAL: I have the honor to make the following report of operations at the harbor of refuge for the year ending June 30, 1879:

The work of construction during the entire year has been carried on directly by the government with hired labor and machinery and by the purchase of material in open market and under advertised contract. This course was adopted on account of the character of the work to be done necessitating modifications in the plans of construction which could not be anticipated in the specifications for a contract. For want of funds, until the middle of the season, the work during 1878 was confined to the building of a complete superstructure over the 5 cribs then in place; the partial preparation of the bottom for a number of the following cribs and a small amount of dredging by a hired dredge.

All the material used was purchased in open market.

On December 4, 1878, proposals were received for furnishing the timber to be used in the construction of the cribs during the season of 1879, and the contract awarded to Farris & Garfield, of Painesville, Ohio. On May 5, 1879, proposals were received for furnishing limestone for crib-filling, and the contract awarded to O. J. Jennings, of Dunkirk, N. Y. The iron and boulder-stone were purchased in open market.

During the months of February and March, 1879, a survey was made of a portion of the harbor between the town dock and north entrance, by sounding through holes cut in the ice 20 feet apart.

It is proposed to expend the balance of the appropriation approved June 18, 1878, in the building and sinking in place (in extension of the lake arm of the breakwater) of 65' by 38' cribs without superstructure, and the building of an extra wall 5 feet high and 1,000 feet in length along the lake face of the breakwater. The material for the wall has been purchased in open market. Two of the cribs have been built, sunk in place, and are now nearly filled with stone. A third crib has been built to 23 courses, 5 additional grillages built to 3 courses each, and 200,000 feet (board measure) timber framed ready to be built into the cribs.

The progress of the work during the present season has been seriously impaired by the failure on the part of Farris & Garfield to deliver the timber as contracted for.

The dimensions of the work now in place are as follows: From north entrance to east end 2,860 linear feet; completed, 2,730 linear feet; cribs without superstructure, 130 linear feet. Completed west of north entrance, 1,500 linear feet. Portion of projected length in place, 62.

TOTAL MATERIAL IN PLACE IN THE WORK.

10,041,375 feet (board measure) timber and plank,
853,619 pounds iron,
29,032 cords of stone,
which amounts are, 55 of the timber and plank, 65 of the iron, and 53 of the stone required for the total length projected.

PUT IN PLACE DURING THE LAST YEAR.

586,798 feet (board-measure) timber and plank,
49,698 pounds iron,
1,934 cords of stone.

It is proposed to expend the appropriation approved March 3, 1879, in extending the lake arm by additional 65' by 38' cribs, in building a complete superstructure over the cribs put in place under appropriation approved June 18, 1878, and in continuing the work of dredging inside the harbor.

The appropriation asked for, for the year ending June 30, 1881, should be expended in the same way.

A tabulated statement of the lake craft using the harbor during the year is annexed.