

REPORT
OF
THE SECRETARY OF WAR,

COMMUNICATING,

In answer to a resolution of the Senate, estimates for the improvement of certain harbors on Lake Erie.

JANUARY 11, 1858.—Referred to the Committee on Commerce. Motion to print referred to the Committee on Printing.

JANUARY 12, 1858.—Report in favor of printing submitted, considered, and agreed to.

WAR DEPARTMENT,
Washington, January 9, 1858.

SIR: I have the honor to enclose herewith a communication from the colonel of the corps of topographical engineers, transmitting copies of estimates for the improvement of certain harbors on Lake Erie, as called for by a resolution of the Senate of the 22d ultimo.

Very respectfully, your obedient servant,

JOHN B. FLOYD,
Secretary of War.

Hon. J. C. BRECKINRIDGE,
President of the Senate.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, January 8, 1858.

SIR: I have the honor of transmitting herewith estimates for the improvement of the harbors of Buffalo, Dunkirk, Erie, Conneaut, Ashtabula, Grand river, Cleveland, Black river, Vermillion, Sandusky bay, River Raisin, and Maumee bay, on Lake Erie, called for by a resolution of the Senate of the 22d December, 1857.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JOHN B. FLOYD,
Secretary of War.

*Extract from the Annual Report of Lieutenant Colonel J. D. Graham,
Corps Topographical Engineers, dated September 30, 1857.*

DUNKIRK HARBOR, NEW YORK.

The estimate of the board of engineers for completing this work will be found printed at pages 383 and 384 of the last mentioned document. The amount of the estimate is \$192,600 81.

Here we are again compelled to present a new estimate of the cost of constructing this work in accordance with the plan of the board. The plan, we may be permitted to say, is able and well adapted to the wants of commerce, if the work be constructed in a manner to render it permanent in its character; otherwise constructed, it would soon become useless for the purposes intended to be subserved by it.

For a work like this, to be founded in a depth of eighteen (18) feet of water, and, subject as it will be to be battered in every gale by a powerful action of the lake sea, the strength appertaining to the plan of construction shown by the drawings in sheet G, No. 21, or our case 3 of civil work now in the topographical bureau, and corresponding to the specifications to be found in the table T 3, at pp. 18 to 21 of Senate Ex. Doc. No. 16, of the 34th Congress, 3d session, ought at least, I would suggest, to be insured to it.

According to this rule, the cribs for the breakwater will be each 30 feet long, 23 feet high from the soil at bottom to the flooring at top, and they will be 25 feet wide.

The cost of such a crib, according to the accompanying estimate, marked M 2, will be \$2,466 28.

Cost of completing the harbor.

According to the lengths of the several breakwaters, as they are given in the plan of the board, and assuming the cost of each crib of thirty feet in length to be as above, the cost of completing this harbor will be as follows, viz:

1. Western breakwater, 1,000 feet long, 33½ cribs, at \$2,466 28 each.....	\$82,209 33
2. Middle breakwater, 2,890 feet long, 96½ cribs, at \$2,466 28 each.....	237,584 97
3. Eastern breakwater, 765 feet long, 25½ cribs, at \$2,466 28 each.....	62,890 14
	<hr/>
	382,684 44
To which should be added for contingencies, such as losses and damages from the lake storms while the work progresses in an unfinished state, 5 per cent.....	19,134 22
	<hr/>
Total for completing this harbor.....	401,818 66

I would recommend that the amount of our estimate for completing this work (\$401,818 66) be granted, in five equal annual appropriations of \$80,363 73. This sum, increased by the amount of estimate M 1, \$5,299 96, required for immediate repairs, will increase the amount required the first year to the sum of \$85,663 69.

DUNKIRK HARBOR, NEW YORK.

M 1.

Estimate of funds required for the immediate repair of the Dunkirk harbor works.

For 10,580 feet lineal of one foot square oak and pine timber, at the average price of 18 cents per lineal foot...	\$1,904 40
For 10,750 feet, board measure, of plank, 3 inches thick, at \$25 per M.....	268 75
For 21,500 pounds of 1-inch square wrought iron, for bolts, at 4 cents per pound.....	860 00
For 150 cords of ballast stone, at \$6 per cord.....	900 00
For superintendence, carpentry, and labor.....	795 00
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	4,818 15
Add 10 per cent., for contingencies.....	481 81
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Amount required for repairs.....	5,299 96
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J. D. GRAHAM,

*Major Topographical Engineers, Brevet Lieut. Colonel,
Superintending Engineer.*

DUNKIRK HARBOR, NEW YORK.

M 2.

Estimate of the cost of one crib suitable for the breakwaters designed for the harbor of Dunkirk, New York.

Each crib to be 30 feet long, 25 feet wide, and 18 feet high from the soil at bottom to the water surface, or 23 feet high from the bottom to the flooring at top; to be constructed in accordance with the drawings in sheet G, No. 21, and the specifications in table T 3, at

pp. 18 to 21 of Senate (Ex.) Doc. No. 16, of the 34th Congress, 3d session.

For 4,061 lineal feet of white oak timber, one foot square, at 18 cents per lineal foot	\$730 98
For 1,728 feet, board measure, of 3-inch oak plank for flooring, at \$18 per M.....	31 10
For 6,537 pounds 1½-inch round wrought iron for bolts, at 4 cents per pound.....	261 48
For 127 pounds of wrought iron spikes, ¾ by ¾ of an inch square, at 7½ cents per pound.....	9 52
For 87 cords of hard boulder stone, at \$7 per cord.....	609 00
Estimated cost of materials.....	1,642 08
For carpenters' work in dressing timber, cutting dove- tails and gains.....	300 00
For putting together, floating out, and filling with stone	150 00
For superintendence by local agent.....	150 00
	2,242 08
Add ten per cent. for contingencies, such as pay of draughtsman and assistants to superintending engi- neer, office rent, transportation, fuel, and quarters of superintending engineer, stationery, &c.....	224 20
Estimated cost of one crib.....	2,466 28

J. D. GRAHAM,
Major Top. Eng'rs, Brevet Lieut. Colonel.

BUFFALO HARBOR, NEW YORK.

No work has been done at this harbor the present season for want of means. A portion of the protection wall is injured, and ought to be repaired immediately.

I agree with Colonel Turnbull in recommending the rebuilding the wall about the light-house. From its present defective condition, that important structure is in danger. I also agree with him in recommending a renewal of the tow-path in a manner to correspond in character with the wall. Its condition is now very bad, even worse than it was at the time of Colonel Turnbull's last report, dated September 1, 1856, to be found in the topographical bureau, in manuscript. It should have immediate attention, or the consequences to the harbor will be serious.

For the cost of these improvements I beg leave to refer to and present again the estimates given in detail by Colonel Turnbull, which will be found printed in Senate (Ex.) Doc. No. 1, of the 34th Congress, 1st session, part 2, at pp. 381 and 382. The same estimates

were again presented by him in September, 1856, for these items, as follows, viz:

For the repair of the tow-path of the south pier.....	\$18,620 85
For rebuilding the wall in front of the light-house.....	1,589 00
To this last item I must now add 50 per cent. for deterioration of the wall since.....	794 50
Also for dredging (now required) 10,850 cubic yards along the south pier and off the pier head, at 50 cents per cubic yard.....	5,425 00
And for contingencies, such as repairs of steam-dredge, transportation, superintendence, &c.....	1,250 00
Total required for Buffalo harbor, New York.....	<u>27,679 35</u>

ERIE HARBOR, PENNSYLVANIA.

Estimate of funds required for the immediate repair of the piers of Erie harbor, Pennsylvania, and for dredging.

1. For the north channel pier.

70 cords of stone, at \$7 per cord.....	\$490 00
2,000 lbs. of 1-inch square wrought iron for bolts, at 4 cents per pound.....	80 00
1,500 lineal feet of timber, hewn one foot square (on hand.)	
For superintendence, carpentry, and labor.....	300 00
Contingencies.....	150 00
Total for the north channel pier.....	<u>1,020 00</u>

2. For the south channel pier.

15 cords of stone, at \$7 per cord.....	105 00
750 pounds of 1-inch square wrought iron for bolts, at 4 cents per pound.....	30 00
300 lineal feet of 1 foot square timber (on hand.)	
For superintendence, workmanship, and contingencies.....	50 00
Total for the south channel pier.....	<u>185 00</u>

3. For the north breakwater pier.

139 cords of stone, at \$7 per cord.....	973 00
2,500 pounds of 1-inch square wrought iron for bolts, at 4 cents per pound.....	100 00
16,500 lineal feet of 1 foot square timber (on hand.)	
For superintendence, labor, carpentry, and contingencies	800 00
Total for the north breakwater pier.....	<u>1,873 00</u>

4. *For the dredging.*

For dredging and removing 17,000 cubic yards from the inner bar, at 18 cents per cubic yard.....	\$3,060 00
For dredging and removing 10,000 cubic yards from the outer bar, at 25 cents per cubic yard.....	2,500 00
Total for the dredging.....	<u>5,560 00</u>

Recapitulation of items.

1. For repairing the north channel pier.....	1,020 00
2. For repairing the south channel pier.....	185 00
3. For repairing the north breakwater pier.....	1,873 00
4. For dredging.....	<u>5,560 00</u>
Amount required for immediate repairs of Erie harbor piers	<u>8,638 00</u>

J. D. GRAHAM,

*Maj. Corps Top. Eng., Bvt. Lt. Col., Sup. Eng.**Estimate of the cost of completing Erie harbor, Pennsylvania, according to the plan of the board of engineers.*

It appears by reference to page 385 of part 2 of Senate (Ex.) Doc. No. 1 of the 34th Congress, 1st session, that the new piers and pier extension proposed to be erected will occupy a depth of 12 feet of water, and will be 17 feet high from the soil at bottom to the flooring at top. To these works there should be given the strength, at least, which is indicated by the plan of construction shown by the drawings in sheet G No. 20, now in the topographical bureau, corresponding to the specifications contained in table T 2 at pages 16 to 18 of Senate (Ex.) Doc. No. 16 of the 34th Congress, 3d session.

Under this plan the cost of a crib 32 feet long, 20 feet wide, and 12 feet high from the bottom to the water surface, or 17 feet high from the bottom to the flooring at top, taking the present prices of materials and labor, will be as follows, viz :

For one crib.

For 1,961 lineal feet of pine timber hewn 1 foot square, at 16 cents per lineal foot.....	\$313 76
For 880 lineal feet of white oak timber hewn 1 foot square, at 18 cents per lineal foot.....	158 40
For 1,482 feet board measure of white oak plank for flooring, 3 inches thick and 8 inches wide, at \$18 per M.	26 67
For 2,660 lbs. of 1-inch square wrought iron bolts, at 4 cents per lb.....	106 40

For 137 lbs. of wrought iron spikes $\frac{3}{8}$ by $\frac{3}{8}$ of an inch square, pointed and headed, at $7\frac{1}{2}$ cents per lb.....	\$10 28
For 53 cords of hard stone of proper size for crib ballast, at \$7 per cord of 128 cubic feet.....	371 00
For superintendence, carpentry in framing, labor, floating to position and sinking.....	400 00
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	1,386 61
Add 10 per cent. for contingencies.....	138 65
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Estimated cost of one crib.....	1,525 16
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1. FOR THE EASTERN ENTRANCE.

North channel pier extension.

430 feet long = $13\frac{1}{2}$ cribs, at \$1,525 16 each.....	20,494 33
South channel pier (new line for a channel way 500 feet wide,) 1,070 feet long = $33\frac{1}{2}$ cribs, at \$1,525 16 each.....	50,997 53
Removing 580 feet of present south pier 12 feet wide to a depth of 12 feet, at \$20 per lineal feet.....	11,600 00
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Estimated cost for eastern entrance.....	83,091 86
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2. FOR THE WESTERN ENTRANCE.

North channel pier 1,650 feet long = $51\frac{1}{10}$ cribs, at \$1,525 16 each.....	78,641 06
South channel pier 2,190 feet long = $68\frac{1}{2}$ cribs, at \$1,525 16 each.....	104,378 13
North breakwater 2,280 feet long = $71\frac{3}{2}$ cribs, at \$1,525 16 each.....	108,667 65
Brush work facing, 4,620 feet of shore north of Barrack point, 50 feet wide = 26,222 square yards, at \$1 25 (estimate of the board of engineers.).....	32,777 50
Brush work facing 1,000 feet of shore south of Barrack point, 50 feet wide = 5,555 square yards, at \$1 25 (estimate by the same.).....	9,943 75
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Estimated cost of western entrance.....	334,408 09
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Recapitulation.

Eastern entrance.....	83,091 86
Western entrance.....	334,408 09
Total to complete Erie Harbor, Pennsylvania, in a permanent manner.....	417,499 95
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J. D. GRAHAM,

Major Corps Topographical Engineers,
Brevet Lieut. Col., Superintending Engineer.

HARBORS ON LAKE ERIE.

CONNEAUT HARBOR, OHIO.

The last appropriation for this harbor was ten thousand dollars, (\$10,000,) granted in the year 1852.

Captain Stansbury, my predecessor in charge, states in his annual report to the topographical bureau of the 30th of September, 1856, that with this sum, "eight hundred and ninety feet of pier have been entirely rebuilt upon the foundation of the old work; one hundred and twenty feet (120) thoroughly repaired; a new crane scow built; and a complete survey and chart of the harbor made and transmitted to the bureau."

A new appropriation is now needed to complete the piers of this harbor. They do not at present extend to 12 feet depth of water. To do this will require that the west pier be prolonged 352 feet and the east pier 288 feet. The first will require and addition of eleven (11) cribs, and the second an addition of nine (9) cribs, each 32 feet long: total for both piers, 20 cribs similar and costing the same per crib as is stated in detail in estimate G presented under the head of Monroe harbor, Michigan, that is to say, \$ 1,426 98, including superintendence, workmanship and all contingencies.

Then, 20 cribs, at \$1,426 98 each, give for the cost of the pier extension, \$28,539 60.

To which add for repairs of present piers.....	\$500 00
Dredging 1,800 cubic yards, at 14 cents per cubic yard.	2,520 00

Amount required for Conneaut harbor, Ohio.....	31,559 60
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I would recommend that this be divided into two equal annual appropriations, each of..... \$15,779 80

ASHTABULA HARBOR, OHIO.

The last appropriation made for this harbor was ten thousand dollars, (\$10,000,) granted in 1852. The whole of it was expended by the end of the year 1855, in making repairs and in extending the harbor piers, according to the approved plans. Full reports have been made by my predecessor in charge of the work done.

To complete this harbor, the windward pier should be extended out 416 feet, and the leeward pier, say 288 feet.

This will require, for the first, 13 cribs, and for the second, 9 cribs; or, for both cribs, 22 piers, similar in all respects, and costing the same per crib as in estimate "G," presented under the head of Monroe harbor, Michigan; that is to say, \$1,426 98 per crib.

Then 22 cribs at \$1,426 98 each	\$31,393 56
For repairs of present piers.....	5,500 00
For dredging, say 8,000 cubic yards, at 14 cents per cubic yard.....	1,120 00

Total required for Ashtabula harbor, Ohio.....	38,013 56
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I would recommend that this sum be granted in two equal annual appropriations, each to be \$19,006 78.

GRAND RIVER HARBOR, FAIRPORT, OHIO.

Estimate of funds required for extending the east pier of Grand River harbor, at Fairport, Ohio, 416 feet; the west pier, 320 feet; total, 726 feet of new pier work. Also, for making repairs and dredging as herein specified.

1. *For the new pier work.*

This will require, for the east pier extension, thirteen cribs; and for the west pier extension, ten cribs; or, for both piers, twenty-three cribs, each thirty-two feet long, twenty feet wide, and twelve feet high from the bottom to the water surface, or seventeen feet high from the bottom to the flooring at top.

It is proposed to construct the cribs as in the case of estimate "G," given under the head of Monroe harbor, Michigan.

The prices of materials and workmanship will be the same in the two cases. We therefore assume the cost of each crib for Grand River (Fairport) harbor, including workmanship, superintendence and contingencies, to be..... \$1,426 98
Then both pier extensions will cost \$1,426 98 × 23 32,819 39

2. *For repairs, including the tearing away some old work and renewing.*

This will require the following materials and workmanship, viz:

For 23,840 lineal feet of pine timber, hewn one foot square, at fourteen cents per lineal foot.....	\$3,337 60
For 7,500 lineal feet of white oak timber, hewn one foot square, at eighteen cents per lineal foot.....	1,350 00
For 7,530 pounds of one inch square wrought iron, for bolts, at four cents per pound.....	310 20
For 410 pounds of wrought iron spikes, for flooring, at 7½ cents per pound.....	30 75
For 3,000 feet, board measure, of 3-inch oak plank, at at \$20 per M.	60 00
For 100 cords of stone, at \$6 per cord.....	600 00
For workmanship and superintendence, &c.....	500 00

Total for repairs, &c..... 6,179 55

3. *For dredging.*

This work will require the excavation and removal of 12,500 cubic yards of earth and sand, at 14 cents per cubic yard.....	1,750 00
For repairs of steam dredge.....	750 00
Total for dredging.....	2,500 00

“Recapitulation.

1. For the pier extensions.....	\$32,819 39
2. For tearing away old work, and making repairs.....	6,179 55
3. For dredging and repairs of steam dredge.....	2,500 00

Amount required for Grand River harbor, (Fairport, Ohio.....	41,498 94
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CLEVELAND HARBOR, OHIO.

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No appropriation has been granted for this work since 1852.

I would adopt the estimate of Captain Stansbury as given in detail, and would recommend, with a view to the timely collection of the requisite materials, that the above sum should be granted in one appropriation of \$44,757 87.

CAPTAIN STANSBURY'S ESTIMATE.

“Estimate of funds required for continuing the improvement of the harbor of Cleveland, (renewed from the report of 1855.)

“WEST PIER.

“For completing the west pier its present length, connecting the two piers and planking the whole, 50 feet wide.....	\$21,467 93
“Contingencies, 10 per cent.....	2,146 79
“Total for west pier.....	23,614 72

“EAST PIER.

“For removing the old stone work of the outer end of the east pier, destroyed by a steamboat, and rebuilding it, (labor only; materials on hand).....	6,877 20
“For tearing up the wooden platform north of the beacon and replacing it with a structure of masonry, to correspond with the rest of the pier and form a solid structure.....	15,152 50
“For tearing away the wooden crib, surrounding the beacon, and to replace the same with the structure of masonry, connecting it with the pier head proposed to be rebuilt as above.....	4,113 45
“Total for east pier.....	26,143 15

"RECAPITULATION.

" West Pier.....	\$23,614 72
" East Pier	26,143 15
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	49,757 87
" Deduct appropriation on hand, September 30, 1855.....	5,000 00
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	44,757 87"
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BLACK RIVER HARBOR, OHIO.

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Captain Stansbury's last estimate for the repairs of this work will be found printed at pages 392 and 393 of the last mentioned Senate document.

The items are given in detail, and amount to.....	\$30,801 76
For increased dilapidation I would add 10 per cent.....	3,080 17
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Amount required.....	33,881 93
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I would recommend that it be granted in two equal annual appropriations of \$16,940 96.

CAPTAIN STANSBURY'S ESTIMATE.

" Estimate of funds required for continuing the improvement of the harbor of Black river.

" EAST PIER.

" To rebuild 300 feet of pier, 13 feet wide from 6 feet below the surface.....	\$6,324 00
" To repair and partially rebuild from surface 725 feet of same pier.....	6,500 00
" To face off 225 feet on inner end of pier, to prevent breach.....	862 50
" For pier head, 40 feet square, in 15 feet water, to rise 9 feet above the surface.....	4,291 40
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" Total for east pier.....	17,977 90
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HARBORS ON LAKE ERIE.

" WEST PIER.

" To rebuild 210 feet on inner end of pier.....	\$2,340 10
" To repair and face up 800 feet inside the harbor.....	4,000 00
" To repair 120 feet, north end of pier.....	1,250 00
" To rebuild pier head from surface of the water, 35 feet square.....	2,433 60
" Total for west pier.....	<u>10,023 70</u>

" RECAPITULATION.

" East pier.....	17,977 90
" West pier.....	10,023 70
" Contingencies, 10 per cent.....	2,800 16
	<u>30,801 76"</u>

VERMILLION HARBOR, OHIO.

I beg leave to renew the estimate made by Captain Stansbury, United States corps of topographical engineers for this harbor, in his report to the topographical bureau, of September 30, 1855, which will be found printed in Senate (Ex.) Doc. No. 1, of the 34th Congress, 1st session, at pp. 393 and 394 of part 2.

The estimate amounts to \$42,856 61.

I would recommend the granting of that sum in two equal annual appropriations of \$21,428 30 each.

CAPTAIN STANSBURY'S ESTIMATE.

" Estimate of funds required for continuing the improvement of the harbor of Vermillion.

" WEST PIER.

" To raise 125 feet of pier to a height of 5 feet, 24 feet wide.....	\$2,035 68
" To rebuild from the water's edge 1,000 feet of pier	14,600 16
" To face up 400 feet of pier (inside)	1,000 00
" Pier head 40 feet square in 15 feet water, to rise 9 feet above surface	4,291 40
" Total for west pier	<u>21,927 24</u>

" EAST PIER.

"To bring up 90 feet of pier to surface of water.....	\$1,132 48
"To rebuild 350 feet of pier from surface, 6 feet high, 24 feet wide.....	7,909 60
"To face up and repair 740 feet (inland)	3,709 00
"Pier head for east pier	4,291 24
"Total for east pier.....	<u>17,033 32</u>

" RECAPITULATION.

"East pier.....	21,927 24
"West pier.....	17,033 32
"Contingencies, 10 per cent.....	3,896 05
	<u>42,856 61"</u>

SANDUSKY HARBOR, OHIO.

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Captain Stansbury was then in charge of this and other works on Lake Erie. * * * * *

I will also renew his estimate, presented at the same time, of funds required for this harbor. It amounts, as will be seen, to the sum of \$112,117.

I would recommend that it be granted in two equal annual appropriations of \$56,058 50 each.

CAPTAIN STANSBURY'S ESTIMATE.

"Estimate of funds required to continue the improvement of the harbor of Sandusky, (renewed.)"

"To complete the line of rough pier on Peninsula Point, to its extremity, 4,050 feet of pier, at \$4 50.....	\$18,900 00
"To construct an entire new breakwater to close the breach between the western extremity of Peninsula Point and the main land, 2,700 feet long, 20 feet wide, and 14 feet high, 90 cribs of 30 feet, at \$900 per crib.	81,000 00
"To connect the above breakwater by a line of rough cribs across the island with the pier already built, 450 feet of rough pier, at \$4 50.....	2,025 00
"Total for Sandusky harbor	<u>112,117 00</u>

MONROE HARBOR, MICHIGAN.

Estimate of funds required for the repair of Monroe harbor, Michigan, and for the extension of both piers 160 feet lakeward.

1. *The extension of the harbor piers.*

This will require for each pier five (5) cribs, each 32 feet long, by 20 feet wide, and 12 feet average height from the soil at bottom to the water surface, or 17 feet high from the bottom to the flooring at top. For both piers there will be required ten (10) such cribs. * * * *

The cost of each crib will be as follows :

For 1,961 lineal feet of pine timber, hewn 1 foot square, at fourteen cents per lineal foot	\$274 54
For 880 lineal feet of white oak timber, hewn 1 foot square, at eighteen cents per lineal foot.....	158 40
For 1,482 feet, board measure, of white oak plank for flooring, 3 inches thick and 8 inches wide, at \$20 per M.....	29 64
For 2,660 pounds of 1-inch square wrought iron for bolts, at four cents per pound.....	106 40
For 137 pounds of wrought iron spikes, $\frac{3}{8}$ by $\frac{3}{8}$ of an inch square, pointed and headed, at $7\frac{1}{2}$ cents per pound.....	10 28
For 53 cords of hard boulder stone, at \$6 per cord.....	318 00
For labor, carpentry, and superintendence.....	400 00
Sum	1,297 26
Add 10 per cent. for contingencies.....	129 72
Estimated cost of one crib.....	1,426 98

Then 10 cribs, at \$1,426 98 each, gives :

1. Cost of the pier extensions to 12 feet water in Lake Erie	14,269 80
2. For renewal of the superstructure of the north pier, for 350 feet, at \$18 per foot.....	6,300 00
3. For repairs of 250 feet of pier work, at \$7 50 per foot...	1,875 00
4. For dredging 10,870 cubic yards, at thirteen cents per cubic yard.....	1,413 10

Amount required for Monroe harbor, Michigan..... 23,857 90

Estimate of funds required for the improvement of the navigation of Maumee bay.

Maumee bay is at the west end of Lake Erie, and the estimate for removing the bar in the channel is as follows :

The length of the cut.....	4,500 feet.
Width.....	600 "
Depth.....	18 inches.

For dredging 150,000 cubic yards, at twenty-five cents per yard.....	\$37,500 00
For towage of Lake Erie dredge and mud scows from Erie harbor to Maumee bay.....	500 00
For repairs of machinery, caulking hull, &c.....	2,000 00
For transportation of officers.....	500 00
For examination of channel, previous and subsequent to excavating.....	500 00
	<hr/> 41,000 00
Contingencies, 10 per cent.....	4,100 00
	<hr/> 45,100 00

Recapitulation of estimates for the improvement of harbors on Lake Erie.

Designation of work or improvement.	Amount required to complete each improvement.	Amount required during the fiscal year ending June 30, 1858.
Improvement of Dunkirk harbor, N. Y.....	\$401,818 66	\$85,663 69
Improvement of Buffalo harbor, N. Y.....	27,679 35	27,679 35
Improvement of the harbor of Erie, Pa.....	417,499 95	113,012 99
Improvement of Conneaut harbor, Ohio.....	31,559 60	15,779 80
Improvement of Ashtabula harbor, Ohio.....	38,013 56	19,006 78
Improvement of Grand river harbor, Ohio.....	41,498 94	41,498 94
Improvement of Cleveland harbor, Ohio.....	44,757 87	44,757 87
Improvement of Black river harbor, Ohio.....	33,881 93	16,940 96
Improvement of Vermillion harbor, Ohio.....	42,856 61	21,428 30
Improvement of Sandusky harbor, Ohio.....	112,117 00	56,058 50
Improvement of river Rasin harbor, Mich.....	23,857 90	23,857 90
Improvement of the navigation of Maumee bay.....	45,100 00	22,550 00
	<hr/> 1,260,641 37	<hr/> 488,235 08

BUREAU TOPOGRAPHICAL ENGINEERS, *January 8, 1858.*

