

6. *Improvement of Vermillion Harbor, Ohio.*—Operations have been in progress during the year widening and deepening the channel between the piers by blasting the solid rock and removing it, together with such deposits of sand, mud, &c., as had been brought down by freshets; the solid rock has been blasted and displaced to a depth of 14 feet, and a channel obtained with a width of 70 feet and depth of 12 feet.

Work during the present season will be confined to the necessary repairs of the piers.

The engineer in charge recommends that the channel between the piers be deepened to 14 feet.

July 1, 1878, amount available .....	\$7,039 50
July 1, 1879, amount expended during fiscal year.....	6,464 76

July 1, 1879, amount available .....	574 74
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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

(See Appendixes G G 6 and G G 13.)

7. *Improvement of Mouth of Black River, Ohio.*—During the fiscal year repairs have been made to both piers, which are now in tolerably good condition.

There is a good channel at the entrance to the river, with a depth of not less than 14 feet.

During the present season some minor repairs will be made to the west pier.

July 1, 1878, amount available .....	\$1,000 00
July 1, 1879, amount expended during fiscal year.....	934 15

July 1, 1879, amount available .....	.65 85
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Amount (estimated) required for annual repairs.....	1,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881..	1,000 00

(See Appendixes G G 7 and G G 14.)

8. *Breakwater at Cleveland, Ohio, and repairs of harbor.*—Operations have been in progress during the year at the mouth of the Cuyahoga River, repairing the piers and dredging the channel at the entrance; the portion of the piers built since 1866 are now in good condition, and there is a wide channel at the entrance to the harbor with a depth of 16 feet water.

Work has progressed well upon the new breakwater; 600 linear feet of crib-work have been sunk, 500 linear feet of superstructure built, and the stone foundation prepared for 1,000 linear feet of crib-work. The breakwater is now 2,050 feet long; upon 1,550 feet of which the superstructure is completed.

During the present season, it is proposed to sink 500 linear feet more of crib-work on the line of the new breakwater; to construct 1,050 linear feet of superstructure; and, if funds are available, to continue the work of prolonging the foundation.

The superstructure upon 600 linear feet of the west pier at the mouth of the Cuyahoga River will be removed.

July 1, 1878, amount available.....	\$122,085 76
Amount appropriated by act approved March 3, 1879 .....	100,000 00
	<u>\$222,085 76</u>

July 1, 1879, amount expended during fiscal year.....	37,168 75
July 1, 1879, outstanding liabilities .....	1,707 90
	<u>38,876 65</u>

July 1, 1879, amount available.....	183,209 11
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Amount (estimated) required for completion of existing project .....	\$1,500,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office.....	200,000 00

(See Appendix G G 15.)

9. *Improvement of Fairport Harbor, Ohio.*—A survey has been made of the harbor during the year, and proposals invited for repairing the east pier.

There is a good channel at the entrance of the harbor about 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.

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
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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

(See Appendix G G 16.)

10. *Improvement of Ashtabula Harbor, Ohio.*—During the year both piers have been extensively repaired, 20 feet of crib-work have been added to the east pier, and the channel through the outer bar has been deepened by removing 1,600 cubic yards of sand.

During the present season, it is proposed to repair the west pier near its inner end, to prolong the east pier 120 feet, and to deepen and widen the channel through the outer bar.

The engineer in charge recommends that both piers be extended to a depth of 16 feet water in the lake.

July 1, 1878, amount available .....	\$13,987 15
Amount appropriated by act approved March 3, 1879.....	9,000 00
	<u>\$22,987 15</u>

July 1, 1879, amount expended during fiscal year.....	3,911 74
July 1, 1879, outstanding liabilities.....	1,392 10
	<u>5,303 84</u>

July 1, 1879, amount available.....	17,683 31
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Amount (estimated) required for completion of existing project.....	50,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office .....	30,000 00

(See Appendix G G 17.)

11. *Improvement of Conneaut Harbor, Ohio.*—No work has been done at this harbor during the year for want of funds.

A serious breach has been made in the east pier which should be closed.

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

(See Appendix G G 18.)

12. *Improvement of Erie Harbor, Pennsylvania.*—During the year about 400 linear feet of the superstructure of the north pier has been rebuilt and minor repairs made to other portions of the piers.

The channel at the entrance to the harbor has been deepened and widened by the removal of 46,385 cubic yards of sand.

A survey has been made of the peninsula of Presque Isle and of the channel at the entrance to the harbor.

During the present season it is proposed to construct several pile jetties for the protection of the shore of the peninsula, and to dredge the channel at the entrance to the harbor to a width of 350 feet and a depth of 16 feet.

July 1, 1878, amount available.....	\$40,789 64	
Amount appropriated by act approved March 3, 1879.....	25,000 00	\$65,789 64
July 1, 1879, amount expended during fiscal year.....	12,279 34	
July 1, 1879, outstanding liabilities.....	408 55	12,687 89
July 1, 1879, amount available.....		53,101 75
Amount (estimated) required for completion of existing project.....	90,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881.	50,000 00	

(See Appendix G G 19.)

IMPROVEMENT OF THE HARBORS OF DUNKIRK AND BUFFALO, LAKE ERIE, AND OF HARBORS ON LAKE ONTARIO, AND ON THE RIVER SAINT LAWRENCE.

Officer in charge, Maj. Walter McFarland, Corps of Engineers.

1. *Improvement of Dunkirk Harbor, New York.*—The balance which remained on hand at the beginning of the fiscal year, after closing the last contract for extending the breakwater, was applied to redecking and leveling the west pier, which had become very dilapidated.

This extension gives the breakwater a total length of 1,191 feet. The estimated cost of completing it to the length originally contemplated, namely, 2,860 feet, is \$262,000.

As there appears to be no present necessity for constructing the whole of this extension, it is proposed to limit its length to about 1,700 feet by adding 510 feet to its present length, the estimated cost of which is \$31,000.

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

(See Appendix H H 1.)

2. *Improvement of Buffalo Harbor, New York.*—The work of extending the Buffalo breakwater under the last contract was completed September 9, 1878, at which time the total length of breakwater was 3,076 feet; yet to be built, 4,524 feet; total proposed length, 7,600 feet.

In October contracts were entered into for the further extension of the breakwater 350 feet under the appropriation of June 18, 1878; and at the close of the fiscal year, 160 linear feet of foundation was completed, and all the cribs, seven in number, each 50 feet long, were nearly ready for sinking. By the close of the present working season this additional length of 350 feet will be completed, making the total completed length of breakwater 3,426 feet, and contracts for the expenditure of the appropriation of March 3, 1879, will be let. It is expected that nearly all the money now available will have been expended before another appropriation can become available.

Inquiries made during the year amongst nautical men elicited the very general opinion that the breakwater is in the highest degree serviceable for the purpose for which it was designed, but that it ought to be extended as soon as possible.

During the year a railroad corporation has seized upon and taken

possession of the north United States pier at Buffalo, which has been in possession and occupancy of the government for over fifty years, and have excluded the United States and its contractors from any use of it.

July 1, 1878, amount available.....	\$92,113 01
Amount appropriated by act approved March 3, 1879.....	100,000 00
July 1, 1879, amount expended during fiscal year.....	192,113 01
	13,220 45

July 1, 1879, amount available.....	178,892 56
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Amount (estimated) required for completion of existing project.....	1,635,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	300,000 00

(See Appendix H H 2.)

3. *Improvement of Wilson Harbor, New York.*—The only work done here during the year was the rebuilding of the superstructure of the east pier from the balance of the appropriation of 1876. The harbor is in good condition, and may be entered by vessels drawing 8 feet at all seasons, and 10 feet when the lake is high.

July 1, 1878, amount available.....	\$3,428 73
July 1, 1879, amount expended during fiscal year.....	1,030 87
July 1, 1879, outstanding liabilities.....	1,499 45
	2,530 32

July 1, 1879, amount available.....	898 41
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Amount (estimated) required for completion of existing project.....	80,000 00
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(See Appendix H H 3.)

4. *Improvement of Olcott Harbor, New York.*—Nothing has been done here during the year for want of funds. The harbor is in good condition.

Amount (estimated) required for completion of existing project.....	\$10,000 00
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(See Appendix H H 4.)

5. *Improvement of Oak Orchard Harbor, New York.*—Nothing has been done here during the year beyond the repair of some damage caused by a vessel running into the west pier. The balance of the appropriation will be applied this season to the repair of the east pier and the removal of gravel from the channel.

July 1, 1878, amount available.....	\$2,426 66
Amount appropriated by act approved March 3, 1879.....	1,000 00
July 1, 1879, amount expended during fiscal year.....	3,426 66
	136 35

July 1, 1879, amount available.....	3,290 31
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Amount (estimated) required for completion of existing project.....	1,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.	1,000 00

(See Appendix H H 5.)

6. *Improvement of Charlotte Harbor, New York.*—Nothing has been done here beyond a few slight repairs to the piers. The balance now available will be applied in the same way.

The superstructure of both piers is decaying so rapidly that it must be entirely rebuilt within 5 years, and it is recommended that one-fifth of the estimated cost of this be appropriated each year until the work is done.

July 1, 1878, amount available.....	\$1,000 00
Amount appropriated by act approved March 3, 1879.....	1,000 00
July 1, 1879, amount expended during fiscal year.....	\$2,000 00
	41, 92

July 1, 1879, amount expended during fiscal year.....	41, 92
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July 1, 1879, amount available.....	1,958 08
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Amount (estimated) required for rebuilding and repairs..... \$45,000 00  
 Amount that can be profitably expended in fiscal year ending June 30, 1881. 9,000 00  
 (See Appendix H H 6.)

7. *Improvement of Pultneyville Harbor, New York.*—No work has been done here during the year. The balance now available will be applied during the present season to the extension of the west pier outward and the east pier inward, and to dredging the channel.

July 1, 1878, amount available.....	\$5,623 51
Amount appropriated by act approved March 3, 1879 .....	4,000 00
	<u>\$9,623 51</u>
July 1, 1879, amount expended during fiscal year .....	47 08
July 1, 1879, amount available.....	9,576 43

Amount (estimated) required for completion of existing project .....	9,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881. ....	9,000 00

(See Appendix H H 7.)

8. *Improvement of Great Sodus Harbor, New York.*—The improvement as designed was completed some years ago, but now requires extensive repairs. The balance now available will be applied this season to the rebuilding of a part of the west pier. The rest of this pier should be rebuilt next year, and the channel should be deepened to 12 feet, for which the officer in charge estimates that \$20,000 will be required.

July 1, 1878, amount available.....	\$7,900 86
Amount appropriated by act approved March 3, 1879 .....	2,000 00
	<u>\$9,900 86</u>
July 1, 1879, amount expended during fiscal year.....	626 15
July 1, 1879, amount available.....	9,274 71

Amount (estimated) required for completion of existing project and repairs. ....	20,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office .....	10,000 00

(See Appendix H H 8.)

9. *Improvement of Little Sodus Harbor, New York.*—Some repairs have been made to the piers. The available balance will be applied this fall to the rebuilding of the superstructure of the west pier, and to dredging the channel to a depth of 12 feet. The officer in charge recommends that both piers be carried out to the 12-foot curve in the lake, the cost of which is estimated at \$60,000.

July 1, 1878, amount available.....	\$11,945 17
Amount appropriated by act approved March 3, 1879.....	5,000 00
	<u>\$16,945 17</u>
July 1, 1879, amount expended during fiscal year.....	1,455 84
July 1, 1879, amount available.....	15,489 33

Amount (estimated) required for completion of existing project.....	2,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881. ....	2,000 00

(See Appendix H H 9.)

10. *Improvement of Oswego Harbor, New York.*—The new breakwater has been repaired where damaged and has been extended 250 feet, its total completed length being 4,366 feet. The under-water work has been extended 430 feet and it is expected to add 215 feet more, and to finish the superstructure before winter sets in.

With the appropriation of March 3, 1879, it is expected to extend the breakwater 700 feet further, and the officer in charge recommends that

the remainder of the original estimate be applied, after the new west breakwater is finished, to the construction of the east breakwater.

July 1, 1878, amount available.....	\$95,062 90
Amount appropriated by act approved March 3, 1879.....	90,000 00
	<u>\$185,062 90</u>
July 1, 1879, amount expended during fiscal year.....	43,278 46
July 1, 1879, amount available.....	141,784 44
Amount (estimated) required for completion of existing project.....	467,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office.....	200,000 00

(See Appendix H H 10.)

11. *Improvement of Ogdensburg Harbor, New York.*—Nothing has been done here during the year, no funds being available. The original scheme of improvement was completed in 1876, except the pile pier, the estimate for which was contingent, and the necessity for which is not yet shown.

Amount (estimated) required for completion of existing project.....	\$70,000 00
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(See Appendix H H 11.)

12. *Improvement of Waddington Harbor, New York.*—No work was done here during the fiscal year, owing to questions having arisen as to where the appropriation of June 18, 1878, should be applied. It is now decided that it be applied to improving the channel below the dam, and will be expended before the close of the present fiscal year.

July 1, 1878, amount available .....	\$5,000 00
July 1, 1879, amount expended during fiscal year.....	130 52
July 1, 1879, amount available .....	4,869 48

Amount (estimated) required for completion of existing project .....	10,000 00
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(See Appendix H H 12.)

#### EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

To comply with provisions of the river and harbor act of March 3, 1879, Major McFarland has been charged with and is now engaged upon *resurvey of Ogdensburg Harbor, New York*, the results of which will be duly submitted when received.

#### PACIFIC COAST.

##### IMPROVEMENT OF OAKLAND AND WILMINGTON HARBORS AND OF SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

Officer in charge, Lieut. Col. G. H. Mendell, Corps of Engineers.

1. *Improvement of Oakland Harbor, California.*—The river and harbor acts of June 18, 1878, and March 3, 1879, imposed the restriction that the sums appropriated shall not become available until the right of the United States to the bed of the estuary and the training walls is secured, free of expense to the government, in a manner satisfactory to the Secretary of War.

This restriction has prevented any active operations of construction throughout the year.

The river and harbor act of March 3, 1879, in addition to restating the restriction of that of June 18, 1878, requires the appropriation of

\$60,000 which it contains to be covered into the Treasury in case these rights shall not be secured before September 1, 1879.

Several consultations with representatives of the Oakland Water-front Company, which is the party with whom the United States have to deal in the matter, have been held with the view of reaching an agreement, but at the close of the fiscal year none had been reached.

If the conclusion of the matter shall permit the expenditure of the sums appropriated, it is proposed to apply them to increasing the height of the jetties and widening the channel between them.

The officer in charge submits an estimate of \$200,000 for continuing the improvement of this harbor for the fiscal year ending June 30, 1881.

July 1, 1878, amount available.....	\$99,642 81	
Amount appropriated by act approved March 3, 1879.....	60,000 00	\$159,642 81
July 1, 1879, amount expended during fiscal year.....		3,701 07
July 1, 1879, amount available.....		155,941 74
Amount (estimated) required for completion of existing project.....	920,435 20	

(See Appendix I I 1.)

2. *Improvement of Wilmington Harbor, California.*—An improvement has taken place during the year both in the width and in the depth of the channel. There is now a practicable channel of 9.5 feet at mean low-water and of 14 feet in neap high-water and 17 feet in spring-tides. The coasting-vessels trading at this point habitually enter the harbor.

The appropriation of the past year was spent mainly in stone, of which 6,166 tons were delivered. The stone was applied to the timber line, of which 330 feet was fairly protected; and to the west training-wall, of which 960 feet was built to a level of 4 feet above low-water; a small portion being placed on the main stone jetty for a distance of 150 feet. The sand-dunes outside of the work have extended and increased in height.

It is proposed to expend the appropriation of \$12,000 made March 3, 1879, in the purchase of stone to be applied to the jetties. The widening of the cut through the reef ought next to receive attention.

A small balance of last year's appropriation remains, which will be expended in the purchase of stone.

July 1, 1878, amount available.....	\$20,000 00	
Amount appropriated by act approved March 3, 1879.....	12,000 00	32,000 00
July 1, 1879, amount expended during fiscal year.....		18,022 40
July 1, 1879, amount available.....		13,977 60
Amount (estimated) required for completion of existing project.....	68,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office.....	20,000 00	

(See Appendix I I 2.)

3. *Improvement of Sacramento and Feather rivers, California.*—During the year 154 snags were removed from the Sacramento River under contract. No bids having been offered in reply to public advertisement for the removal of snags in Feather River, an arrangement was made with a private party under which a few snags were removed. The funds that remained upon the completion of the snagging were devoted to a thorough hydrographic survey of the Sacramento River and its subsidiary channels below the mouth of the American River. The bars were carefully examined, and samples of the material composing them were ob-

tained from 100 borings. The slope of the river in its different parts was determined, and some investigation of the movement of the bottom in high stages of water and of the quantity of sediment carried by the river were made. The results of this survey have been recorded in maps, scale 1 inch to 300 feet, and in a number of sections and profiles.

The operations for the coming year will include the usual removal of snags.

The operations recommended for the coming year are constructions to improve the navigation at Heacock's, the Ironhouse and Ida Shoals on the lower river, and for the upper river the construction of a snag-boat and improvements of bars and bends.

July 1, 1878, amount available.....	\$15,183 85	
Amount appropriated by act approved March 3, 1879.....	12,000 00	\$27,183 85
July 1, 1879, amount expended during fiscal year.....		16,007 19
July 1, 1879, amount available.....		11,176 66
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office.....	50,000 00	

(See Appendix I I 3.)

#### EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

To comply with provisions of the river and harbor act of March 3, 1879, Lieutenant-Colonel Mendell has been charged with and is now engaged upon the following, the results of which will be duly submitted when received:

1. *Petaluma Creek, California.*
2. *Sacramento River, California.*

#### IMPROVEMENT OF THE HARBOR AT SAN DIEGO—IMPROVEMENT OF SAN JOAQUIN RIVER, CALIFORNIA.

Officer in charge, Lieut. Col. C. S. Stewart, Corps of Engineers.

1. *Improvement of harbor at San Diego, California.*—The damages to the slopes of the levee caused by the heavy rains of the winter of 1877-'78 were repaired. In a few places where the stone facing of river slope had been undermined by drainage from the top of the levee, it was taken up and relaid. The total expense amounted to \$68.22, exhausting the appropriation.

The appropriation of \$1,000 made for the present fiscal year will probably suffice for repairs for several years to come.

July 1, 1878, amount available.....	\$68 22	
Amount appropriated by act approved March 3, 1879.....	1,000 00	\$1,068 22
July 1, 1879, amount expended during fiscal year.....		68 22
July 1, 1879, amount available.....		1,000 00

(See Appendix J J 1.)

2. *Improvement of San Joaquin River, California.*—The original project having been completed, no work has been done during the past fiscal year.

A resurvey of the part of the river hitherto worked upon is proposed as soon as may be practicable.

July 1, 1878, amount available.....	\$629 91	
July 1, 1879, amount available.....	629 91	

(See Appendix J J 2.)

## EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

To comply with the provisions of the river and harbor act of June 18, 1878, Lieutenant-Colonel Stewart was charged with and has completed the following:

1. *The harbor of San Luis Obispo, California.*
2. *The harbor of San Buenaventura, California.*
3. *The harbor of Santa Barbara, California.*

The results of these examinations, made with a view to the practicality of building breakwaters at those places, were transmitted to Congress and printed in House Ex. Doc. No. 22, Forty-fifth Congress, third session. (See also Appendix J J 3.)

4. *Colorado of the West from Fort Yuma to El Dorado Cañon.* (See Appendix J J 4.)

And to comply with provisions of the river and harbor act of March 3, 1879, he was charged with and is now engaged upon an examination of *Trinidad Harbor, California*, the results of which will be duly submitted when received.

To comply with the provisions of the river and harbor act of June 18, 1878, the late Lieut. Col. B. S. Alexander, Corps of Engineers, was charged with and completed examinations of the following harbors, the results of which were transmitted to Congress and printed as House Ex. Doc. No. 22, Forty-fifth Congress, third session:

1. *Crescent City Harbor, California, with a view to its adaptability as a harbor of refuge.*
2. *Humboldt River, California, with a view to its adaptability as a harbor of refuge.*

(See also Appendix J J 5.)

## IMPROVEMENT OF RIVERS AND HARBORS IN OREGON AND IN WASHINGTON TERRITORY.—IMPROVEMENT OF LOWER CLEARWATER RIVER, IDAHO.—CONSTRUCTION OF CASCADES CANAL, COLUMBIA RIVER.

Officer in charge, Maj. G. L. Gillespie, Corps of Engineers, since October 22, 1878, when he relieved Maj. J. M. Wilson, Corps of Engineers' of the charge of these works. Lieut. C. F. Powell, Corps of Engineers, has been under the immediate orders of Major Gillespie since May 10, 1879.

1. *Improvement of the Lower Willamette and Columbia Rivers, Oregon.*—Operations during the fiscal year have consisted of dredging at the mouth of the Willamette, at Swan Island Bar, Willamette River, and at Saint Helen's Bar, Columbia River.

Surveys have been made at Swan Island, Willamette Slough, Coon Island Slough, Saint Helen's Bar, Maxwell's Bar, Sand Island and Harbor, including bar at the mouth of the Columbia River. Water-gauges, with large figures, have been established in the Columbia River for the use of pilots of deep-draft vessels at Hog's Back, above and below Saint Helen's Bar, and at the mouth of the Willamette. Extensive repairs have been made upon the United States dredge and scows.

During the present season it is proposed to continue dredging over shoal bars in the Willamette and Columbia rivers, to build an open stone and brush dam in the Willamette Slough near its head, and to commence a stone and brush dike at the head of Swan Island, to deflect the current toward the right bank.

July 1, 1878, amount available .....	\$36,811 89
Amount appropriated by act approved March 3, 1879 .....	45,000 00
	\$81,811 89
July 1, 1879, amount expended during fiscal year .....	10,104 89
July 1, 1879, amount available .....	71,707 00
	71,707 00
Amount (estimated) required for completion of existing project .....	223,974 00
Amount that can be profitably expended in fiscal year ending June 30, 1881 .....	150,000 00

(See Appendixes K K 1 and K K 13.)

2. *Improvement of Upper Willamette River, Oregon.*—Operations during the fiscal year have consisted of the removal of a portion of Bissell's and Dove's Rocks, in the Rock Island Rapids; of removal of snags and stumps from the river from Portland to Corvallis, and of cutting trees from the banks of the river. Propelling power and a scraper have been added to the snag-boat.

During the present season it is proposed to continue the removal of snags and stumps from the channel, and to scrape the shoal bars.

July 1, 1878, amount available .....	\$20,126 25
Amount appropriated by act approved March 3, 1879 .....	12,000 00
	\$32,126 25
July 1, 1879, amount expended during fiscal year .....	17,724 74
July 1, 1879, amount available .....	14,401 51
	14,401 51

Amount estimated:

Annually required to maintain the river in the condition contemplated in the plan of improvement .....	17,500 00
* Amount (estimated) required for completion of existing project .....	46,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office .....	50,000 00

(See Appendixes K K 2 and K K 14.)

3. *Improvement of Upper Columbia and Snake rivers, Oregon and Washington Territory.*—Operations during the fiscal year were carried on from September to December, 1878, both inclusive, removing solid rock from the channel through Five Mile, Fish Hook and Pine Tree Rapids, Snake River, Washington Territory.

During the present season it is proposed to continue the removal of solid rock at Umatilla Rapids, in the Columbia River, and at Fish Hook, Monumental, Palouse, and Texas Rapids, in the Snake River.

July 1, 1878, amount available .....	\$20,000 00
Amount appropriated by act approved March 3, 1879 .....	20,000 00
	\$40,000 00
July 1, 1879, amount expended during fiscal year .....	16,693 18
July 1, 1879, amount available .....	23,306 82
	23,306 82

Amount (estimated) required for completion of existing project .....	92,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881, as revised in this office .....	40,000 00

(See Appendixes K K 3 and K K 15.)

4. *Construction of canal around the Cascades of Columbia River, Oregon.*—Work has been carried on, under contract, since October 19, 1878, excavating for foundation for both locks, excavating a portion of the canal prism, drilling and blasting bowlders, and dressing stone for the

\* "Existing project" includes:

The building of a snag-boat .....	\$14,000 00
Survey of the river .....	12,000 00
Construction of 6,000 feet of dam .....	20,000 00
	\$46,000 00