43D CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc. 1, Part 2.

REPORT

OF THE

SECRETARY OF WAR,

BEING PART OF

THE MESSAGE AND DOCUMENTS

COMMUNICATED TO THE

TWO HOUSES OF CONGRESS

AT THE

BEGINNING OF THE FIRST SESSION OF THE FORTY-THIRD CONGRESS.

VOLUME II.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1873.

REPORT

OF

THE CHIEF OF ENGINEERS.

Section, and Oblique Section, and at the last two places brush had also been laid for their further protection; and,

8. Accurate resurveys made in 1872 of Cove Section and Oblique Section, together with elaborate sounding and current observations in the inner harbor, with a report thereon.

Of the several appropriations made for this harbor there was July 1, 1872, an unexpended balance of $5,984.43. With this balance, together with a part of the appropriation of March 3, 1873, the following work has been done during the last fiscal year, viz: The construction of 1,160 linear feet of brush jetties in extension of many of those hitherto built on Beach Point; the rebuilding and repair of the bulk-head near the State dike, and the repair of the several jetties on Beach Point where necessary; the stone bulk-head on Long Point extended and strengthened for the protection of the light-house; and a large quantity of beach-grass planted on Beach Point. For continuing these repairs, and for the other necessary works projected for the preservation of this harbor, an additional appropriation is desired.

Amount available July 1, 1872	$5,984 43
Amount appropriated by act of March 3, 1873	6,000 00
Amount expended during the fiscal year ending June 30, 1873	9,597 81
Amount available July 1, 1873	2,386 62
Amount required for the fiscal year ending June 30, 1875	8,000 00

(See Appendix X 24.)

EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

Lieutenant-Colonel Thom was charged with and has completed the following, provided for by act of June 10, 1872, viz:

1. *Survey of Machias River, Maine.* (See Appendix X 25.)
2. *Survey of Camden Harbor, Maine.* (See Appendix X 26.)
3. *Survey of the channel and bank at entrance of Salem Harbor, Massachusetts.* (See Appendix X 27.)
4. *Survey of Merrimac River, Massachusetts.* (See Appendix X 28.)

He is also charged with the following, directed to be made in compliance with provisions of the act of March 3, 1873, viz:

1. *At Aroostook River, Maine, for improvement of the channel.*
2. *The Penobscot River, Maine, from Oldtown to Medway and vicinity.*
3. *At Portsmouth Harbor, New Hampshire, for breakwater between Gerrish's Island and Wood Island.*
4. *In Ipswich Bay, Massachusetts, at Hodgkin's Cove, to ascertain the practicability of a harbor of refuge by building a breakwater there.*

These surveys are in progress, will be completed this season, and their results transmitted as soon as received.

IMPROVEMENT OF RIVERS IN OREGON.

Officer in charge, Maj. Henry M. Robert, Corps of Engineers.

1. *Improvement of the Lower Willamette River, Oregon.*—A cut 4,400 feet long, 100 feet wide, and 17 feet deep at low tide was finished across Swan Island Bar during the working season of 1872, and an examination just concluded shows that it has kept comparatively free from deposit during the two freshets which have since intervened.

A channel of 15½ feet at low water was re-opened across the bar at the mouth of the river, and extensive examinations were made over other shoals reported to be in course of formation.

A new dredge built during the fiscal year will be employed at the

mouth of the river during the season in making a cut of 17 feet at low water, as also at Post-Office Bar, three miles above.

With the appropriation of March 3, 1873, the officer in charge proposes to dredge a 17-foot channel across Saint Helen's Bar, in Columbia River, as well as to examine a new and dangerous shoal near the "Hog's Back."

Amount available July 1, 1872	$53,854 80
Amount expended during the fiscal year ending June 30, 1873	46,330 08
Amount available July 1, 1873	27,524 72
Amount required for fiscal year ending June 30, 1875, for improvement of the Lower Willamette and Columbia rivers from Portland, Oregon, to the sea	20,000 00

(See Appendix Y 1.)

2. *Improvement of the Willamette River above Oregon City.*—Two hundred and twenty-two large and dangerous snags have been removed, and 2,000 feet of wing dams were built by contract at six different points on the river. Additional work of this kind is recommended to be done during the next fiscal year, the amount appropriated for the present year being insufficient to do much more than work the snag-boat.

Amount available July 1, 1872	$8,253 61
Amount appropriated by act of March 3, 1873	3,000 00
Amount expended during fiscal year ending June 30, 1873	8,241 40
Amount available July 1, 1873	3,012 21
Amount required for fiscal year ending June 30, 1875	15,000 00

(See Appendix Y 2.)

3. *Improvement of the Upper Columbia River, Oregon.*—A contract was made for the removal of rock in the John Day, Devil's Bend, and Umatilla Rapids of this river. John Day rock was removed to the required depth, 7 feet mean low water, and 213½ cubic yards were removed from Umatilla Rapid. Running ice prevents the completion of the work before the spring rise, and the time for the completion of the contract has been extended to April 30, 1874.

The work proposed for the next fiscal year is the improvement of Homly Rapid, so as to give the same depth of water as will be obtained on the above-named three points.

Amount available July 1, 1872	$50,000 00
Amount expended during fiscal year ending June 30, 1873	21,785 67
Amount available July 1, 1873	28,214 33
Amount required for fiscal year ending June 30, 1875	20,000 00

(See Appendix Y 3.)

Survey of Saint Helen's Bar, Columbia River, Oregon.—A second examination of this bar was made in October last to ascertain the change caused by the summer freshet. No material change was found to have taken place. The officer in charge reports that slight dredging each year, in connection with the Lower Willamette improvement, will suffice to keep the channel over the bar open.

(See Appendix Y 4.)

EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

Major Robert was charged with and has completed, in compliance with provisions of the act of June 10, 1872, an examination at Port Orford Harbor, Oregon, with a view to making a harbor of refuge at that point. (See Appendix Y 5.)

He is also charged with the following, provided for in the act of March 3, 1873:

1. *Yamhill River, Oregon.*
2. *Mouth of the Coquille River, Oregon.*

The results of which will be duly submitted when received.

BREAKWATER AT WILMINGTON, CALIFORNIA—REMOVAL OF RINCON ROCK IN THE HARBOR OF SAN FRANCISCO.

Officer in charge, Maj. G. H. Mendell, Corps of Engineers, having under his immediate orders Lieut. C. B. Sears, Corps of Engineers.

The timber construction, in progress at the date of the last annual report, was completed in November. Twenty-seven hundred feet of the first and 1,000 feet of the second construction were built. The first section was embanked with clay, sand, and gravel almost throughout its length to the height of mean low water or above.

In July the high course of tide undermined and carried away 360 feet of the work. The gaps thus made were left open until the timber-work was completed. Afterward they were closed, using stone and timber.

The part of the work next Deadman's Island, 2,000 feet in length, was advanced two-thirds to completion. A part of the stone used in this part of the work was furnished under contract from Catalina Island. A part was taken from Deadman's Island and from the beach in the vicinity.

The water on the bar has been deepened one foot. The deep water has been advanced about 250 feet seaward. When the current ceases to dredge, artificial means will be used to excavate a channel, which is intended to be 200 feet wide and 10 feet deep.

It is believed that the funds now available will be sufficient for this purpose, as well as to complete the other parts of the work.

Amount available July 1, 1872	$145,461 47
Amount appropriated by act of March 3, 1873	150,000 00
Amount expended during fiscal year ending June 30, 1873	149,814 40
Amount available July 1, 1873	145,647 07

No additional appropriation is required for the next fiscal year.

(See Appendix Z 1.)

2. *Removal of Rincon Rock, harbor of San Francisco.*—It appearing from the report of the officer in charge, transmitting results of a careful examination he was directed to make with the view of determining the probable amount of rock to be removed to a depth of 20 feet at mean low water, that inasmuch as a re-adjustment of the line of the water-front, and of the system of wharves which is contemplated by the harbor commissioners of San Francisco, might render the removal of the rock not only unnecessary but perhaps positively harmful, it was deemed expedient to wait a reasonable time before taking action upon the expenditure of this appropriation. But subsequently it appearing from reliable representations to be the opinion and desire of the mercantile part of the community of San Francisco that the removal of Rincon Rock should not be longer delayed, the officer in charge was directed to contract with the lowest bidder therefor, and the work is now in progress.

Amount appropriated for this work by act of June 10, 1872	$50,000 00

(See Appendix Z 2.)

EXAMINATIONS AND SURVEYS FOR IMPROVEMENT.

In compliance with provisions of the act of June 10, 1872, Major Mendell was charged with and has completed the following:

1. *At Estero Bay, San Luis Obispo County, Cal.* (See Appendix Z 3.)
2. *Of the harbor of San Diego, Cal.* (See Appendix Z 4.)

Y 1.

IMPROVEMENT OF THE LOWER WILLAMETTE RIVER, OREGON.

The operations during the past year have been confined to dredging, with the old dredger belonging to the city of Portland, at Swan Island and the bar at the mouth of the Willamette River, and the construction for a new dredger and two large dumping-scows.

Swan Island Bar.—The old dredger was put into thorough repair and work commenced on the continuation of Swan Island cut on the 10th of August. Every effort was made to complete the cut across the bar this season, as it was hoped, that when finished, the annual freshet would not cause so much deposit in the cut as it had the previous year. With one intermission during September, when the dredger had to proceed to the bar at the mouth of the river, the work was pushed through unremittingly with only such detentions as were due to accidents, and the delays caused by these were not great, as the precaution had been taken to have on hand duplicates of all parts of the machinery which were likely to break.

About the 15th of November the cut reached the 17-foot curve above the bar, and until the 19th of December, when the dredge went back to the mouth of the river, she was occupied in dredging a wide funnel-mouth, or entrance, to the channel at its southern end.

An examination by my assistant, made during the present month, shows that the two "high waters" which have occurred since the completion of the cut, have made but a few inches (4 or 5) deposit in the channel, and that in only a small part of it, after seven and a half months' intermission of dredging. Last year the deposit in one place was 4 feet deep; in 1870–'71 it was two feet; in 1869–'70 it measured 150 cubic yards in the small cut then finished.

The number of cubic yards of material dredged out was 21,560 by scow measurement on about 1,820 linear feet of cut; of this amount about 4,500 cubic yards were new deposit in the cut.

The Swan Island cut can now be considered completed, as it has been dredged to a depth of 17 feet at low tide during the lowest stage of water in the river. The cut is 4,400 feet long, 100 feet wide, opening out to 250 feet at the head, and averages 3 feet deep, though at its deepest part it is at least 5 feet deep, and therefore making 5 feet difference in the draught of vessels that can cross the bar in the fall. The bar is composed mostly of clay and gravel, and will, in all probability, require very little attention hereafter, though I presume there will always be slight annual deposits of sand at this point.

Bar at the mouth of the river.—In September, 1872, an examination showed but 12 feet of water for 300 linear feet, and 13 feet for 200 linear feet on this bar. The dredger was sent to this point September 11, and by the end of that month had opened a channel holding 15½ feet at low water (the depth then existing at Swan Island) across the bar.

On the 19th of December, after the Swan Island cut was finished, she was sent again to this point with the intention of spending the remainder of the working season here, but a sudden storm on the 23d raised the river rapidly and put a stop to all further operation. Four thousand one hundred and sixty-five cubic yards of clay and sand were removed at this point on about 500 linear feet of cutting.

The total excavation during the year was 25,725 cubic yards, at a cost of $12,503.34, including repairs to old dredger and surveys and office expenses at an average cost of 48.6 cents currency per cubic yard.

Excluding the repairs to the old dredger and surveys and office expenses, the net cost per cubic yard of the dredging would be 30.8 cents per yard, the repairs alone costing $3,016.48.

In April a large troublesome snag, which had lodged during the high water, was removed from Swan Island channel.

After the completion of the work in December, some necessary repairs were made on the old dredger, and she was turned over to the common council of the city of Portland in as good condition as when received therefrom, making due allowance for her natural depreciation during the five and a half years she had been in the hands of the Government.

After an investigation into the merits of the various dredging-machines, it was decided that the best for use on the Columbia and Willamette Rivers was the Morris and Cummings machine, and with the approval of the Chief of Engineers, arrangements were made with the owners of the patent for the purchase of the machinery with the right to use it on the Willamette and Columbia Rivers, and in September advertisements were inserted in the papers inviting proposals for the construction of the hull of the dredge-boat, a boiler, and two engines, and two dumping-scows, all of which were built in this city. Owing to misunderstandings with the patentees as to their increase of price for the machinery and patent-right, and afterward to the refusal of the Central Pacific Railroad to deliver the machinery at San Francisco, without payment of the entire freight-bill, while the law positively prohibited my paying freight on public property over that road, rendering it necessary for me to go to Sacramento, the headquarters of the company, before I could get the property released—owing to these delays the machinery was not received till June 14 of this year. After it was put up I found it advisable to have some additional machinery made so as to do as much as possible of the work by steam.

Arrangements were made to have the dredger ready by the 15th of August, which is about the time the summer's dredging is usually begun, but an extensive fire, sweeping over twenty of the city blocks, destroyed the foundery doing our work and delayed the time of commencing the dredging till the 1st of September.

The dredge has a bucket holding 1½ cubic yards, and is arranged for digging to a depth of 35 feet, or about 8 feet deeper than the old dredge, which had a single dipper. This will allow us to work earlier in the season when the increased depth of water in the Willamette is compensated for by the fact that it is back water from the Columbia, and there is consequently no current. Instead of the snag-boat (belonging to the city of Portland) formerly used, there is provided a skeleton-bucket which in three hours can be substituted for the dredging-bucket, and thus the dredger is converted into a snag-boat. The dredger is 85 feet long, 30 feet wide, with accommodations on board for a crew, and costs with complete outfit $31,000, currency.

The two scows built are 70 by 20 by 7 feet, and contain 100 cubic yards each. Their cost was $2,741.46 currency, each.

The increased size of the dredge and scows, and the fact that they are to be used in the Columbia River where it is over six miles wide and exposed to a heavy sea, has rendered it necessary to employ a much more powerful tug than formerly used, and also to build a wood-scow, which will be necessary in the Columbia.

During the month of October I had a resurvey of Saint Helen's Bar of the Columbia, to ascertain its condition during the low water after the June freshet. The change since the survey on the previous spring was im-

material. As there was doubt as to the correct level of lowest water, I had erected a simple automatic tide-gauge at this point, which was in operation from November 17, 1872, to January 5, 1873, which revealed the fact that the water fell on the 25th of November 15 inches below the plane that had been assumed in all our surveys as the lowest water, and that on the 20th of December it was again within 7 inches of the same low level. I have just had this bar examined by my assistant, Mr. R. B. Randall, and find that a channel 100 feet wide can be obtained across it with 15 feet of water, (reduced to extreme low water,) though on either side of this narrow channel there is only 13 feet of water. I propose to dredge a channel about 1,000 feet long and 100 feet wide to a depth of 17 feet at low water, and as the lowest high water observed was 2 feet 6 inches above our base, we would have in the channel at high water never less than 19 feet 6 inches. I think part of the trouble with this bar is due to the fact that the buoys on either side of the channel (established by the Light-House Department) are too far apart, and vessels keeping between them may run into even 11 feet of water. There will probably be 5,000 cubic yards of dredging at this bar this summer.

The surveys just made show that at the mouth of the Willamette the usual deposit has been made, reducing the depth of the water to 10 feet at extreme low water. The cut to be made here to reach a depth of 17 feet will be about 500 feet long, and as it will be made 100 feet wide, the excavation will amount to about 9,000 cubic yards. This amount will have to be annually removed in order to keep a channel with 17 feet of water open to Portland, as I cannot yet see any practicable method of preventing this annual deposit.

Three miles above the mouth of the Willamette River is the Post-Office Bar, which shows only 15 feet of water, and will require a cut 400 feet long and the removal of about 2,000 cubic yards of material.

These three bars will require the removal of about 16,000 cubic yards this year, and I think it safe to estimate that a similar amount will have to be removed annually between Portland and Saint Helen's in order to keep open a 17-foot channel at extreme low water.

About five miles above Astoria in Cathlamet Bay, where the river is seven miles wide and the channel very crooked and narrow, is found the Hog's Back, a bar which, according to the Coast-Survey of 1868, had 14 feet of water on it. I understand that since then it has been filling up; and, still worse, that one and a half miles above it, where the Coast Survey chart shows 21 feet of water, there is only 10 feet now, and that though the pilots have tried to find some deeper channel, they have failed. This obstruction is of such a serious nature that I shall examine it immediately, and if possible, with the means at my disposal, open a channel through it. It has already been unfortunate that I could not assure shippers that this bar would be improved this season. At present there is only 17 feet of water at highest tide.

If a channel when once cut will not fill in faster than at the rate it has done since the survey of 1868 at the worst place, namely, 2½ feet each year, I think this bar can be kept to a depth of 15 feet at low water, or 22 feet at high water, by the annual use of the dredger when not needed on the upper part of the river.

The financial statement on account of the improvement of the Lower Willamette River for the past fiscal year is as follows:

Available July 1, 1872		$53,854 80
Expended during the year:		
New dredger (incomplete *)	$27,581 90	
Two new dumping-scows	5,482 93	

* Since finished at a cost of $31,000.

One new wood-scow	$529 41	
Dredger	7,919 98	
Repairs	3,016 48	
Snagging	56 50	
Superintendence, surveys, and office expenses	1,742 88	
		$46,330 08
Balance on hand June 30, 1873		7,524 72
Appropriated March 3, 1873		20,000 00
Available July 1, 1873		27,524 72

which will complete the new dredger and her outfit, and provide for its running expenses, &c., to June 30, 1874.

Estimate for the fiscal year 1874–'75 for the improvement of the Lower Willamette and Columbia Rivers from Portland, Oreg., to the sea.

Running expenses of steam-dredger, six months, at $2,500	$15,000 00
Repairs and care of dredger and scows	2,000 00
Surveys, office expenses, and contingencies	3,000 00
	20,000 00

Abstract of bids received for construction of hull of dredger, boiler and engines, and two dumping-scows, for the Lower Willamette River, Oregon.

Bidders' names and residences.	Hull of dredger.	Two dumping-scows, all rejected.	Boiler and engines.	Two dumping-scows, with modified specifications.
Robert Loller, Portland, Oreg	$11,000 00	*$12,000 00		
I. F. Steffen, Portland, Oreg	6,250 00	6,750 00		$5,200 00
I. Paquet, Oregon City, Oreg	7,925 00	8,975 00		
T. J. Bulger, Portland, Oreg	5,149 00	7,149 00		5,495 00
Oregon Iron-Works, Portland, Oreg			$7,250 00	
Willamette Iron-Works, Portland, Oreg			6,744 00	

* Thrown out.

Y 2.

IMPROVEMENT OF THE WILLAMETTE RIVER ABOVE OREGON CITY.

The operations during the year comprised the removal of 222 snags from the channel by the United States snag-boat, and the building of 2,000 linear feet of wing-dams at various points on the river. The snag-boat was towed up the river and floated down, working on the way for over three months in July, August, September, and October, and removed a total of 207 snags from the river-channel at the following points: Eola Slough, Beaver Rapid, Matheney's Bar, Biterman's Bend, Gervais Slough, Gibson's Bar, Fairfield, Big Slough, Carey's Bend, and Ash Island. These snags were from 10 to 110 feet each in length, and from 2 to 30 feet in circumference of butt and roots. Many were two-thirds bedded in the river-bottom, and were very difficult to remove. The Long's scraper was used to advantage at Gibson's Bar, attached to the snag-boat, and floated down over the bar, being hauled up stream again by hand.

Two thousand feet of wing-dams were built, under a contract made in the previous fiscal year, as follows, namely:

	Feet.
Bowers' Bar	359
Humphrey's Rapid	308
Lone-Tree Rapid	358
Beaver Rapid	270
Union Bar	275
Yamhill Bar	430
	2,000

While laying out the dams I found Chitwood Bar, for which I had estimated 600 feet of wing-dam, with a channel 3 feet deep on the very line I had marked for scraping, and it has continued this season in as good condition. The dams were completed in November, and built so as not to rise higher than 6 inches above the lowest water, and consequently the winter freshet injured them very little. They have accomplished all I expected of them, and have justified their construction. Additional wing-damming will be of great service on the river.

Last June the snag-boat went again to work, pulling 75 snags during the month, which, with those removed last season, makes a total of 222 removed during the fiscal year, at an average cost, including repairs, of $10.25 each.

During the present working season, which began last June, the snag-boat, while drifting down stream, will continue to remove the most dangerous snags from the channel, and to build small dams where it can be done to advantage with the crew of the snag-boat.

For the next fiscal year I would recommend an appropriation of at least $7,500, which will, in addition to the usual work of snagging, &c., defray the expense of putting a small donkey-engine and boiler on the snag-boat so as to work the capstan with steam-power.

This will enable much more work to be done each year before extreme low water, so that the steamboats will have the advantage of the improvements during the lowest stage of water. Last January the canal and locks at Oregon City were completed, so that boats can descend from the Upper Willamette to Portland, or the Columbia River. Additional steamers have been built and are building, and everything indicates that the trade on the river will increase greatly. In view of this fact, and of the success of the plan of improvement so far as carried out, I think it would benefit the country far more than their cost if additional wing-dams were built and the snag-boat were converted into a steamboat, (she is built on the model of the river steamers,) so that she could be used for scraping the bars as well as snagging, and would be able to do much more work than at present, or than with a steam-power capstan.

The boat was built specially with the view of converting her into a stern-wheel steamer whenever the trade on the river was sufficient to justify the expense. As long as she could do the required work without steam-power it was cheaper to run her as has been done. To carry on the improvement on this larger scale, there could profitably be used $15,000, about one-half of the amount being required for putting steam-power on the snag-boat.

The following statement shows the expenditures and balance on account of this work for the year 1872–'73:

Available July 1, 1872		$8,253 61
Expended:		
Snagging	$2,273 88	
Wing-dams	5,076 75	
Superintendence, care of property, office expenses, &c	890 77	
		8,241 40
Balance on hand July 1, 1873		12 21
Appropriated March 3, 1873		3,000 00
Available July 1, 1873		3,012 21
Appropriation required for fiscal year 1874–'75		$15,000 00

Abstract of bids received for building wing-dams on the Upper Willamette River, Oregon.

Name and residence.	Amount per linear foot per dam.	Remarks.
L Paquet, Oregon City, Oreg	$2 50	Accepted.

Y 3.

IMPROVEMENT OF THE UPPER COLUMBIA RIVER, OREGON.

In August, 1872, a project was forwarded to the Chief of Engineers for the application of the $50,000 appropriated by Congress for this improvement. On its approval, advertisements were inserted calling for proposals, to which but one response was received, and in October, a contract was made with Mr. J. B. Montgomery for the removal of the rock contemplated, and the contractor began immediately to convey men and material to the ground.

In the early part of November the weather was unfavorable, and work did not begin fully until the middle of the month, when, a cold spell coming on, the river suddenly fell 2 feet. The contractor began on John Day Rock and Umatilla Rapids, working a large force of men on the former.

In December running ice so hindered operations at Umatilla that work was suspended, only about 15 cubic yards having been removed from one rock in that rapid. On January 20, he resumed and continued working until the end of March, when high water stopped all further operations.

The work done during this time was the removal of the whole of John Day Rock above a plane 7 feet below mean low water, (about 1,000 cubic yards,) and 213½ cubic yards from Umatilla Rapid. None of the latter has been paid for, and only 80 per cent. of the contract price for the "John Day" work; 20 per cent. being preserved until the completion of the whole work embraced in the contract.

Immediately after making the contract, I made an examination of the rapids, and found that the real difficulties at Devil's Bend were not included in the survey of 1869, and consequently agreed with the contractor that an equal amount of rock would be removed, the rocks to be selected by me at the time his boats were at the rapids, as the expense of building boats for a survey did not appear justifiable.

In a special report, dated May 9, 1873, transmitting the application of Mr. Montgomery for an extension of the time for the completion of the work one year, I stated fully my reasons for recommending that his request be granted. This was approved by the Chief of Engineers, and the contractor has now until April 30, 1874, to finish the work, which it is expected he will be able to do. No work can be done until the low water season, beginning in November, and the difficulties encountered in the prosecution of the work are so great, that it is impossible to make any definite calculations on the completion of the work.

The amount asked for the next fiscal year will be applied to the improvement of Homly Rapid, and such other work as may tend eventually to put the rest of the river, from the Dalles to the crossing of the North Pacific Railroad, (near Snake River,) in the same condition for navigation as the John Day, Umatilla, and Devil's Bend will be when the present contract is finished.

The inclosed copies of correspondence from a director and the general agent of this company will show the necessity of the proposed work.

The following is a statement of the moneys expended and available for this improvement during the fiscal year:

Available July 1, 1872		$50,000 00
Expended:		
Removal of rocks	$19,296 69	
Superintendence, office expenses, &c	2,488 98	
		21,785 67
Balance on hand June 30, 1873		28,214 33
Amount required for fiscal year 1874–'75		50,000 00

No appropriation was made or asked for the present fiscal year.

Abstract of bids for removal of rock in the Upper Columbia River, Oregon.

Bidder's name and residence.	For John Day Rock, 960 cubic yards.	Devil's Bend.	Umatilla Rapid.
J. B. Montgomery, Portland, Oreg ..	$24, 100 00	$8, 550 00	$10,000 for 200 cubic yards, and $25 for each additional cubic yard.

OFFICE OF OREGON STEAM NAVIGATION COMPANY,
Portland, Oreg., September 7, 1872.

MY DEAR SIR: The inclosed letters I submit for your information.

If you can comply with the request of the Union Pacific Railroad Company, and include Homly Rapids in your estimates for improvements, you will greatly oblige a very important interest. The prospects are that the Union Pacific Railroad Company will soon commence the construction of the main trunk line from mouth of Snake River to Pend D'Oreille Lake, in which event it will be all-important to the interests of the country that will be thus opened to settlement and commerce that the obstructions in Homly Rapids be removed at an early day. I earnestly request your favorable consideration of the subject.

Very respectfully, &c.,

J. C. AINSWORTH,
President.

Maj. ROBERT, *U. S. A.*

NORTHERN PACIFIC RAILROAD COMPANY, PACIFIC DIVISION,
Office Assistant Treasurer and General Agent, Kalama, W. T., September 4, 1872.

DEAR SIR: The inclosed letter was sent me by Mr. Canfield, with request that we try to induce Major Robert to include Homly Rapids in his plans. It would seem important that this be done, and I shall be glad to know that you present the case to him.

Yours, truly,

J. W. SPRAGUE,
General Agent.

Capt. J. C. AINSWORTH,
President Oregon Steam Navigation Company.

P. S.—I am informed that General Cass, president-elect, and about a dozen others, will reach Portland Saturday, 28th instant.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., August 21, 1872.

SIR: The engineer officer in charge of the improvement of the Upper Columbia, Maj. H. M. Robert, Portland, Oreg., has been directed to submit to this office a project for the expenditure of the appropriation of June 10, 1872, for this object, specifying in

what manner and what portion of the river the funds available should be applied. His report thereon has not been received. When received, if approved, immediate steps will be taken to prosecute the work.

By command of Brigadier General Humphreys.

Very respectfully, your obedient servant,

J. G. FOSTER,
Lieut. Col. Engineers and Bvt. Maj. Gen.

THOMAS H. CANFIELD, Esq.,
Director Northern Pacific Railroad Company,
120 *Broadway, New York City.*

Y 4

SURVEY OF SAINT HELEN'S BAR, COLUMBIA RIVER, OREGON.

In the month of October, 1872, a resurvey of this bar was made to ascertain its condition during the low water after the summer freshet. The change since the previous survey in May was very slight, and I think that a small amount of dredging in July or August of each year will keep open a channel across this bar. In November a tide-gauge was set up at Saint Helen's, which registered the highest and lowest water of each day until January 5, when the river rose so much as to render further observations useless. It was found that the water was, on November 25, 15 inches lower than what was supposed to be the lowest water. At this extreme low water there would have been only about 14 feet 6 inches on the bar. This work is now, by appropriation for this year, included with that upon the Lower Willamette River, and therefore no additional funds are required for it. The full commercial statements required were submitted with my annual report for last fiscal year, (1871–'72.)

The cost of survey and tidal observations was $213.39.

Y 5.

PORT ORFORD HARBOR, OREGON.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., January 18, 1873.

GENERAL: I have the honor to submit the following report of my examination at Port Orford, with a view to making a harbor of refuge at that point.

On the 12th of September, 1872, accompanied by my assistant, Mr. F. H. West, I left Portland, and reached Empire City, on Coos Bay, on the 15th. From Coos Bay, there being only a trail, we proceeded on horseback, reaching Port Orford the night of the 17th. We remained there five days, examining the bay and its surroundings. As there was no boat at the place, except a light skiff, I had a small raft constructed, and by means of some gas-pipe from an old mill, with a cone at the end, succeeded in getting samples of the bottom of the roadstead in eight fathoms. Judging from these samples, which were sand with a moderate mixture of clayey substance, the bottom is excellent holding-ground, for which it has a good reputation. The facilities for obtaining rock could scarcely be better. A breakwater would naturally run from the points of rock either north or south of Nelly's Cove, (see sketch annexed.)