

channel and dredge the sand shoal immediately above Berkeley bridge. It was thought that more good would result from removing bowlders with the \$2,000 than by dredging. From the uncertainty as to their size and exact location, it was impossible to prepare specifications for their removal, and authority to have the work done by day's labor was given. The lowest offer, \$4.75 per cubic yard, was by Messrs. G. L. and H. W. Phillips, of Quincy Point, Massachusetts, and they were employed to do the work. The amount of bowlders removed from the channel between Weir and Dighton, a distance of 6 miles, was  $232\frac{43}{100}$  cubic yards. This included the most dangerous ones in this distance, and all of which special complaint had been made. On the shoalest parts, where trouble had been experienced by vessels touching the bottom, all were removed, the larger ones being chained and hoisted and the smaller raised in buckets filled by divers.

The channel of 60 feet least width is now thought to be free from bowlders, having a less depth than 10 feet in the lower and 9 feet in the upper part of the river at mean high-water. The tide rises 5.28 feet at Dighton and 3.41 feet at Weir.

#### WORK PROPOSED FOR THE FISCAL YEAR ENDING JUNE 30, 1880.

The only place that has a less depth than above stated, is at Berkeley Shoal. This shoal is composed of sand, and vessels are not damaged by grounding on it. It is now thought best not to attempt to deepen the water on it. The amount of the last appropriation, \$1,000, is too small to wholly remove this shoal, and it may be desirable to leave it as it is to limit the depth to which vessels can be loaded; for if it is removed they will be loaded deeper and be injured by striking on bowlders in the channel above.

A greater benefit to the navigation may be obtained with the \$1,000 by removing the bowlders on the sides of the channel in its narrowest places and at the bends. The change in the methods of freighting coal from sailing vessels to long barges towed by steam-tugs has been made on this river since the improvement began, and for them the channel is too narrow and some of the turns too short.

Were the banks composed of sand or clay these long vessels would find the navigation difficult but not dangerous. As it is, the occasional bowlders scattered along the sides of the natural channel and the numerous ones along the sides of the artificial cuts which have been pushed out to the side by the dredges employed are likely to stave a hole in any vessel hitting them.

It is proposed to continue removing bowlders by hired labor, for the same reasons as before given.

With the expenditure of the funds on hand the improvement may be considered as substantially completed according to the original design, and no further sums are asked for under it. The commerce of the river is growing in importance, and an improvement of much greater magnitude is desired by the business interests.

It is probable that an effort in this direction will be made by memorial to Congress.

#### IMPORTANCE OF TAUNTON RIVER NAVIGATION.

The amount of commerce on this river as given below was kindly furnished us by Messrs. Staples & Phillips.

#### Commerce on the Taunton River in 1878.

Grain .....			Tons.
Flour .....	bush.	800,000	20,000
Coal .....	bbls.	30,000	3,000
Iron and iron ore .....	tons	150,000	150,000
Clay and sand .....	do.	35,000	35,000
General merchandise .....	do.	12,000	12,000
Lumber, feet .....	do.	10,000	10,000
Cotton .....	b. m.	5,000,000	10,000
	bales.	20,000	4,000
Total .....			244,000

Since 1870 the tonnage owned on this river has increased as follows, viz:

Barges .....	Tons.
Steamers .....	3,000
15 schooners .....	1,800
Total .....	7,600
	12,400

The amount of commerce in former years we have no means of obtaining.

Taunton River is in the Fall River collection-district. Fall River is the nearest port of entry. The amount of revenue collected in this district for the fiscal year ending June 30, 1879, \$\_\_\_\_\_.

#### Money statement.

July 1, 1878, amount available .....	\$2,000 00
Amount appropriated by act approved March 3, 1879 .....	1,000 00
July 1, 1879, amount expended during fiscal year .....	\$3,000 00
July 1, 1879, amount available .....	1,973 79
	1,026 21

#### B 6.

#### IMPROVEMENT OF PAWTUCKET (SEEKONK) RIVER, RHODE ISLAND.

##### DESCRIPTION OF LOCALITY.

This is an estuary forming the continuation of Providence River from Providence to Pawtucket, a distance of 5 miles, and forms a shoal tidal basin of about  $1\frac{1}{2}$  square miles. The navigation is seriously obstructed by a badly arranged draw-bridge near its lower end, at East Providence. The ruling low-water channel depth before it was improved was 5 feet. The mean rise of the tide is about 5 feet at Pawtucket. It was dredged till the ruling depth at mean low-water was 7 feet, and least channel width of 75 feet.

##### HISTORY.

Dredging was begun (by an appropriation from the general government) in 1868, \$17,000 being allotted; in 1870, \$8,000 was appropriated; in 1871, \$7,000; in 1872, \$10,000; in 1873, \$10,000; in all \$52,000. For details see Annual Report 1874, pp. 227 to 237, Part II.

## WORK DURING LAST FISCAL YEAR.

Nothing was done beyond making a few tidal observations and levelings to test the high and low water determinations and bench-marks made in the survey of 1873. These were verified as closely as the engineering operations had rendered necessary. Since then the city of Providence has been extending streets into the tidal basin, and there has been talk of rebuilding the bad draw-bridge. Questions about the tides have arisen in the discussion of questions relating to these matters, which, whether practical or not, require somewhat nearer determinations than those heretofore made.

## WORK DURING THE ENSUING FISCAL YEAR.

It is proposed to make some repeated levelings and tidal observations, and to sound over some of the shoals that are said to have formed since the dredging operations in 1875. No appropriation is asked for.

## IMPORTANCE OF THE IMPROVEMENT.

Pawtucket is a town of about 30,000 inhabitants, largely engaged in manufactures. In 1878 there were 350 schooners and 14 barges towed up the improved channel, having a freight of about 100,000 tons.

It is in the Providence collection-district, that place being the nearest port of entry. The revenue collected there in the past fiscal year is \$145,187.79.

*Money statement.*

July 1, 1878, amount available.....	\$1,383 53
July 1, 1879, amount expended during fiscal year.....	281 73
July 1, 1879, amount available.....	1,101 80

## B 7.

## IMPROVEMENT OF PROVIDENCE RIVER AND NARRAGANSETT BAY, RHODE ISLAND.

## LOCALITY OF IMPROVEMENT.

Providence River is an estuary of Narragansett Bay, extending from Nayat Point to the city of Providence. Its length is about 7 miles, with a width varying from 1,000 feet to 2 miles, and a depth in the channel varying from 12 feet to 50 feet at mean low-water, with a mean rise of tide of 4.7 feet. Near its head this estuary is joined by another, called the Seekonk or Pawtucket River, extending 5 miles further, to the town of Pawtucket. The Providence River also contains Bulkhead Rock, for whose partial removal there is an unexpended special appropriation of \$5,000. All the improvement thus far included under the title of this work is situated in the limits of Providence River, except a possible deepening upon a shoal below Nayat Point and above Rocky Point, to facilitate the navigation by means of the west entrance to the bay; it is not in the way, using the middle entrance to the bay.

## HISTORY OF PREVIOUS IMPROVEMENT.

According to the records we have, a survey was made of Providence Harbor by Lieut. Wm. S. Rosecrans, United States Engineers, under an appropriation made by the city, which was completed in March, 1853. In 1852, an appropriation of \$5,000 was made, and this was expended by Capt. George Dutton, United States Engineers, in dredging, in 1853, at the "Crook"—a bad shoal then existing just below Fox Point, and having a depth of only "4.3 feet at low tide." The dredging was carried to 9 feet depth at low-water, over an area of 50 yards by 280 yards.

The next appropriation was \$25,000, made in 1867, based on an estimate made by an assistant of the United States Coast Survey (Mr. F. P. Webber). This was expended in 1867, by Colonel D. C. Houston, United States Engineers, in dredging at the locality of the "Crook," with the exception of \$2,000 employed to remove a wreck opposite Sabin's Point. With this dredging a depth of 12 feet at low-water was secured up to Fox Point.

In 1870, another appropriation of \$5,000 was made by Congress which was expended under my direction at the locality of the "Crook" (which itself may be said to have been removed), and a depth of 14 feet at mean low-water secured up to the wharves at Fox Point. (For details of foregoing, see Annual Report, 1871, pp. 727-730).

On June 10, 1872, another appropriation was made. It was \$10,000, and was all expended under my direction in widening the channel just below Fox Point. A survey was made this year, as authorized by Congress, with a view to cutting off the "point of long bed," on the east side of the channel, opposite Sassafraz Point. (See Annual Report for 1872, p. 820; and for 1873, pp. 968-970).

On March 3, 1873, an appropriation of \$10,000 was made, which was all expended in removing the point of long bed. See Annual Report for 1874, pp. 237-239.) This practically completed the improvement by dredging as far as it was needed for the use of coasting-vessels. The city had also expended largely in deepening about the wharves.

## HISTORY OF REMOVAL OF BULKHEAD ROCK.

An estimate for removing this so as to give a depth of 14 feet at mean low-water was made by Capt. A. H. Holgate, United States Engineers, in June, 1870, at a cost of \$2,500. Its least depth then was 8 feet at mean low-water. A depth about that sought was secured that year by large blasts of gun-powder placed upon the rock.

In the annual report for 1875, p. 291, an estimate was submitted to increase the depth to 18 feet at mean low-water, requiring an appropriation of \$5,000. This was renewed in the Annual Report for 1876, part I, pp. 207, 208; and again in the Annual Report for 1877, part I, p. 199.

On June 18, 1878, an appropriation of \$5,000 was made for removing this rock, but operations upon it were reserved, for the reason that the new plan requires greater depth. (Annual Report for 1878, part I, p. 232, par. 3.)

## HISTORY OF THE IMPROVEMENT FOR LARGE SEA-GOING VESSELS.

This is given in detail in the last Annual Report (part I, pp. 231-241) up to the beginning of the present fiscal year. In brief, this improvement was designed at first by the Board of Harbor Commissioners of Rhode Island, with a view to obtaining a free channel-way from Provi-

dence to the Ocean, having a depth of 23 feet at mean low-water and least width of 400 feet, besides an enlarged basin for anchorage of a somewhat less depth shoaling up to 10 feet at an extreme width of 800 feet. This was to cost, in round numbers, \$500,000. The plan was submitted to an advisory council, appointed by request, by the President of the United States, of which Rear-Admiral Daniel Ammen was chairman. This council changed the plan somewhat, so as to make the 23-foot mean low-water channel only 150 feet wide, gradually shoaling to 12 feet on an extreme width of 940 feet, and to 6 feet at an extreme width of 1,060 feet; the channel-way to be symmetrical in cross-section with the greatest depth in the middle. This was also estimated to cost about \$500,000. After being memorialized, Congress referred the matter to the War Department for a report, which was made by myself. I submitted an estimate for work during the next fiscal year (the one just closed) of \$100,000, to make a channel 23 feet deep at mean low-water 200 feet wide, to at once open the harbor to ocean steamers to the greatest depth proposed, leaving the widening to be a subsequent matter. Congress, however, appropriated only \$50,000 for this purpose. The interests of Providence, as represented by some of its most prominent public and business men, it was thought, in view of the amount appropriated, would be best served by commencing the center line of the new channel at a depth of 20 feet at mean low-water, and carrying it through between Fox Point and Field's Point to a width as great as the money would allow. This latter course was adopted by the Engineer Department.

WORK EXECUTED DURING THE FISCAL YEAR ENDING JUNE 30, 1879.

Avertisements for proposals for dredging were issued August 5, and the following proposals received:

Abstract of proposals received at the Engineer Office U. S. A., Newport, R. I., August 20, 1878, for excavation in Providence River, R. I.

Name and address of bidder.	Price per cubic yd.	Commence.		Complete.		\$45,000 will pay for—
		1878.	1879.	Yards.	Yards.	
E. R. Seward, Albany, N. Y.	\$0 11½	Sept. 10	June 30	391,304	327,272	
George C. Fobes & Co., Baltimore, Md.	13½	Sept. 2	June 30	324,324	310,344	
S. A. Hammond, Bridgeport, Conn.	14½	Oct. 1	July 1	310,344	310,344	
Atlantic Dredging Company, Brooklyn, N. Y.	14½	Oct. 1	June 30	310,344	281,250	
M. F. Brainard, Albany, N. Y.	16	Sept. 10	Aug. 1	281,250	250,000	
Morris & Cumings Dredging Company, New York.	18	Oct. 1	July 1	250,000	225,000	
John A. Bouker, New York	20	Oct. 1	June 30	225,000	180,000	
H. N. & A. J. Beardsley, Bridgeport, Conn.	25	Sept. 15	Jan. 1	180,000		
Jesse & Lyman Boynton, Boston, Mass., and Providence, R. I.						

Abstract of contract for excavation in Providence River, R. I.

Name and address of contractor.	Date of contract.	Commence.	Complete.
E. R. Seward, Albany, N. Y.	Aug. 22, 1878	Sept. 10, 1878	June 30, 1879

The contractor did not commence work until October 5, 1878. He had a large dredge of the clam-shell pattern, capable of dredging probably from 2,000 to 3,000 cubic yards per day, six scows of 200 yards' capacity each, and a steam-tug. The power of the tug and capa-

city of the scows, owing to the distance to the dumping ground, were insufficient to keep the dredge employed continuously. The work was prosecuted up to December 25, 1878. The weather then became too cold to successfully carry it on. The contractor sent his dredge to New York, ostensibly for the purpose of repairing, or completing the necessary repairs. Work was to have been renewed, weather permitting.

During the time the work of dredging was in progress there was removed from the channel 72,314 cubic yards of mud. This excavation made a cut 3,100 feet long, 70 feet wide, and 20 feet deep at mean low-water. The material was nearly all deposited in the deep water in Narragansett Bay, between Half-way Rock and Gould Island, and Conanicut Island and Rhode Island.

The amount of work accomplished was not satisfactory. The contractor was duly notified that his rate of progress was too slow. On his assurance of putting on additional machinery and prosecuting the work in the spring with vigor he was allowed to continue with what facilities he had. It was then too late in the fall to make arrangements to put other parties on the work that season, and it was not deemed advisable to make new arrangements for the spring work, as the contractor was confident of his ability to then make the desired rate of progress. The winter was unusually long and severe, and it was not until April that the weather was suitable for the resumption of work. The contractor was urged to begin as soon as possible. He promised to have two dredges on the work by April 1. Under date of March 19, 1878, he wrote that he was unable to procure suitable dump scows; after this no word was received from him, and communications sent to him were unnoticed, although I had evidence of their being received. He and his bondsmen were then notified that the terms of contract had not been complied with, and that other parties would be invited to bid for the completion of the work, and that the said bondsmen would be held responsible for any increased cost.

The following offers were received in answer to letters addressed, asking for prices for doing the whole or part of the work:

H. N. & A. J. Beardsley, Bridgeport, Conn.	19½ cents per yard.
Atlantic Dredging Company, Brooklyn, N. Y.	19½ cents per yard.
Morris & Cumings Dredging Company, New York City	20 cents per yard.
Geo. C. Fobes & Co., Baltimore, Md.	21½ cents per yard.

The lowest bid received was 19½ cents per cubic yard, which is 8 cents per yard in excess of the contract price. The prices given were considered excessive, and for this reason, and because the contractors' bonds were not large enough to cover the difference, the offers were rejected. Mr. Seward's contract called for the removal of about 391,000 cubic yards; deducting 72,314 cubic yards removed, leaves 318,686 cubic yards to be dredged to complete the contract; this latter number of yards, at 8 cents per cubic yard (the difference between the contract price, 11½ cents, and the lowest offer received, 19½ cents), amounts to \$25,494.88. The reserve held on work done (10 per cent.) is \$831.62. The amount of bond given for faithful performance of contract was \$5,000, which amount, if added to the reserve and subtracted from \$25,494.88 (the amount necessary to complete the contract at the increased price), would leave a deficit of \$19,663.26.

The dumping ground for this work is 19 miles from Providence and it is because of this great distance that all excavated material must be towed, that the prices asked were so high. The ground was selected as the nearest place known to me, where objections could not be raised to the dumping. In the work in Providence River under my direction in pre-

vious years, many complaints were made of dumping done to the injury of property on the adjoining shores. A law of the State of Rhode Island prohibits dumping on the east side of Providence River below Devil's Hand Rock. The State Board of Harbor Commissioners are unwilling to have any material dumped except at or in the vicinity of the dumping-ground selected or on the flats in Providence Harbor above Sassafras Point. The water at the latter place is too shoal to permit dumping except at high-water.

It is proposed to withhold the remainder of the appropriation of \$50,000 made by act approved June 18, 1878, until the appropriation of \$60,000 by act approved March 3, 1879, is made available, and then to invite proposals in the usual manner for the whole amount. It is thought that the interests of the government will be best served by so doing, as it will offer greater inducements to procure suitable means to perform the work.

This work has been under the superintendence of Mr. H. A. Bentley, assistant engineer.

#### BULKHEAD ROCK.

This rock, as before stated, was removed to about 14 feet depth, under an appropriation of \$2,500 made in 1870. The line of the east side of the proposed channel, by the new plan of improvement, extends east of the rock, and to make the required width and depth at this point requires a depth of 20 feet at mean low-water on Bulkhead Rock. Advertisements were issued for doing this under date of May 30, 1879, and the following bids were received:

*Abstract of proposals received at the Engineer Office, U. S. A., June 26, 1879, at 12 m., for the removal of Bulkhead Rock, Providence River, R. I., to a depth of 20 feet at mean low-water.*

Name and address of bidder.	Price.	Commence.	Complete.	Remarks.
David V. Howell, Savannah, Ga.....	\$3,922 00	Sept. 1, 1879	June 30, 1880	Bid informal.
Isaac A. Sylvester, Newton, Mass.....	7,169 00	.....	June 30, 1880	
Geo. W. Townsend, 214 Atlanticave., Boston, Mass.....	7,860 00	.....	June 30, 1880	

The contract will be awarded to the lowest bidder, Mr. D. V. Howell, on his furnishing evidence of his ability to perform the work, and satisfactory bonds.

#### THE PROBABLE OPERATIONS DURING NEXT FISCAL YEAR.

Will be the continuation of the dredging above Field's Point to make a depth of 20 feet at mean low-water and a channel of 23 feet depth and 200 feet width through Pawtuxet shoal and the removal of Bulkhead Rock to a depth of 20 feet at mean low-water.

The amount of money estimated necessary to complete this improvement is \$390,000, of which \$100,000 could be expended judiciously during the next fiscal year.

#### IMPORTANCE OF THE IMPROVEMENT.

Providence is a city of about 100,000 inhabitants and is the second city in size and importance in New England. It is a manufacturing city of importance. Large quantities of arms of war are made here. It is a very convenient distributing point, and its fine approaches from the

ocean will give it a large opportunity for foreign trade as soon as the contemplated deep channel is secured.

The total number of vessels that arrived at the port of Providence during the year 1878 was 5,580, of which 1,975 were steamers from Baltimore, Philadelphia, New York, Fall River, and Newport; 3,440 were barks, brigs, schooners, sloops and barges from various American ports and 112 foreign barks, brigs, and schooners. Providence is in the Providence collection district, and that place is a port of entry. The amount of revenue collected there during the fiscal year ending June 30, 1879, was \$145,187.79.

#### Money statement.

##### Improvement of Providence River and Narragansett Bay.

July 1, 1878, amount available.....	\$50,000 00	
Amount appropriated by act approved March 3, 1879.....	60,000 00	
		\$110,000 00
July 1, 1879, amount expended during fiscal year.....	10,532 69	
July 1, 1879, outstanding liabilities.....	831 62	
		11,364 31
July 1, 1879, amount available.....		98,635 69
Amount (estimated) required for completion of existing project.....		390,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1881.		100,000 00

##### Improvement of Providence River—Removal of Bulkhead Rock.

July 1, 1878, amount available.....	\$5,000 00
July 1, 1879, amount expended during fiscal year.....	5 20
July 1, 1879, amount available.....	4,994 80

#### B 8.

#### IMPROVEMENT OF BLOCK ISLAND HARBOR, RHODE ISLAND.

##### ITS LOCATION AND SIZE.

It is placed on the east side of the island toward its south end. It consists of an inner harbor of about 1½ acres having a mean low-water depth of 7 feet. This little harbor is composed of stone up to the level of low-water and then of a timber crib filled with stone, the inner side being lined with piling to protect the vessels. It is entered by an opening 60 feet wide. Outside of this is a larger sheltered place secured from gales except in the northeast quarter (which are not serious) and from which a partial shelter suffices. This outer harbor is formed by a breakwater of riprap granite, extending out about 1,100 feet beyond the inner harbor; then there is an opening of 200 feet with a depth of 18 feet at mean low-water; then a detached piece curving to the westward which is 300 feet long, terminating in about 24 feet depth at mean low-water. Another piece detached again can at some future time be added extending toward the shore so as to greatly increase the completely sheltered area, and by dredging the depth can be made 24 feet at mean low-water. The mean rise of the tide is about 3 feet. A steamboat wharf has been built just outside the inner harbor, and all the facilities necessary to the local wants of the island, and its use as a summer resort, are provided. The lighting of its approaches is now in charge of the Light-House Department.

This harbor is an enlarged modification of the original design of a harbor for local purposes. The first plan was to build it of riprap up to low-water and surmount this with a cut-stone parapet. The change permitted the enlargement of the area and a reduction of the cost.

#### IMPORTANCE OF THE WORK.

Block Island is about 9 miles long and 4 miles broad, with a permanent population of about 1,400 souls. Heretofore their means of living was by fishing and farming, and their want of harbors made them very isolated. There are no rocks *in situ* to form long projecting headlands and sheltered areas, the formation being of sand, clay, gravel, and ancient glacial deposits, gradually undermined by the waves and leaving a dangerous surf-beaten shore. The island is about 10 miles from the main land at Point Judith, about 13 miles from Montauk Point on the west, and about 39 miles from No Man's Land and Martha's Vineyard on the east. A depth of water for the largest ships exists all around it. Since the harbor was begun a first-class light-house and fog-signaling apparatus has been erected on the southeast part of the island, making it a most desirable point to correct the ship's reckoning on approaching the shore, since a safe lee can be made on one side or the other of the island, and pilots found ready to conduct them to port. Here the government has also provided a life-saving station in the shelter of the breakwater. A light-house has for a long time existed on the north end of the island, and there only appears to be wanting now a good fog-signal on the southwest end of the island, to guide vessels coming out of the Long Island Sound and going to sea between the island and Montauk light, and also the coasters going eastward outside of Long Island, on their way to Vineyard Sound and Buzzard's Bay. More wrecks are made on this southwest shore than on any other part of the island.

The completion of the inner harbor led to the acquirement by the islanders of several decked schooners, which they could not have before, no craft being admissible that could not be hauled on the shore in storms beyond the reach of the waves. Fishing-smacks from great distances also seek shelter here, and thus the capacity of the harbor is fully tried at times. Were a larger harbor constructed it would often be filled with coasters, to which it would furnish a much-needed shelter between Long Island and Vineyard Sounds.

The deep water all around the island always makes it possible for vessels to find shelter behind it from any winds; but the sudden changes which generally occur from heavy southeast gales to equally strong ones from the northwest, prevent any ordinary coasting-vessels seeking the northwest side to escape the southeasters (which are the most destructive on account of high tides and waves), for unless manned by large crews, as the mackerel-men only are, the sudden changes would catch them before they could escape from the lee shore.

The island, however, would readily furnish this shelter to a fleet of war steamers ready to move with the change of the wind, so that the objection sometimes made to constructing a large harbor here because it might be of advantage to an enemy in war has but little weight. The immediate effect of the new harbor has been to much increase the fishing facilities and wealth of the island, and to furnish a means of convenient landing for an ocean summer resort that is increasing in importance at a very rapid rate. It has led to increased facilities for ocean navigation, and when connected with the main land by telegraph, as it probably soon will, will be the advanced post to signal the approach of

European vessels to our shores. It is probably but the beginning of a greater harbor of more general value to the coasting navigation.

#### WORK DURING THE PAST FISCAL YEAR.

Under a contract before made, some riprap stone was being deposited to fill up places that had settled during the storms of the previous winter. This was completed during the last season, 2,927 tons having been deposited. This completed the harbor as constructed for local purposes. In the beginning of 1879 the Light-House Department assumed charge of lighting the entrance; our superintendence over the structure ceased, and the public property employed on the work was transferred elsewhere or disposed of by public sale. A small remainder of the appropriation will be used in preparing a detailed account and drawings illustrative of the work when the present season's work elsewhere closes. No other work is now anticipated, and no further appropriation is recommended.

#### BRIEF HISTORY OF THE IMPROVEMENT.

The breakwater was commenced in October, 1870, and completed in November, 1878. The amount of stone used in its construction was about 95,000 tons. The inner harbor was built in 1871 and 1872. The crib-work contains about 320,000 feet (board measure) of timber and 6,000 tons of stone. This inner harbor was dredged to 7 feet depth at mean low-water in 1872 and 1873. The depth before dredging was from 0 to 4½ feet. There has been removed from the sheltered anchorage about 3,000 tons of bowlders.

Block Island is in the Newport collection-district, and Newport is the nearest port of entry. The amount of revenue collected there during the fiscal year ending June 30, 1879, was \$1,811.01.

#### Money statement.

July 1, 1878, amount available.....	\$5,554 72
July 1, 1879, amount expended during fiscal year .....	5,209 19
July 1, 1879, amount available.....	345 53

#### B 9.

#### IMPROVEMENT OF LITTLE NARRAGANSETT BAY, RHODE ISLAND AND CONNECTICUT.

#### LOCALITY OF IMPROVEMENT.

Little Narragansett Bay is at the mouth of Pawcatuck River and is between Stonington and Watch Hill. It is separated from the ocean by a narrow sand beach extending from Watch Hill toward Stonington, a distance of about 3 miles, leaving an opening between its end and Stonington of about 1 mile. The water in this bay is shoal; 4½ feet at mean low-water is the greatest depth that can be carried across it. The Pawcatuck River, navigable to Westerly, a distance about 5 miles from its mouth, can only be approached through this bay; this river has been improved by the general government under my direction so that there is now a channel 75 feet wide and 5½ feet deep at mean low-water up to Westerly. The mean rise of the tide is about 2<sup>5</sup>/<sub>10</sub> feet.